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SECTION 00900

ATTACHMENTS

Attachment 1

Department of Army Facilities Standardization Program

1. The DA Facilities Standardization Program. The point of contact is Jeffery T. Hooghouse, AIA; CEMP-ET.
Voice: (703) 428-7246
E-mail: Jeffery.T.Hooghouse@HQ02.USACE.army.mil

2. Library of Standard Design Website: http://cadlib.wes.army.mil/html/cos/cfusion/MainPage.htm.

3. Standard Design Packages.

3.1. Unaccompanied Enlisted Personnel Housing (includes the Soldier Community Building).

3.2. Brigade and Battalion Headquarters.

3.3. Company Operations Facilities.

3.4. Enlisted Personnel Dining Facilities.

ATTACHMENT 2

Comprehensive Interior Design Requirements

1. The Comprehensive Interior Design (CID) Package. This proposal requires the completion of a CID Package. The CID package is the design of the total interior environment. It requires a Building Interior Design (BID) and Furnishings Interior Design (FID). The two categories of interior design cover different aspects of the interior environment and are funded through different sources.

1.1. Building Interior Design. BID is the design of related interior finishes such as walls, ceilings, floor coverings, and built-in casework. It involves the selection and sampling of all applied finishes for the building's interior features. With the exception of furniture systems, which are funded with operations and maintenance (O&M) or non-appropriated funding (NAF), Building Interior Design is funded with military construction funds (MILCON) appropriated by Congress. This proposal is funded by MILCON appropriations.

1.1.1. Building Interior Design will include interior floor plans, finish schedules, and interior color samples. If necessary, it should include interior elevations showing finish placement. The products and materials specified are procured and installed by the contractor.

1.2. Furnishings Interior Design (FID). FID is the design of interior furnishings and the finishes related to them. FID designs are typically funded by the installation with operations and maintenance (O&M) funds.

1.2.1 Furnishings Interior Design (FID) involves the selection and sampling of the furnishings components of the interior environment. This may include furniture systems, freestanding furniture, artwork, beds, desks, chairs, dining tables, and accessories including artwork. The FID will include furniture placement plans, information on all freestanding furnishings and accessories, furniture cost estimates, and order data sheets. These products and materials coordination with the Government to procure these items in order for them to be in place before the building is occupied. The products and materials specified are procured by the Government and installed by the contractor.

2. Presentation Formats.

2.1. Binders. Building Interior Design and Furnishings Interior Design information and samples are to be submitted in 8-1/2" x 11" format in three-inch or four-inch D-ring binders. Fold out items should have a maximum spread of 25-12 inches. Each binder should be labeled on the outside spine and front cover with the following information:

- Building Interior Design or Furnishings Interior Design.
- Project Title and Number.
- Location.
- Date.
- Volume Number (example: Volume 1 of 3).

2.2. Color Boards. Color boards should be sturdy enough to support all samples. Large samples, such as ceiling tiles or carpet samples can be provided separately from the color board in a loose sleeve that can be moved from one scheme to another. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, velcro, or double-faced foam tape. Do no use rubber cement or glue. Samples which can not be adequately fastened should be labeled so they can be identified independently.

2.2.3. Material and finish samples should indicate true pattern, color and texture. Label all finish samples with material codes used in the project submittal. Photographs or colored photocopies of materials or fabrics are not preferred. Carpet samples should be large enough to show a complete pattern or design. If the specified carpet has a large pattern, provide a color photograph showing the overall pattern in addition to the carpet sample. Color photocopies of artwork and plants are acceptable.

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3. Drawing Information Requirements

3.1. Composite Floor Plan. The floor plan should show all panels, components and free-standing furniture in relationship to the building and the building systems. This includes information on locations of light switches, fire pull boxes, mechanical devices, and other wall mounted items. The composite floor plan should be a full size contract drawing showing furnishing item numbers (where applicable), and gross and net areas of each floor.

3.2. Workstation Panel Plan. The panel plan should include a panel symbol legend, panel placements, critical dimensions, of aisles widths, and critical dimensions tying the panels to the building's structural, electrical and mechanical systems. Panels must not block access to mechanical, electrical or fire controls. Each panel should be coded with the following system:

PANEL	WIDTH	HEIGHT
N (non-powered) or P (powered)	centimeters	centimeters

For example, a non-powered panel 610 mm (2 feet wide) and 1727 mm (five feet eight inches high) would be noted on the plan as "**N 61 172.7**".

3.3. Workstation Electrical, Voice, & Data Plans. The electrical, voice and data plans should show any panel placements, all receptacles used in each workstation, height and location of all light switches and mechanical control devices, and a symbol legend. The workstation design must be coordinated with the building's communication and mechanical engineering drawings.

3.4. Furniture Systems. In the color guide specifications on furniture systems, indicate the fabric width, fiber content, and construction method for the workstations. The vendor should be indicated on the drawings and in the color guide specifications.

3.5. Workstation Types and Number Codes. The workstations should be classified into groups of like configuration and features. Each group or type should be given a single letter code (A, B, etc.). For example, all similar reception stations might be type A and all similar offices might be type B. Each workstation should also be given a unique number code similar to a room number but separate from the building room numbering system. Every workstation should be identified on every plan with the composite code composed of the letter identifying the type and the workstation number code. For example, "A110" would indicate that workstation number 110 is a type A station.

3.6. Workstation Isometric/Elevation and Inventory Drawings. These drawings should show an elevation or isomeric of each type of workstation with a related inventory list of all the panels and components used, and the method of attachment. The inventory list should describe components generically rather than using specific part numbers.

3.7. Workstation Finishes. It is suggested that three fabric finishes be used for furniture systems: one color for panels and one for tackboards and flipper doors. A third color will be used to unify workstations used by the same organizational group.

3.8. Workstation Components. An ergonomically designed chair should be included in the workstation. The following items are some of the typical workstation components and options that must be selected and specified.

3.8.1. Panels.

Acoustical/non-acounstical	Powered/non-powered

3.8.2. Components.

Work Surfaces	Drawers
Shelves (with/without doors)	Files (lateral, panel hung/bins)

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Task Lights/Special purpose
Drafting surface
Counter tops
Freestanding Components

3.8.3. Accessories.

Tackboards
Shelf dividers
Paper flow devices
Computer turntable
Coat rack
Keyboard trays
Wrist rest/Foot rest
Locks
Reader stands
Market/chalk boards
Printer stand
Wire guides
Mouse pads
Disc storage

3.8.4. Signs.

Organizational signs
Workstation name signs

3.9. Health, Safety, Accessibility, and Environmental Quality. Designers must consider safety, health, disabled access, and environmental standards. Many of these concerns are regulated by code authorities and quantified by standardized testing. Designers should be aware of pertinent regulations and should cite them in the submittals.

3.9.1. Health and Safety Criteria. Fire safety is one of the most important aspects in any design. Designers must comply with all appropriate fire safety codes and provide for safe egress in the event of fire. Code requirements on this issue are stringent, and there are several regulations relating to flammability of interior materials and furnishings. See Section 2, Criteria References.

Designers should provide protection against injury and death from falls, chemical emissions, electronic emissions, and microbial conditions. Indoor air quality should not be compromised.

3.9.2. Accessibility. All designs, including signage, must comply with the American Disabilities Act (ADA) or the Uniform Federal Accessibility Standards, whichever is the most stringent. The only exceptions to this requirement are facilities which limit their access to able bodied military personnel. These facilities are described in Sections 13 through 19.

3.9.3. Environmental Quality. Designers must provide an environment that is comfortable, welcoming, and conducive to work. Contributing factors include ergonomically correct furniture, appropriate efficient lighting, and good acoustical control.

3.9.3.1. Furnishings and equipment should be comfortable, sturdy, and designed for anthropomorphic fit and stability.

3.9.3.2. Lighting is an important tool in shaping the ambiance of the environment. Careful consideration should be given to lighting in order to produce a comfortable environment that is easy to live and work in. Reflectance should be minimized and task lighting should provide glare-free illumination of work surfaces.

3.9.3.3. Provide adequate acoustical control to ensure a good working environment.

4. Building Interior Design Submittal Items. Some items that are usually included in the Building Interior Design are listed below.

Carpet
Ceramic Tiles and Stones
Paint
Wood Stains
Ceiling Tiles and Grid
Solid Surfacing Materials
Resilient Floor Coverings
Terrazzo
Wallcoverings
Wall Base
Plastic Laminates
Built-in Casework

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Blinds and other Window Coverings
Toilet Partitions
Cubicle Curtains
Trim and Hardware Finishes
Marker Boards and Bulletin Boards
Moveable Room Dividers
Signage
Decorative Light Fixtures

5. Furnishings Interior Design Submittal Items. Some items that are usually included in the comprehensive interior design are listed below.

ADP Tables/Printer Stands/Support Furnishings.
UEPH Bedroom Furniture
DFAC Dining Tables & Chairs
SCB Lounge Furniture
Artwork.
UEPH Desks, Chairs, Lamps, & Accessories.
DFAC Framed Pictures & Photographs
SCB Recreation Furniture

5.1. Manufacturer's Summary List. The Manufacturer's Summary List is a list of all the manufacturers whose products are used in the FID package. For each manufacturer, provide name, address, phone number, fax number, and a point of contact.

5.2. Furniture Placement Plans. This is a plan of one room showing each furniture component in the room. There will be one Furniture Placement Plan for each room in the Composite Floor Plan that contains furniture. Furniture Placement Plans are drawn at 1:50 (1/4" = 1'-0") if possible, or at 1:100 (1/8" = 1'-0") if the room or area is very large. Each Furniture Placement Plan should include the following information:

- The job name, location and date.
- The footprint of the room.
- The furnishings.
- The room name and number.
- A Furnishing Item Number for each furnishing item.
- Quantity of each product specified for the FID.

5.3. Furniture Illustration Sheets. Provide one Furniture Illustration Sheet for each item of furniture in the FID. The Furniture Illustration Sheet should include the following information:

- The job name, location and date.
- A picture or line drawing of the product specified.
- The Furnishing Item Number which keys the product to the Composite Floor Plan and Furniture Placement Plan.
- The options specified, if any.
- Specification data on the finishes and fabric.
- Samples of the finishes and fabric.
- A comprehensive list giving all occurrences of the item, sorted by room. For instance:
  4 each Room 103 Commander
  2 each Room 104 Receptionist

Furniture Illustration Sheets should be arranged in numerical order by furnishing item number. The furnishing item numbers should begin with 001.

5.4. Artwork Placement Plans. Artwork Placement Plan shows the spatial relationship between the furniture and the artwork in a room. There will be one Artwork Placement Plan for each room in the Composite Floor Plan that contains artwork. Assign a furnishing item number to each piece of artwork. The Artwork Placement Plan will show the artwork but it will not show the furniture item number for clarity. Artwork Placement Plans are drawn at 1:50 (1/4" = 1'-0") if possible, or at 1:100 (1/8" = 1'-0") if the room or area is very large. Each Artwork Placement Plan should include the following information:

- The job name, location and date.

- The room name and number.
- A plan of the room locating the artwork.
- An elevation of each wall containing artwork showing mounting height.
- A Furnishing Item Number for each artwork item.
- Quantity of each product specified for the FID.

5.4.1. The following functional areas do not require artwork: Unaccompanied Enlisted Personnel Housing room modules,

5.5. Artwork Illustration Sheets. Provide one Artwork Illustration Sheet for each piece of art in the FID. The Artwork Illustration Sheet should include the following information:

- The job name, number, location and date.
- The title of the artwork and the artist's name.
- A picture of the proposed artwork. Color photos are acceptable.
- The furnishing item number, which keys the product to the Composite Floor Plan and the Artwork Placement Plan.
- Name and number of the room where artwork will be displayed.
- Quantity of each product specified for the FID.
- Name and number of the room where artwork will be displayed.
- Frame description and sample of mat colors.
- Mounting height and installation instructions.
- Specify security mounting if required.

5.6. Itemized Furniture Cost Estimate. The itemized cost estimate lists all furnishings and indicates quantities, unit costs and totals. It is organized according to UNICOR and GSA/FSC Group, Part, and Section of the FSC Schedules. The cost estimate should also include a 10% general contingency and 7% installation listed as separate line items. Estimated freight charges that are not included in the furniture cost should be listed as a separate line item.

5.7. Order Data Sheets. The Order Data Sheets provide all information necessary to order the furnishings specified in the FID. Only one item should be listed per data sheet. The sheets should be in numerical order. The Order Data Sheet should include the following information:

- A Furnishing Item.
- The job name, location and date.
- FSC Group, Part, and Section.
- GSA contract No., Special Item No. (SIN), and contract expiration date.
- Maximum Order Limitation.
- Source and manufacturer's name, ordering address, telephone number and FAX number.
- Product name.
- Product model number or National Stock Number (NSN).
- Finish name and number.
- Fabric name and number.
- Dimensions.
- Weight.
- Description (construction information, fabric content, finish application, etc.).
- Justification. (Example: These guest chairs are coordinated to match the task seating at each workstation. The size of the guest chairs is critical because of the limited space where they are to be placed. If this company is not selected, coordinate the newly proposed finishes with furniture item numbers 001, 002, and 003.)
- Item location by room number.
- Quantity per room.
- Total quantity.

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- Unit Price.
- Total Price.
- Estimated freight charges, 7% of item cost. (note whether or not freight charges are included in the price of the FID item.)
- Special instructions (if any).

5.8. FID Cost General Information.

5.8.1. Furnishing Sources. Furniture may be obtained from three source categories: UNICOR, GSA FSC/FSG, and open market. UNICOR is the trade name for the Federal Prisons Industries Inc. (FPI), a wholly owned government corporation established in 1934. General Services Administration Federal Supply Class/Federal Supply Groups list products on GSA contract. Government contracts with private manufacturers that have a fixed price, a maximum order limitation, and fixed expiration date. Every effort should be made to use UNICOR or GSA. There may be on occasions when there is no current FSS/GSA or UNICOR resource for a furnishing requirement, or when items available on FSS/GSA contract or from UNICOR do not meet the functional requirements of the project. If the latter occurs, the Contracting Officer must submit a Request of Waiver to UNICOR. The FID designer shall assist in the waiver process by providing the information within the brackets of the sample letter below. GSA sources are not mandatory for DoD projects, but all procurement procedures must be followed as stated in the FAR, Federal Acquisition Regulations. Open market line items over $2,500 will require a justification letter. Open market line items over $25,000 will have to be solicited by bid, and solicitation documents including detailed specifications will be required. Line items under a General Service Administration (GSA) contract that exceed the maximum order limitation will also require a formal solicitation for bid.

ATTACHMENT 3

Sustainable Design Facility Rating Worksheet

1. This sustainable facility rating worksheet is derived from The U. S. Green Building Council LEED 2.0 (Leadership in Energy and Environmental Design) Green Building Rating System ™.

2. The worksheet criteria numbering scheme parallels, but does not match LEED 2.0. LEED does not number major sections, e.g. 'Sustainable sites, rather it numbers criteria within each major section. Where additional criteria have been added they fall at the end of major sections.

3. The worksheet criteria all follow the format: Intent, Requirement and Technologies/Strategies.
Intent: A statement of the primary goal for the criterion;
Requirement: Quantifiable conditions necessary to achieve stated intent;
Technologies/Strategies: Suggested technologies, strategies and referenced guidance on the means to achieve identified requirements.

4. Projects are evaluated for each facility criterion which are either 'Prerequisites' or result in a point score.

Prerequisites: These criterion are a statement of minimum requirements and must be met. No further points will be awarded unless the minimum is achieved. These criterion are recognizable by an 'R' in the number scheme, ex. 1.R1, and a 'Reqd.' in the score column.

Point Score: These criterion are evaluated and result in a point score. Where the potential score is greater than 1, no partial points are granted.

5. Facility Sustainable Project Certification Levels:

Facility Bronze	25 to 34 Points
Facility Silver	35 to 49 Points
Facility Gold	50 to 74 Points
Facility Platinum	75 to 100 Points

6. The sustainable design criteria have been developed to address facility life cycle phases including programming, design, construction and commissioning.

7. Sustainable Worksheet criteria developed by:
Stephen N. Flanders (Lead), U. S. Army Engineering Research & Development Center (ERDC-CRREL)
Richard L. Schneider, U. S. Army Engineering Research & Development Center (ERDC-CERL)
Donald Fournier, U. S. Army Engineering Research & Development Center (ERDC-CERL)
Annette Stumpf, U. S. Army Engineering Research & Development Center (ERDC-CERL)

8. A Excel spread sheet of the rating worksheet is available for your use. The spread sheet is required at the 50% submittal after award. The rating tool is called SPIRIT.

ATTACHMENT 3

Facility Summary Sheet

1.0	**Sustainable Sites (S)**	
1.R1	Erosion, Sedimentation and Water Quality Control	[Required]
1.C1	Site Selection	[2 Points Maximum]
1.C2	Installation Redevelopment	[2 Points Maximum]
1.C3	Brownfield Redevelopment	[1 Point Maximum]
1.C4	Alternative Transportation	[4 Points Maximum]
1.C5	Reduced Site Disturbance	[2 Points Maximum]
1.C6	Storm water Management	[2 Points Maximum]
1.C7	Landscape and Exterior Design to Reduce Heat Islands	[2 Points Maximum]
1.C8	Light Pollution Reduction	[1 Point Maximum]
1.C9	Optimize Site Features	[1 Point Maximum]
1.C10	Facility Impact	[2 Points Maximum]
1.C11	Site Ecology	[1 Point Maximum]

2.0	**Water Efficiency (W)**	
2.C1	Water Efficient Landscaping	[2 Points Maximum]
2.C2	Innovative Wastewater Technologies	[1 Point Maximum]
2.C3	Water Use Reduction	[2 Points Maximum]

3.0	**Energy and Atmosphere (E)**	
3.R1	Fundamental Building Systems Commissioning	[Required]
3.R2	Minimum Energy Performance	[Required]
3.R3	CFC Reduction in HVAC&R Equipment	[Required]
3.C1	Optimize Energy Performance	[3 Points Maximum]
3.C2	Renewable Energy	[3 Points Maximum]
3.C3	Additional Commissioning	[1 Point Maximum]
3.C4	Elimination of HCFC s and Halons	[1 Point Maximum]
3.C5	Measurement and Verification	[1 Point Maximum]
3.C6	Green Power	[1 Point Maximum]
3.C7	Distributed Generation	[1 Point Maximum]

4.0	**Materials and Resources (M)**	
4.R1	Storage & Collection of Recyclables	[Required]
4.C1	Building Reuse	[3 Points Maximum]
4.C2	Construction Waste Management	[2 Points Maximum]
4.C3	Resource Reuse	[2 Points Maximum]
4.C4	Recycled Content	[2 Points Maximum]
4.C5	Local/Regional Materials	[2 Points Maximum]
4.C6	Rapidly Renewable Materials	[1 Point Maximum]
4.C7	Certified Wood	[1 Point Maximum]

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5.0	**Indoor Environmental Quality (IEQ) [Q]**	
5.R1	Minimum IAQ Performance	[Required]
5.R2	Environmental Tobacco Smoke (ETS) Control	[Required]
5.C1	IAQ Monitoring	[1 Point Maximum]
5.C2	Increase Ventilation Effectiveness	[1 Point Maximum]
5.C3	Construction IAQ Management Plan	[2 Points Maximum]
5.C4	Low-Emitting Materials	[4 Points Maximum]
5.C5	Indoor Chemical and Pollutant Source Control	[1 Point Maximum]
5.C6	Controllability of Systems	[2 Points Maximum]
5.C7	Thermal Comfort	[2 Points Maximum]
5.C8	Daylight and Views	[2 Points Maximum]
5.C9	Acoustic Environment /Noise Control	[1 Point Maximum]
5.C10	Facility In-Use IAQ Management Plan	[1 Point Maximum]
6.0	**Facility Delivery Process (P)**	
6.C1	Holistic Delivery of Facility	[7 Points Maximum]
7.0	**Current Mission**	
7.C1	Operation and Maintenance	[3 Points Maximum]
7.C2	Design for Soldier and Workforce Productivity and Retention	[3 Points Maximum]
8.0	**Future Missions**	
8.C1	Assess the Lifespans of the Designed Use & Supporting Systems	[2 Points Maximum]
8.C2	Design for Adaptation, Renewal and Future Uses	[2 Points Maximum]

Total Score	
25 to 34 Points - SPRT Bronze	
35 to 49 Points - SPRT Silver	
50 to 74 Points - SPRT Gold	
75 to 100 Points - SPRT Platinum	

ATTACHMENT 3

1.0 Sustainable Sites 20

1.R1 Erosion, Sedimentation and Water Quality Control

Reqd.

Intent: Control erosion and pollutants to reduce negative impacts on water and air quality.

Requirement: Design a site sediment and erosion control plan and a pollution prevention plan that conforms to best management practices in the EPA's Storm Water Management for Construction Activities, EPA Document No. EPA-833-R-92-001, Chapter 3, OR local Erosion and Sedimentation Control standards and codes, whichever is more stringent. The plan shall meet the following objectives:

- Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
- Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter.
- Prevent hazardous material discharge into storm water systems.
- Prevent petroleum oils and lubricants (POL) discharge into storm water systems.

Technologies /Strategies: The EPA standard lists numerous measures such as silt fencing, sediment traps, oil grit separators, construction phasing, stabilization of steep slopes, maintaining vegetated ground cover and providing ground cover that will meet this prerequisite.

1.C1 Site Selection

Intent: Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site. Select site based on functional adjacencies/relationships and land use compatibility.

Requirement: Do not develop buildings on portions of sites that meet any one of the following criteria: **1**

- Prime training or maneuver land.
- Land whose elevation is lower than 5 ft. above the 100-year flood elevation as defined by FEMA.
- Land that provides habitat for any species on the Federal or State threatened or endangered list.
- Within 100 feet of any wetland as defined by 40 CFR, Parts 230-233 and Part 22, OR as defined by local or state rule or law, whichever is more stringent.

Select site based on functional adjacencies/relationships and land use compatibility. **1**

- Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure.
- Select site in area of high density.
- Site facilities based on the strength of their relationships to other facilities/land-uses to limit travel distances. The stronger the relationship/functional interaction, the closer the distance between two facilities.
- Select for distance to installation transit systems and access to pedestrian ways and bike paths.
- Select for development previously used or developed suitable and available sites.

Technologies /Strategies: Screen potential building sites for these criteria and/or ensure that these criteria are addressed by the designer during the conceptual design phase. Utilize landscape architects, ecologists, environmental engineers, civil engineers, and similar professionals for the screening process. New wetlands constructed as part of stormwater mitigation or other site restoration efforts are not affected by the restrictions of this prerequisite.

ATTACHMENT 3

Sustainable Sites (Continued)

1.C2 Installation Redevelopment

Intent: Channel development to installation cantonment areas with existing infrastructure, protecting greenfields and preserving habitat and natural resources.

Requirement:	Increase localized density to conform to existing or desired density goals by utilizing sites that are located within an existing minimum development density of 60,000 square feet per acre (2 story downtown development).	1
	Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure.	1

Technologies /Strategies: During the site selection process give preference to previously developed sites with installation cantonment redevelopment potential such as facility reduction program cleared sites.

1.C3 Brownfield Redevelopment

Intent: Rehabilitate damaged sites where development is complicated by real or perceived environmental contamination, reducing pressure on undeveloped land.

Requirement:	Develop on a site classified as a brownfield and provide remediation as required by EPA's Brownfield. Redevelopment program requirements OR Develop a brownfield site (a site that has been contaminated by previous uses).	1

Technologies /Strategies: Screen potential damaged sites for these criteria prior to selection for rehabilitation.

1.C4 Alternative Transportation

Intent: Reduce pollution and land development impacts from automobile use.

Requirement:	Locate building within ½ mile of installation transit systems.	1
	Provide suitable means for securing bicycles, with convenient changing/shower facilities for use by cyclists, for 5% or more of building occupants.	1
	Locate building within 2 miles of alternative-fuel refueling station(s).	1
	Size parking capacity not to exceed minimum installation cantonment requirements AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR, add no new parking for rehabilitation projects AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants.	1

Technologies /Strategies: Select sites near installation transit served by safe, convenient pedestrian pathways.

1.C5 Reduced Site Disturbance

Intent: Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirement:	On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways, and main utility branch trenches, and 25 feet beyond pervious paving areas that require additional staging areas in order to limit compaction in the paved area; OR, on previously developed sites, restore a minimum of 50% of the remaining open area by planting native or adapted vegetation.	1
	Reduce the development footprint (including building, access roads and parking) to exceed the local zoning's open space requirement for the site by 25% or in accordance with installation policy on open space set asides, whichever is greater.	1

Technologies /Strategies: Note requirements on plans and in specifications. Establish contractual penalties for destruction of trees and site areas noted for protection. Reduce footprints by tightening program needs and stacking floor plans. Establish clearly marked construction and disturbance boundaries. Delineate laydown, recycling, and disposal areas. Use areas to be paved as staging areas. Work with local horticultural extension services or native plant societies to select indigenous plant species for site restoration and landscaping.

ATTACHMENT 3

Sustainable Sites (Continued)

1.C6 Stormwater Management

Intent: Limit disruption of natural water flows by minimizing storm water runoff, increasing on-site infiltration and reducing contaminants.

Requirement: Implement a stormwater management plan that results in:

No net increase in the rate or quantity of stormwater runoff from existing to developed conditions; OR, if existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff.	1
Treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS), and 40% of the average annual post development total phosphorous (TP), by implementing Best Management Practices (BMPs) outlined in EPA's Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA 840-B-92-002 1/93).	1

Technologies /Strategies: Significantly reduce impervious surfaces, maximize on-site stormwater infiltration, and retain pervious and vegetated areas. Capture rainwater from impervious areas of the building for groundwater recharge or reuse within building. Use green/vegetated roofs. Utilize biologically-based and innovative stormwater management features for pollutant load reduction such as constructed wetlands, stormwater filtering systems, bioswales, bio-retention basins, and vegetated filter strips. Use open vegetated swales to reduce drainage velocity and erosion, reduce system maintenance, increase vegetative variety and support wildlife habitat where space permits.

1.C7 Landscape and Exterior Design to Reduce Heat Islands

Intent: Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirement:

Provide shade (within 5 years) on at least 30% of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc., OR, use light-colored/ high-albedo materials (reflectance of at least 0.3) for 30% of the site's non-roof impervious surfaces, OR place a minimum of 50% of parking space under-ground OR use open-grid pavement system (net impervious area of LESS than 50%) for a minimum of 50% of the parking lot area.	1
Use ENERGY STAR Roof compliant, high-reflectance AND low emissivity roofing (initial reflectance of at least .65 and three-year-aged reflectance of at least .5 when tested in accordance with ASTM E408) for a minimum of 75% of the roof surface; OR, install a "green" (vegetated) roof for at least 50% of the roof area.	1

Technologies /Strategies: Employ design strategies, materials, and landscaping designs that reduce heat absorption of exterior materials. Note albedo/reflectance requirements in the drawings and specifications. Provide shade (calculated on June 21, noon solar time) using native or climate tolerant trees and large shrubs, vegetated trellises, or other exterior structures supporting vegetation. Substitute vegetated surfaces for hard surfaces. Explore elimination of blacktop and the use of new coatings and integral colorants for asphalt to achieve light colored surfaces.

1.C8 Light Pollution Reduction

Intent: Eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environments.

Requirement: Do not exceed Illuminating Engineering Society of North America (IESNA) footcandle level requirements as stated in the Recommended Practice Manual: Lighting for Exterior Environments, AND design interior and exterior lighting such that zero direct-beam illumination leaves the building site.	1

Technologies /Strategies: Consult IESNA Recommended Practice Manual: Lighting for Exterior Environments for Commission Internationle de I'Eclairage (CIE) zone and pre and post curfew hour descriptions and associated ambient lighting level requirements. Ambient lighting for pre-curfew hours for CIE zones range between .01 footcandles for areas with dark landscapes such as parks, rural, and residential areas, and 1.5 footcandles for areas with high ambient brightness such as installation urban areas with high levels of nighttime activity. Design site lighting and select lighting styles and technologies to have a minimal impact off-site and minimal contribution to sky glow. Minimize lighting of architectural and landscape features. Exterior lighting should be consistent with security lighting requirements.

ATTACHMENT 3

Sustainable Sites (Continued)

1.C9 Optimize Site Features

Intent: Optimize utilization of the site's existing natural features and placement of man-made features on the site.

Requirement: Perform both of the following: **1**

- Maximize the use of free site energy.
- Plan facility, parking and road-ways to "fit" existing site contours and limit cut and fill.

Technologies /Strategies: Evaluate site resources to ascertain how each can enhance the proposed project and visa versa. Work to maximum advantage of the site's solar and wind attributes. Use landscaping to optimize solar and wind conditions and to contribute to energy efficiency; Locate and orient the facility on the site to optimize solar and wind conditions.

1.C10 Facility Impact

Intent: Minimize negative impacts on the site and on neighboring properties and structures; avoid or mitigate excessive noise, shading on green spaces, additional traffic, obscuring significant views, etc.

Requirement: Cluster facilities to reduce impact, access distance to utilities and sufficient occupant density to support mass transit. **1**

Collaborate with installation and community planners to identify and mitigate potential impacts of the project beyond site boundaries, and transportation planners to insure efficient public transport. **1**

Technologies /Strategies: Involve local/regional planners and community members in installation master planning processes. Recognize the context and the impact of a project beyond site boundaries, and integrate it with the larger installation/community context/land use.

1.C11 Site Ecology

Intent: Identify and mitigate all existing site problems including contamination of soil, water, and air, as well as any negative impacts caused by noise, eyesores, or lack of vegetation.

Requirement: Develop site environmental management and mitigation plan. **1**

Technologies /Strategies: Understand site and surrounding ecosystem interdependence and interconnectivity. Plan landscaping scheme to incorporate biodiversity. Preserve/enhance existing trees, hydrological features, ecosystems, habitats, and cultural resources. Increase the existence of healthy habitat for native species. Reintroduce native plants and trees where they have been destroyed by previous development.

ATTACHMENT 3

2.0 Water Efficiency 5

2.C1 Water Efficient Landscaping

Intent: Limit or eliminate the use of potable water for landscape irrigation.

Requirement: Use high efficiency irrigation technology, OR, use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means. **1**

Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems. **1**

Technologies /Strategies: Specify water-efficient, native or adapted, climate tolerant plantings. High efficiency irrigation technologies include micro irrigation, moisture sensors, or weather data based controllers. Feed irrigation systems with captured rainwater, gray water, or on-site treated wastewater.

2.C2 Innovative Wastewater Technologies

Intent: Reduce generation of wastewater and potable water demand, while increasing local aquifer recharge.

Requirement: Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR, treat 100% of wastewater on site to tertiary standards. **1**

Technologies /Strategies: Develop a wastewater baseline according to the methodology outlined in the LEED Reference Guide. Implement decentralized on-site wastewater treatment and reuse systems. Decrease the use of potable water for sewage conveyance by utilizing gray and/or black water systems. Non-potable reuse opportunities include, toilet flushing, landscape irrigation, etc. Provide advanced wastewater treatment after use by employing innovative, ecological, on-site technologies including constructed wetlands, a mechanical recirculating sand filter, or aerobic treatment systems.

2.C3 Water Use Reduction

Intent: Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirement: Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act (EPACT) of 1992 fixture performance requirements. **1**

Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements. **1**

Technologies /Strategies: Develop a water use baseline including all water consuming fixtures, equipment, and seasonal conditions according to methodology guidance outlined in the LEED Reference Guide. Specify water conserving plumbing fixtures that exceed Energy Policy Act of 1992 fixture requirements in combination with ultra high efficiency or dry fixture and control technologies. Specify high water efficiency equipment (dishwashers, laundry, cooling towers, etc.). Use alternatives to potable water for sewage transport water. Use recycled or storm water for HVAC/process make up water. Install cooling tower systems designed to minimize water consumption from drift, evaporation and blowdown.

ATTACHMENT 3

3.0 Energy and Atmosphere 28

3.R1 Fundamental Building Systems Commissioning **Reqd.**

Intent: Verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended.

Requirement: Implement all of the following fundamental best practice commissioning procedures.

- Engage a commissioning authority.
- Develop design intent and basis of design documentation.
- Include commissioning requirements in the construction documents.
- Develop and utilize a commissioning plan.
- Verify installation, functional performance, training and documentation.
- Complete a commissioning report.

Technologies /Strategies: Introduce standards and strategies into the design process early, and then carry through selected measures by clearly stating target requirements in the construction documents. Tie contractor final payments to documented system performance. Refer to the LEED Reference Guide for detailed descriptions of required elements and references to additional commissioning guides. Specify pre-occupancy baseline IAQ testing at time of commissioning. Test for indoor air concentrations of CO, CO2 , total VOCs and particulates. Test to assure that adequate ventilation rates have been achieved prior to initial occupancy.

3.R2 Minimum Energy Performance **Reqd.**

Intent: Establish the minimum level of energy efficiency for the base building and systems.

Requirement: Design to meet building energy efficiency and performance as required by TI800-01 (AEI).

Technologies /Strategies: Use building modeling and analysis techniques to establish and document compliance. ASHRAE/IESNA 90.1-1999 provides guidance for establishing building base case development and analysis.

Use a professionally recognized and proven computer program or programs that integrate architectural features with air-conditioning, heating, lighting, and other energy producing or consuming systems. These programs will be capable of simulating the features, systems, and thermal loads used in the design. Using established weather data files, the program will perform 8760 hourly calculations. BLAST, DOE-2 or EnergyPlus are acceptable programs for these purposes.

3.R3 CFC Reduction in HVAC&R Equipment **Reqd.**

Intent: Reduce ozone depletion.

Requirement: Zero use of CFC-based refrigerants in new base building HVAC&R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phaseout conversion.

Technologies /Strategies: Specify only non-CFC-based refrigerants in all base building HVAC&R systems.

ATTACHMENT 3

Energy and Atmosphere (Continued)

3.C1 Optimize Energy Performance.

Intent: Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Requirement: Reduce design energy usage (DEU) compared to the energy use budget (EUB) in joules per square meter per year as described in the requirements of Chapter 11 of the TI 800-01, as demonstrated by a whole building simulation.

Reduction Beyond Minimum

New Construction	Existing Building	
10%	0%	**4**
20%	10%	**8**
30%	20%	**12**
40%	30%	**16**
50%	40%	**20**

Technologies /Strategies: Develop and use building modeling and analysis techniques to establish a base case that meets the minimum prerequisite standard. ASHRAE/IESNA 90.1-1999 provides guidance for establishing building base case development and analysis. Perform interactive energy use analysis for selected design elements that affect energy performance and document compliance.

Unit of measure for performance shall be annual energy usage in joules per square meter. Life-Cycle energy costs shall be determined using rates for purchased energy, such as electricity, gas, oil, propane, steam, and chilled water and approved by the adopting authority. Refer to the LEED Reference Guide or Whole Building Design Guide for a wide variety of energy efficiency resources and strategies including conservation measures, electromechanical energy efficiency technologies (for example ground-source heat pumps), passive heating and cooling strategies, solar hot water, and daylighting.

Life-Cycle costing will be done in accordance with 10 CFR 436.

3.C2 Renewable Energy

Intent: Encourage and recognize increasing levels of self-supply through renewable technologies to reduce environmental impacts associated with fossil fuel energy use.

Requirement: Supply a net fraction of the building's total energy use through the use of on-site renewable energy systems.

Percentage (%) of Total Annual Energy Usage in Renewables

5%	**1**
10%	**2**
20%	**3**

Technologies /Strategies: Employ the use of on-site non-polluting-source renewable technologies contributing to the total energy requirements of the project. Consider and use high temperature solar and/or geothermal, photovoltaics, wind, biomass (other than unsustainably harvested wood), and bio-gas. Passive solar, solar hot water heating, ground-source heat pumps, and daylighting do not qualify for points under this credit. Credit for these strategies is given in Energy & Atmosphere Credit 1: Optimizing Energy Performance.

ATTACHMENT 3

Energy and Atmosphere (Continued)

3.C3 Additional Commissioning

Intent: Verify and ensure that the entire building is designed, constructed, and calibrated to operate as intended.

Requirement: In addition to the Fundamental Building Commissioning prerequisite, implement the following additional commissioning tasks: **1**

1. Conduct a focused review of the design prior to the construction documents phase.
2. Conduct a focused review of the construction documents when close to completion.
3. Conduct a selective review of contractor submittals of commissioned equipment.
4. Develop a system and energy management manual.
5. Have a contract in place for a near-warranty end or post occupancy review.

Items 1,2, and 3 must be performed by someone other than the designer.

Technologies /Strategies: Introduce standards and strategies into the design process early, and then carry through selected measures by clearly stating target requirements in the construction documents. Tie contractor final payments to documented system performance. Refer to the LEED Reference Guide for detailed descriptions of required elements and references to additional guidelines.

3.C4 Elimination of HCFC's and Halons

Intent: Reduce ozone depletion and support early compliance with the Montreal Protocol.

Requirement: Install base building level HVAC and refrigeration equipment and fire suppression systems that do not contain HCFC's or Halon. **1**

Technologies /Strategies: Utilize base building HVAC and refrigeration systems that use non ozone damaging liquids for the refrigeration cycle. Refer to the LEED Reference Guide for qualifying alternatives.

3.C5 Measurement and Verification

Intent: Provide for the ongoing accountability and optimization of building energy and water consumption performance over time.

Requirement: Comply with the installed equipment requirements for continuous metering as stated in Option B: Methods by Technology of the US DOE's International Performance Measurement and Verification Protocol (IPMVP) for the following: **1**

- Lighting systems and controls.
- Constant and variable motor loads.
- Variable frequency drive (VFD) operation.
- Chiller efficiency at variable loads (kW/ton).
- Cooling load.
- Air and water economizer and heat recovery cycles.
- Air distribution static pressures and ventilation air volumes.
- Boiler efficiencies.
- Building specific process energy efficiency systems and equipment.
- Indoor water risers and outdoor irrigation systems.

ATTACHMENT 3

Energy and Atmosphere (Continued)

3.C5 Measurement and Verification (Continued)

Technologies /Strategies: Design and specify equipment to be installed in base building systems to allow for comparison, management, and optimization of actual vs. estimated energy and water performance. Employ building automation systems to perform M&V functions where applicable. Tie contractor final payments to documented M&V system performance and include in the commissioning report. Provide for ongoing M&V system maintenance and operating plan in building operations and maintenance manuals. Consider installation of an Energy Management and Control System (EMCS) which is compatible with exiting installation systems to optimize performance.

3.C6 Green Power

Intent: Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.

Requirement: Engage in a two year contract to purchase power generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-E requirements. **1**

Technologies /Strategies: Purchase power from a provider that guarantees a fraction of its delivered electric power is from net nonpolluting renewable technologies. Begin by contacting local utility companies. If the project is in an open market state, investigate Green Power and Power Marketers licensed to provide power in that state. Grid power that qualifies for this credit originates from solar, wind, geothermal, biomass, or low-impact hydro sources. Low-impact hydro shall comply with the Low Impact Hydropower Certification Program.

3.C7 Distributed Generation

Intent: Encourage the development and use of distributed generation technologies which are less polluting than grid-source energy.

Requirement: Reduce total energy usage and emissions by considering source energy implications and local cogeneration and direct energy conversion. **1**

Technologies /Strategies: Investigate the use of integrated generation and delivery systems, such as co-generation, fuel cells, micro-turbines and off-peak thermal storage.

ATTACHMENT 3

4.0 Materials and Resources 13

4.R1 Storage & Collection of Recyclables — Reqd.

Intent: Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Requirement: Provide an easily accessible area that serves the entire building that is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, and metals .

Technologies /Strategies: Establish a waste management plan in cooperation with users to encourage recycling. Reserve space for recycling functions early in the building occupancy programming process and show areas dedicated to collection of recycled materials on space utilization plans. Broader recycling support space considerations should allow for collection and storage of the required elements and newspaper, organic waste (food and soiled paper), and dry waste. When collection bins are used, bin(s) should be able to accommodate a 75% diversion rate and be easily accessible to custodial staff and recycling collection workers. Consider bin designs that allow for easy cleaning to avoid health issues.

4.C1 Building Reuse

Intent: Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste, and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirement: Reuse large portions of existing structures during renovation or redevelopment projects.

Maintain at least 75% of existing building structure and shell (exterior skin and framing excluding window assemblies).	1
Maintain an additional 25% (100% total) of existing building structure and shell (exterior skin and framing excluding window assemblies).	1
Maintain 100% of existing building structure and shell AND 50% non-shell (walls, floor coverings, and ceiling systems).	1

Technologies /Strategies: Evaluate retention of existing structure. Consider facade preservation, particularly in installation urban areas. During programming and space planning, consider adjusting needs and occupant use patterns to fit within existing building structure and interior partition configurations. Identify and effectively address energy, structural, and indoor environmental (lead & asbestos) issues in building reuse planning and deconstruction documents. Percentage of reused non-shell building portions will be calculated as the total area (s.f.) of reused walls, floor covering, and ceiling systems, divided by the existing total area (s.f.) of walls, floor covering, and ceiling systems.

4.C2 Construction Waste Management

Intent: Divert construction, demolition, and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process.

Requirement: Develop and implement a waste management plan, quantifying material diversion by weight.

Recycle and/or salvage at least 50% (by weight) of construction, demolition, and land clearing waste.	1
Recycle and/or salvage an additional 25% (75% total by weight) of the construction, demolition, and land clearing debris.	1

ATTACHMENT 3

Materials and Resources (Continued)

4.C2 Construction Waste Management (Continued)

Technologies /Strategies: Develop and specify a waste management plan that identifies licensed haulers and processors of recyclables; identifies markets for salvaged materials; employs deconstruction, salvage, and recycling strategies and processes, includes waste auditing; and documents the cost for recycling, salvaging, and reusing materials. Source reduction on the job site should be an integral part of the plan

The plan should address recycling of corrugated cardboard, metals, concrete brick, asphalt, land clearing debris (if applicable), beverage containers, clean dimensional wood, plastic, glass, gypsum board, and carpet; evaluate the cost-effectiveness of recycling rigid insulation, engineered wood products and other materials; hazardous materials storage and management; and participation in manufacturers' "take-back" programs to the maximum extent possible. Refer to the LEED Reference Guide for guidelines and references that provide waste management plan development and implementation support including model bid specificati

4.C3 Resource Reuse

Intent: Extend the life cycle of targeted building materials, reducing environmental impacts related to materials manufacturing and transport.

Requirement: Specify salvaged or refurbished materials for 5% of building materials. **1**

Specify salvaged or refurbished materials for 10% of building materials. **1**

Technologies /Strategies: Commonly salvaged building materials include wood flooring/ paneling/cabinets, doors and frames, mantels, iron work and decorative lighting fixtures, brick, masonry and heavy timbers. See the LEED Reference Guide for calculation tools and guidelines. Determine percentages in terms of dollar value using the following steps:

1. Calculate total dollars* (see exclusions) of the salvaged or refurbished material.
2. Calculate total dollars (see exclusions) of all building materials.
3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: In total dollar calculations, exclude; labor costs; all mechanical and electrical material and labor costs; and project overhead and fees. *If the cost of the salvaged or refurbished material is below market value, use replacement cost to estimate the material value, otherwise use actual cost to the project.

4.C4 Recycled Content

Intent: Increase demand for building products that have incorporated recycled content material, reducing the impacts resulting from extraction of new material.

Requirement: Specify a minimum of 25% of building materials that contain in aggregate a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material. **1**

Specify an additional 25% (50% total) of building materials that contain in aggregate, a minimum weighted average of 20% post consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material. **1**

ATTACHMENT 3

Materials and Resources (Continued)

4.C4 Recycled Content (Continued)

Technologies /Strategies: Specify building materials containing recycled content for a fraction of total building materials. Select products and materials with supporting information from the AIA Resource Guide or the EPA Environmentally Preferable Purchasing (EPP) Program. Common building materials and products with recycled content include; wall, partition, and ceiling materials and systems; insulation; tiles and carpets; cement, concrete, and reinforcing metals; structural and framing steel. For products/materials not listed, selection should be made on the basis of EPP criterion and/or:

- -- Toxicity;
- -- Embodied energy;
- -- Production use of water, energy and ozone depleting substances (ODSs);
- -- Production limits on toxic emissions and effluents;
- -- Minimal, reusable or recycled/recyclable packaging;
- -- Impact on indoor environmental quality (IEQ);
- -- Installation that limits generation of waste;
- -- Materials that limit waste generation over their life;
- -- EPA guideline compliance; and

1. Calculate total dollars (see exclusions) of the material that contain recycled content.
2. Calculate total dollars (see exclusions) of all building materials.
3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees)

4.C5 Local/Regional Materials

Intent: Increase demand for building products that are manufactured locally, reducing the environmental impacts resulting from transportation, and supporting the local economy.

Requirement: Specify a minimum of 20% of building materials that are manufactured regionally within a radius of 500 miles. **1**

Of these regionally manufactured materials, specify a minimum of 50% that are extracted, harvested, or recovered within 500 miles. **1**

Technologies /Strategies: Specify and install regionally extracted, harvested, and manufactured building materials. Contact the state and local waste management boards for information about regional building materials. See the LEED Reference Guide for calculation methodology guidelines. Determine percentages in terms of dollar value using the following steps:

1. Calculate total dollars (see exclusions) of material that is locally or regionally manufactured.
2. Calculate total dollars (see exclusions) of all building materials.
3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees.

4.C6 Rapidly Renewable Materials

Intent: Reduce the use and depletion of finite raw and long cycle renewable materials by replacing them with rapidly renewable materials.

Requirement: Specify rapidly renewable building materials for 5% of total building materials. **1**

ATTACHMENT 3

Materials and Resources (Continued)

4.C6 Rapidly Renewable Materials (Continued)

Technologies /Strategies: Rapidly renewable resources are those materials that substantially replenish them-selves faster than traditional extraction demand (e.g. planted and harvested in less than a 10 year cycle) and do not result in significant biodiversity loss, increase erosion, air quality impacts, and that are sustainably managed. See the LEED Reference Guide for calculation methodology guidelines. Determine percentages in terms of dollar value using the following steps:

1. Calculate total dollars (see exclusions) of materials that are considered to be rapidly renewable.
2. Calculate total dollars (see exclusions) of all building materials.
3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees.

4.C7 Certified Wood

Intent: Encourage environmentally responsible forest management.

Requirement: Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council guidelines for wood building components including but not limited to framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers. **1**

Technologies /Strategies: Refer to the Forest Stewardship Council guidelines for wood building components that qualify for compliance to the requirements and incorporate into material selection for the project.

ATTACHMENT 3

5.0 Indoor Environmental Quality (IEQ) 17

5.R1 Minimum IAQ Performance **Reqd.**

Intent: Establish minimum IAQ performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.

Requirement: Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda.

Technologies /Strategies: Include proactive design details that will eliminate some of the common causes of indoor air quality problems in buildings. Introduce standards into the design process early. Incorporate references to targets in plans and specifications. Ensure ventilation system outdoor air capacity can meet standards in all modes of operation. Locate building outdoor air intakes (including operable windows) away from potential pollutants/contaminant sources such as sporulating plants (allergens), loading areas, building exhaust fans, cooling towers, sanitary vents, dumpsters, vehicular exhaust, and other sources. Include operational testing in the building commissioning report. Design cooling coil drain pans to ensure complete draining. Include measures to control and mitigate radon buildup in areas where it is prevalent.

5.R2 Environmental Tobacco Smoke (ETS) Control **Reqd.**

Intent: Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).

Requirement: Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, OR, by providing a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no recirculation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 Pa (0.03 inches of water gauge). Performance of smoking rooms shall be verified using tracer gas testing methods as described in ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commiss

Technologies /Strategies: Prohibit smoking in the building and/or provide designated smoking areas outside the building in locations where ETS can not reenter the building or ventilation system and away from high building occupant or pedestrian traffic.

5.C1 IAQ Monitoring

Intent: Provide capacity for indoor air quality (IAQ) monitoring to sustain long term occupant health and comfort.

Requirement: Install a permanent carbon dioxide (CO_2) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor levels by more than 530 parts per million at any time. **1**

Technologies /Strategies: Install an independent system or make CO_2 monitoring a function of the building automation system. Situate monitoring locations in areas of the building with high occupant densities and at the ends of the longest runs of the distribution ductwork. Specify that system operation manuals require calibration of all of the sensors per manufacturer recommendations but not less than one year. Include sensor and system operational testing and initial set point adjustment in the commissioning plan and report. Also consider periodic monitoring of carbon monoxide (CO), total volatile organic compounds (TVOCs), and particulates (including PM10).

ATTACHMENT 3

Indoor Environmental Quality (IEQ) (Continued)

5.C2 Increase Ventilation Effectiveness

Intent: Provide for the effective delivery and mixing of fresh air to building occupants to support their health, safety, and comfort.

Requirement: For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (E) greater than or equal to 0.9 as determined by ASHRAE 129-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy. **1**

Technologies /Strategies: Employ architectural and HVAC design strategies to increase ventilation effectiveness and prevent short-circuiting of airflow delivery. Techniques available include use of displacement ventilation, low velocity, and laminar flow ventilation (under floor or near floor delivery) and natural ventilation. Operable windows with an architectural strategy for natural ventilation, cross ventilation, or stack effect can be appropriate options with study of inlet areas and locations. See the LEED Reference Guide for compliance methodology guidelines.

5.C3 Construction IAQ Management Plan

Intent: Prevent indoor air quality problems resulting from the construction/renovation process, to sustain long term installer and occupant health and comfort.

Requirement: Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture damage, AND replace all filtration media immediately prior to occupancy (Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as deter-mined by ASHRAE 52.2-1999). **1**

Conduct a minimum two-week building flushout with new filtration media at 100% outside air after construction ends and prior to occupancy, OR, conduct a baseline indoor air quality testing procedure consistent with current EPA protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445. **1**

Technologies /Strategies: Specify containment control strategies including protecting the HVAC system, controlling pollutant sources, interrupting pathways for contamination, enforcing proper housekeeping and coordinating schedules to minimize disruption. Specify the construction sequencing to install absorptive materials after the prescribed dry or cure time of wet finishes to minimize adverse impacts on indoor air quality. Materials directly exposed to moisture through precipitation, plumbing leaks, or condensation from the HVAC system are susceptible to microbial contamination. Absorptive materials to protect and sequence installation include; insulation, carpeting, ceiling tiles, and gypsum products. Appoint an IEQ Manager with owner's authority to inspect IEQ problems and require mitigation as necessary.

5.C4 Low-Emitting Materials

Intent: Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort.

Requirement: Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:

- Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51 **1**
- Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements. **1**
- Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. **1**
- Composite wood or agrifiber products must contain no added urea-formaldehyde resins. **1**

ATTACHMENT 3

Indoor Environmental Quality (IEQ) (Continued)

5.C4 Low-Emitting Materials (Continued)

Technologies /Strategies: Evaluate and preferentially specify materials that are low emitting, non-irritating, nontoxic and chemically inert. Request and evaluate emissions test data from manufacturers for comparative products. Ensure that VOC limits are clearly stated in specifications, in General Conditions, or in each section where adhesives, sealants, coatings, carpets, and composite woods are addressed.

5.C5 Indoor Chemical and Pollutant Source Control

Intent: Avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

Requirement: Design to minimize cross-contamination of regularly occupied areas by chemical pollutants: **1**

Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

Technologies /Strategies: Design to physically isolate activities associated with chemical contaminants from other locations in the building, providing dedicated systems to contain and remove chemical pollutants from source emitters at source locations. Applicable measures include eliminating or isolating high hazard areas; designing all housekeeping chemical storage and mixing areas (central storage facilities and janitors closets) to allow for secure product storage; designing copy/fax/printer/printing rooms with structural deck to deck partitions and dedicated exhaust ventilation systems; and including permanent architectural entryway system(s) to catch and hold particles to keep them from entering and contaminating the building interior. Consider utilization of EPA registered anti-microbial treatments in carpet, textile or vinyl wall coverings, ceiling tiles or paints where microbial contamination is a concern. Utilize “breathable” wall finishes where circumstances require, to reduce moisture build-up and prevent microbial cont

5.C6 Controllability of Systems

Intent: Provide a high level of individual occupant control of thermal, ventilation, and lighting systems to support optimum health, productivity, and comfort conditions.

Requirement: Provide a minimum of one operable window and one lighting control zone per 200 s.f. for all occupied areas within 15 feet of the perimeter wall. **1**

Provide controls for each individual for airflow, temperature, and lighting for 50% of the non perimeter, regularly occupied areas. **1**

Technologies /Strategies: Provide individual or integrated controls systems that control lighting, airflow, and temperature in individual rooms and/or work areas. Consider combinations of ambient and task lighting control and operable windows for perimeter and VAV systems for non perimeter with a 1:1: 2 terminal box to controller to occupant ratio.

5.C7 Thermal Comfort

Intent: Provide for a thermally comfortable environment that supports the productive and healthy performance of the building occupants.

Requirement: Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone. **1**

Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building. **1**

Technologies /Strategies: Integrated envelope and HVAC system design strategies that achieve thermal comfort conditions based on mean radiant temperature, local air velocity, relative humidity, and air temperature. Install and maintain a temperature and humidity monitoring system for key areas of the building (i.e., at the perimeter, and spaces provided with humidity control). This function can be satisfied by the building automation system. Specify in system operation manuals that all sensors require quarterly calibration. Include criteria verification and system operation in commissioning plan and report.

ATTACHMENT 3

Indoor Environmental Quality (IEQ) (Continued)

5.C8 Daylight and Views

Intent: Provide a connection between indoor spaces and the outdoor environment through the introduction of sunlight and views into the occupied areas of the building.

Requirement: Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight. **1**

Direct line of sight to vision glazing from 90% of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. **1**

Technologies /Strategies: Implement design strategies to provide access to daylight and views to the outdoors in a glare-free way using exterior sun shading, interior light shelves, and /or window treatments. Orient buildings to maximize daylighting options. Consider shallow or narrow building footprints. Employ courtyards, atriums, clerestory windows, skylights, and light shelves to achieve daylight penetration (from other than direct effect or direct rays from the sun) deep into regularly occupied areas of the building.

5.C9 Acoustic Environment /Noise Control

Intent: Provide appropriate **acoustic conditions** for user privacy and comfort.

Requirement: Minimize environmental noise through appropriate use of insulation, sound-absorbing materials and noise source isolation. **1**

Technologies /Strategies: Evaluate each occupied environment and determine the appropriate layout, materials and furnishings design.

5.C10 Facility In-Use IAQ Management Plan

Intent: Insure the effective management of facility air quality during its life.

Requirement: Perform all of the following: **1**

- Develop an air quality action plan to include scheduled HVAC system cleaning.
- Develop an air quality action plan to include education of occupants and facility managers on indoor pollutants and their roles in preventing them.
- Develop an air quality action plan to include permanent monitoring of supply and return air, and ambient air at the fresh air intake, for carbon monoxide (CO), carbon dioxide (CO_2), total volatile organic compounds (TVOCs), and particulates (including PM10).

Technologies /Strategies: Provide action plan for periodic system maintenance, monitoring, occupant/manager training.

ATTACHMENT 3

6.0 Facility Delivery Process 7

6.C1 Holistic Delivery of Facility

Intent: Deliver a facility that optimizes tradeoffs among sustainability, first costs, life cycle costs and mission requirements.

Requirement:	
Choose team leaders that are experienced in holistic delivery of facilities.	1
Train the entire team in the holistic delivery process. The team must include all stakeholders in the facility delivery, including the users, the contracting staff, the construction representatives, project manager, and design/engineering team members.	1
Identify project goals and metrics.	1
Plan and execute charrettes with team members at critical phases of the facility delivery.	1
Identify and resolve tradeoffs among sustainability, first costs, life cycle costs and mission requirements through charrettes and other collaborative processes.	2
Document required results for each phase of project deliverables that achieve the project goals and are measurable throughout the facility life span.	1

Technologies /Strategies:

Develop performance specifications or choose competitive range of products that meet environmental criteria.

Use automated modeling and analysis tools to assess site and facility design alternatives.

Conduct life-cycle cost analysis (LCCA) in the design process to reduce energy and water consumption.

Conduct a full ecological assessment to include soil quality, water resources and flows, vegetation and trees, wildlife habitats and corridors, wetlands, and ecologically sensitive areas to identify the least sensitive site areas for development. Evaluate space utilization/functions to reduce overall space requirements, considering networking, flextime, flexi-place, dual-use, and other strategies to reduce space requirements/optimize facility size.

Commission all facility systems to ensure proper performance as designed.

ATTACHMENT 3

7.0 Current Mission 6

7.C1 Operation and Maintenance

Intent: Assure that the delivery process assures efficient operation and maintenance of the facility.

Requirement: Develop a facility operations and maintenance program to include: **2**

Commissioning instructions for all facility systems.

- Comprehensive facility operations and maintenance instructions for system operation, performance verification procedures and results, an equipment inventory, warrantee information, and recommended maintenance schedule. The instructions should include a comprehensive, preventive maintenance program to keep all facility systems functioning as designed.
- A periodic training program for occupants, facilities managers, and maintenance staff in all facility operations and maintenance activities.
- Instructions on sustainable cleaning and pest control practices.
- Develop a comprehensive site/facility recycling/waste management plan.

Provide surfaces, furnishings, and equipment that are appropriately durable, according to life cycle cost analysis. **1**

Technologies /Strategies: Maintain facility elements, systems and subsystems on a routine maintenance schedule to ensure integrity and longevity.

Perform scheduled cleaning and maintenance activities with nontoxic environmentally preferable cleaning products and procedures. Keep air ducts clean and free of microorganisms through a structured program of preventive maintenance. Clean lighting systems following a regular maintenance schedule to ensure optimum light output and energy efficiency.

Use pesticides and herbicides sparingly and only when necessary with preference to natural methods and materials over poisons and toxic agents.

Use automated monitors and controls for energy, water, waste, temperature, moisture, and ventilation monitors and controls. Turn off the lights, computers, computer monitors, and equipment when not in use. Enable power-down features on office equipment.

7.C2 Design for Soldier and Workforce Productivity and Retention

Intent: Provide a high-quality, functional, healthy and safe work environment to promote soldier and workforce productivity and retention.

Requirement: Provide a high quality indoor environment to enhance user/occupant quality of life (QOL). **1**

Provide a highly functional work environment to promote user/occupant work productivity. **1**

Provide a healthy and safe work environment to sustain QOL and productivity. **1**

Technologies /Strategies: Use a ASID-qualified designer to provide stimulating interior environments with pleasant colors, surface treatments, room proportions and ceiling heights, external views, natural lighting, and quality detailing for interior furnishings, equipment, materials and finishes. Use IES standards to provide light to occupied space with variations in level, comfortable contrasts, natural color rendition, natural/man-made, and adequate controls to optimize light aesthetic qualities. Provide occupant control of individual work areas configuration, and lighting, thermal and ventilation systems.

Collaborate with end users to identify functional and technical requirements and to perform adjacency studies. Configure occupied space to address the specific workers/occupants functions and activities that will be carried out there. Meet AEI guide requirements. Design and configure occupied space, and select furniture and equipment using human ergonomics. Identify existing user amenities, such as dining, recreation, socializa

ATTACHMENT 3

8.0 Future Missions 4

8.C1 Assess the Lifespans of the Designed Use and Supporting Systems

Intent: Understand the typical or likely lifespan of the function to be accommodated by the facility in order to recognize how soon the facility should be expected to adapt to a different use. Also, understand the lifespans of the various building systems to understand when they will need to be updated during the lifespan of the facility and to design the facility in a manner that facilitates the updating of each system.

Requirement:

Identify how long the designed function is likely to occupy the current facility.	1
Identify how long the envelope, structure, HVAC, plumbing, communications, electrical, and other systems are likely to last before requiring replacement or upgrade. Consider economic, functional and physical obsolescence.	1

Technologies /Strategies: Consider the life span of the weapon systems, doctrines, or other programs supported by the facility.

Use life cycle data and other sources to identify the life span of the embodied systems.

8.C2 Design for Adaptation, Renewal and Future Uses

Intent: Explicitly design the facility to maximize accommodation of future uses. The greater the future flexibility, the less likely is the facility to be a source for waste materials or to require additional materials.

Requirement:

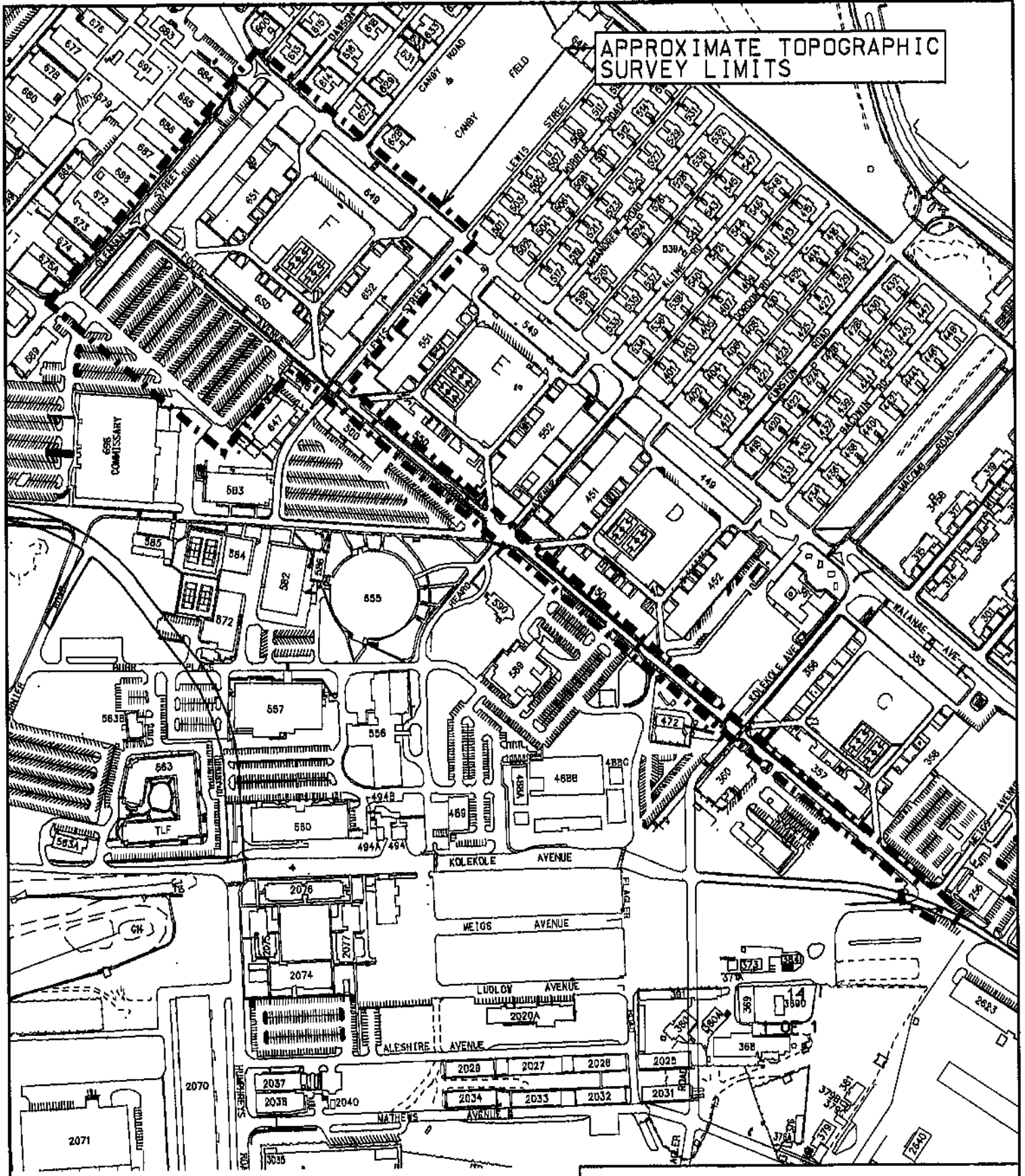
Identify possible future uses for the facility, consider alternatives that expand the list of possible future uses. AND Design the building to accommodate as wide a range of future uses, as practical. AND Design the installation of building systems to accommodate foreseeable change with a minimum amount of disruption, cost, and additional materials.	1
Build the smallest facility necessary to meet current mission functional requirements, using the most efficient shape and form, while taking into consideration expansion capabilities and potential future mission requirements. AND Design the facility for recycling of materials and systems.	1

Technologies /Strategies: Create durable, long-lasting and adaptable facility shell and structural system. Create an adaptable, flexible facility design using open planning, service corridors, interstitial space, access floors, demountable walls/partitions and other adaptable space configuration/utilization strategies.

Select materials that are recyclable, avoiding composite materials, such as reinforced plastics and carpet fibers and backing. Consider selecting materials and labeling construction materials with identification information to facilitate recycling. Use pre-cut/pre-fabricated materials and use standard lengths and sizes (dimensional modularity) in design. Design facility systems and subsystems for reconfiguration and/or disassembly/recycling using reversible/reusable connectors.

ATTACHMENT 4

GENERAL SITE PLAN



FY01 MCA PN 52265 WBR & BUP PN 52266 WBR,
PHASE 4A, RENOVATE QUAD F
SCHOFIELD BARRACKS, OAHU, HAWAII

GENERAL SITE PLAN
RENOVATE QUAD F

FEBRUARY 2001

ATTACHMENT 4

SHT

PRELIMINARY SOILS INVESTIGATION LETTER REPORT
for
FY01 WHOLE BARRACKS RENEWAL - PHASE 4A
Schofield Barracks, Oahu, HI

January 24, 2001

1.0 PURPOSE AND SCOPE: This preliminary soils investigation letter report attachment to the request for information (RFP) package for the subject project is intended to be used for information only, during the bidding process. Information about the anticipated subsurface materials that may be encountered during grading and excavation operations was taken from past subsurface investigations of projects in the Schofield Barracks area. This letter report also provides recommendations regarding area grading, subgrade preparation, foundation design, and flexible pavement design.

2.0 GEOLOGIC DATA:

2.1 References: "Geology of the State of Hawaii", Harold T. Stearns, 2nd edition, 1985, pages 59 and 115-116.

2.2 Geology: Schofield Barracks is located on the Schofield Plateau between the Waianae and Koolau Ranges. The Schofield Plateaus was formed by lava flows from the Koolau range stopping against the older Waianae range. Alluvium from the Waianae range also butts against and interfingers with the Koolau lavas on the western side of the plateau and along the rim of Kaukonahu Valley. Thick deposits (approximately 15 to 18 meters) of fluvial and residual soils generally underlie the project area. The basalts in Hawaii slowly decompose by physical and chemical weathering into the red soils observed in road cuts. The weathering decreases with increasing depth below the ground surface. Near surface soil have been completely altered such that the soil has no characteristics of the original rock. Observed within deep road cuts along Kamehameha Highway near Schofield Barracks, Sterns (ref 2.1) were approximately 3 meters of red soil overlying about 15 to 18 meters of decomposed basalt in which the physical features of the parent basalt can still be observed.

Scattered boulders encountered within excavations are the result of the decomposition of basalt into "onion skin" boulders or spheroidally weathered basalt. Larger quantities of basalt boulders and cobbles, if encountered, may be the fluvial deposits from the Waianae range.

3.0 SITE AND PROJECT DESCRIPTION:

3.1 Project Description.

The WBR project renovates Quadrangle F. Quadrangle F consists of four buildings; Bldg. 649, 650, 651, and 652. Site improvements will include construction of a multi-purpose recreation court, a covered gear wash area, vehicular parking areas, and landscaping.

4.0 SUBSURFACE INVESTIGATION:

No subsurface investigation was undertaken because only a few minor structures will be constructed.

5.0 SUBSURFACE CONDITIONS:

5.1 Subsurface Conditions. Assumed subsurface soil layers consist of the typical reddish-brown clayey-silt. Consistency range from medium to stiff. Groundwater should not be encountered during earthwork operations for the site work. Occasional basalt boulders may be encountered due to insufficient weathering of the parrent rock.

6.0 FOUNDATION DESIGN:

6.1 References.

a. Army Technical Manual TM 5-818-1, "Soils and Geology: Procedures for Foundation Design of Buildings and Other Structures," October 1983.

6.2 Site Grading and Preparation.

a. The ground surface where construction is proposed should be completely cleared, stripped and grubbed to a depth sufficient to remove all pavements, slabs, appurtenances, vegetation, roots, and other debris. The stripped soils may be used as landscape fill material with approval from the landscape architect. Surfaces to receive fill should be properly scarified, moisture conditioned to within 3% of optimum moisture and compacted to the specified density. Any soft areas that do not respond to the required compaction should be excavated to remove the soft material and backfilled with compacted satisfactory fill material.

b. All excavated in-place residual soils free of deleterious matter, stones larger than 3 inches, and expansive values less than or equal to 2% when tested by the CBR method may be used as satisfactory fill material. **Imported** satisfactory fill material should consist of materials classified by ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, SC, ML, and MH. In addition, any imported material should have a liquid limit less than 40 and a plasticity index less than 15.

c. Crusher waste material may be used under sidewalks, etc. Crusher waste material is a by-product of commercial quarry operations, free from vegetable matter and other deleterious substances. The material may be pit run, except that it shall be handled and processed so as to consistently produce a material reasonably well graded from coarse to fine. Crusher waste material should have a maximum aggregate size of 3-inches when tested in accordance with ASTM C136. In addition, the percentage passing the No. 4 shall be not less than 20 nor more than 60 percent, and the percentage passing the No. 200 sieve (wash gradation) shall not exceed 20 percent. The portion of material passing the No. 40 sieve shall have a liquid limit less than 40 and a plasticity index less than 15. The sand equivalent value should not e less than 19 when tested in accordance with ASTM D2419.

d. All fill/cut materials (i.e., under building slabs or paved areas) should be moisture conditioned to within 3% of optimum moisture and compacted to a minimum 95% of maximum density for cohesionless soils, and a minimum 90% of maximum density for cohesive soils, as determined by ASTM D 1557.

e. Satisfactory fill materials should be placed in 8-inch maximum loose lifts and compacted utilizing heavy compaction equipment. The loose lift thickness should be reduced to 6-inches when placed and compacted in confined areas, such as beneath or adjacent to footings or in utility trenches. Where power driven, hand-tampers (i.e., "jumping jacks") are used, the maximum loose lift thickness should also be reduced to 6-inches.

f. The finished grade from edge of building to 10 feet away should be sloped 5 percent to provide positive drainage away from foundations. If building roof runoff is intercepted with gutters and down spouts, the down spout should be long enough to discharge beyond the backfill limits of the blower building.

g. If footings are formed, the remaining annulus between the footing edge and excavation face should be wide enough to allow hand-held equipment to compact the backfill material. Excavation surfaces that become wet or muddy should be remediated by drying the excavation surface and recompacting or removing the wet material. Excavation surfaces that become dried out and cracked should be remediated by moisture conditioning and recompacting the surface.

6.3 **Shallow Foundations.** Based on previous projects, the recommended allowable soil bearing pressures for footings bearing on undisturbed silt or newly compacted fill is 143.6 Kpa (3000 psf). Allowable bearing pressures may be increased by one third for short term loading such as seismic or

wind loads. All footings should bear a minimum 60 centimeters (24 inches) below the lowest adjacent grade. Isolated and continuous footings should be at least 45 centimeters (18 inches) wide.

6.4 **Seismicity.** See General Design - Structural section of RFP.

6.5 **Slabs-on-grade.** Slabs-on-grade shall be supported on a vapor barrier over 100 mm (4 inches) of compacted Granular Termite Barrier (GTB) over a separation geotextile over 100 mm (4 inches) of compacted Capillary Water Barrier (CWB) material. The subgrade beneath proposed buildings should be kept continually moist (no standing water) for at least 5 days prior to placement of the CWB. The GTB shall be conditioned with only enough moisture for compaction. Saturation or flooding is prohibited.

The vapor barrier shall have the following properties:

Minimum 15-mil thick polyolefin geomembrane manufactured with ISO certified virgin resins.

Water Vapor Transmission Rate	ASTM E-96	not exceeding 0.006 gr./ft2/hr.
Permeance Rating	ASTM E-96	not exceeding 0.015 gr./ft2/hr.
Water Vapor Retarder	ASTM E-1745	meets or exceeds Class B
Puncture Resistance	ASTM E-1709	minimum 1970 grams
Tensile Strength	ASTM D-638	minimum 45 lbf/in.

Vapor barrier joints shall be lapped a minimum of (12 inches) and sealed with the manufacturer's recommended mastic or pressure sensitive tape. The vapor barrier shall be lapped over footings or sealed to foundations. The contractor shall check the vapor barrier surface, seams, and penetrations at columns and utilities for damage and discontinuities prior to the placement of GTB. The check shall be performed in the presence of the Contracting Officers representative.

7.0 FLEXIBLE PAVEMENT DESIGN:

7.1 References.

a. Army Technical Manual TM 5-822-2, "General Provisions for Roads, Streets, Walks, and Open Storage Areas", April 1977.

b. Army Technical Manual TM 5-822-5, "Pavement Design for Roads, Streets, Walks, and Open Storage Areas", June 1992.

7.2 **Discussion.** A California Bearing Ratio (CBR) value of 6% is adopted based upon previous tests on similar soils at Schofield Barracks. Anticipated traffic for the driveway and parking for the maintenance building has been estimated to place the pavements in the category III traffic.

7.3 Design Parameters and Required Thickness.

	Access Road & Parking
Traffic Category:	III
Class Street:	E
Design Index:	3
Subgrade CBR:	6%
Base Course CBR:	80%
Design Total Thickness:	325 mm (13 inches)

Recommended Pavement Structure:

Surface Course AC:	50 mm (2 inches)
Base Course:	150 mm (6 inches)
Subbase Course	125 mm (5 inches)

7.4 Pavement Recommendations.

a. The asphalt concrete should meet State of Hawaii, Department of Transportation, Standard Specifications for Road and Bridge Construction, 1994, Mix No. IV, Asphalt Viscosity Grade modified AR8000. The asphalt pavement should be compacted to a minimum 92% of theoretical maximum density as determined by ASTM D 2041.

b. The base course should meet State of Hawaii, Department of Transportation, Standard Specifications for Road and Bridge Construction, 1994, 1-1/2 inch maximum size aggregate gradation. The base course should be compacted to 100% of maximum density as determined by AASHTO T-180.

c. The subbase course should also meet State of Hawaii, Department of Transportation, Standard Specifications for Road and Bridge Construction, 1994. . Minimum CBR strength of 50%. The subbase course shall be compacted to 100% of maximum density as determined by AASHTO T-180.

d. The prime coat should meet ASTM D 2027 for MC-30 or MC-70 (cutback asphalt), and should be applied at a rate of 0.15 to 0.40 gallons per square yard. Prime coat should be placed on top of the compacted base course prior to placement of the AC surface course.

e. The tack coat should meet ASTM D 977 for SS-1 (emulsified asphalt), and should be applied at a rate of 0.05 to 0.20 gallons per square yard. Tack coat should be used to bond new asphalt pavement to any existing asphalt pavement or concrete structures (i.e., curb and gutters).

8.0 **POINT OF CONTACT**: For additional geotechnical design information or to discuss the recommendations in this letter report, please contact US Army Corps of Engineers, Pacific Ocean Division, Building 230, Fort Shafter, HI 96858, attention: Design Branch, Raymond Kong (ph 808-438-6953).

QUAD F FIRE ALARM SEQUENCE OF OPERATIONS MATRIX

Legend:
1=Activation of supervisory alarm only required.
O=Mandatory sequence

System output:	Transmit alarm to Emergency Forces	Transmit Supervisory alarm to Emergency Forces	Transmit Trouble Alarm to Emergency Forces	Activate visible and audible alarm annunciator	Activate visible and audible supervisory annunciator	Activate visible and audible trouble annunciator	Activate all occupant notification appliances	Initiate Special Elevator Recall (see elevator specification)	Shutdown elevator power thru shunt trip	Release door to close	Activate sounder base alarms in all dwelling units in building	Activate sounder base alarm	Activate all sounder base alarms in only dwelling unit	Shut down air handling fan	Release all doors in stair to close	Initiation devices and occupant notification appliances operation maintained	Initiate Elevator Emergency Recall Phase I	Local sprinkler alarm gong activated upon sprinkler flow
System Input:																		
Sprinkler riser or floor water flow or pressure switch	O			O			O				O							O
Sprinkler valve tamper switch		O			O													
Elevator sprinkler flow switch (Elev mach rm)	O			O			O		O		O							O
Heat detector located max 2' from spklr head (Elev mach rm only)	O			O			O	O			O							
Loss of voltage to control circuit for the disconnecting elevator power		O			O													
Elevator lobby or Elevator Machine Rm Smoke Detector		O			O												O	
Manual pull station	O			O			O				O							
Smoke Detector for Release of Magnetic Door Holder not protecting stair door opening		O			O					O								
Dwelling unit smoke detector w/sounder base (multiple rooms in dwelling unit)		1			1							O	O					
Dwelling unit smoke detector w/sounder base (single room type dwelling unit only)		1			1							O						
Single break or ground fault in fire alarm circuit			O			O										O		
Supply duct smoke detector (>2000 CFM)		O			O									O				
Return duct smoke detector (>15000 CFM)		O			O									O				
Smoke detector near Fire alarm panel in unoccupied room		O			O													
Smoke detector for release of magnetic door holder protecting stair door opening.		O			O					O					O			
Kitchen hood suppression system activation	O			O			O				O							

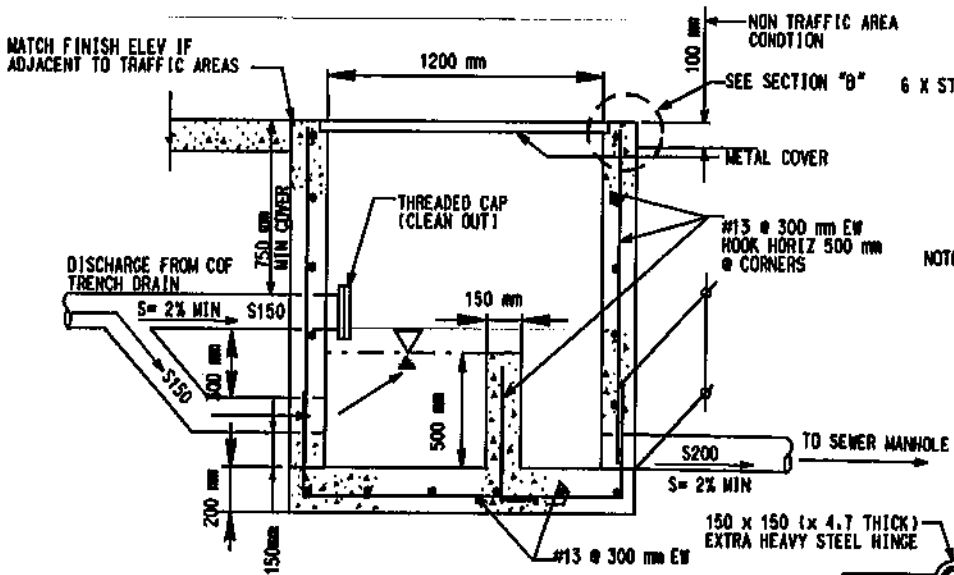
NOTES:
1. This control sequence supercedes any conflicting sequence in the specification or other RFP document.
2. This is the minimum sequence of operation required for this project. Revision of any sequence must be approved by the Contracting Officer through coordination with the designer and District Fire Protection Engineer.
3. The operation sequence indicated is not complete. Provide other operation sequences in accordance with NFPA 72 and RFP Documents.

ATTACHMENT 7

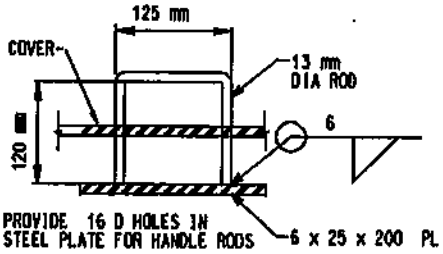
(NOT USED)

ATTACHMENT 8

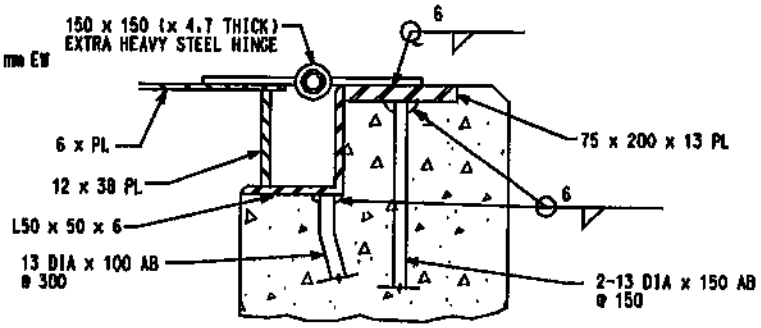
TYPICAL GAS TRAP DETAIL



SECTION "A-A"



HANDLE DETAIL



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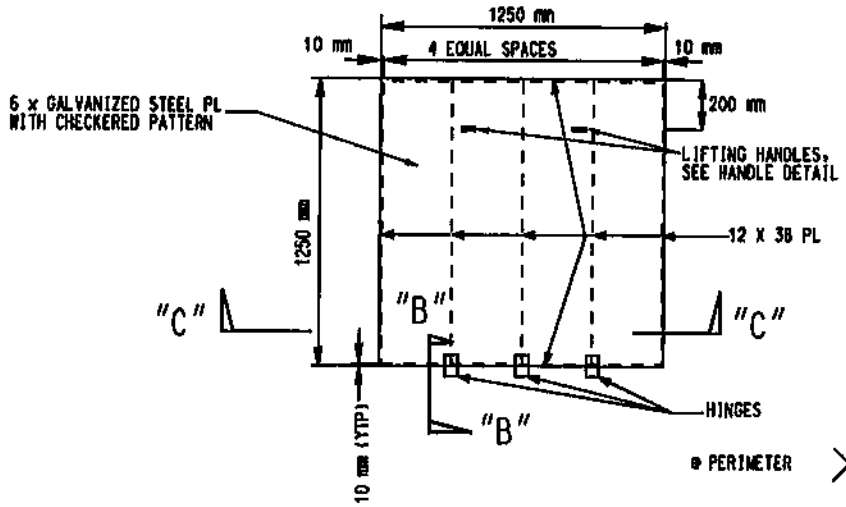
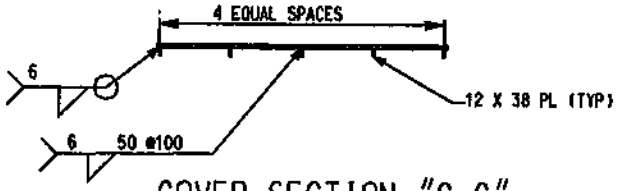
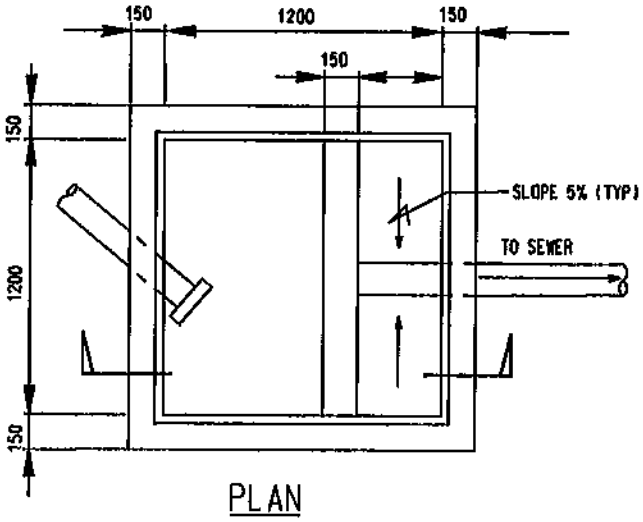


COVER-PLAN



COVER-SECTION "C-C"



PLAN

NOT TO SCALE

NOTE: ALL UNITS ARE IN MILLIMETERS (mm) UNLESS INDICATED OTHERWISE.

FY01 MCA PN 52265 WBR & BUP PN 52266 WBR, PHASE 4A, RENOVATE QUAD F
SCHOFIELD BARRACKS, OAHU, HAWAII

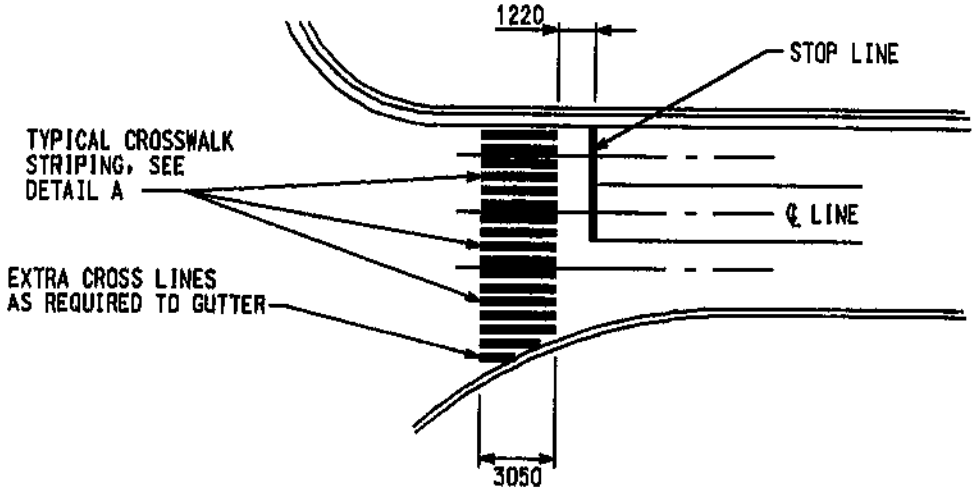
TYPICAL GAS TRAP DETAIL

FEBRUARY 2001	ATTACHMENT 8

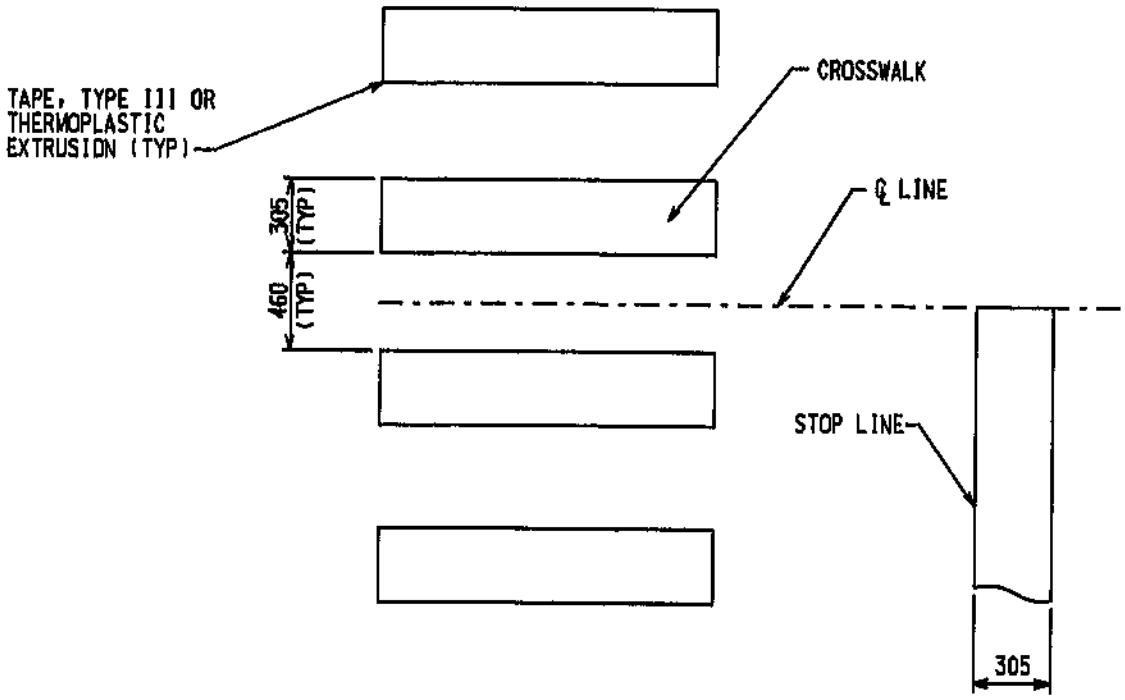
SHT

ATTACHMENT 9

CROSSWALK & STOP LINE DETAIL



PLAN
NOT TO SCALE



DETAIL "A"
NOT TO SCALE

NOTE: UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS.

FY01 MCA PN 52265 WBR & BUP PN 52266 WBR
PHASE 4A, RENOVATE QUAD F
SCHOFIELD BARRACKS, OAHU, HAWAII

CROSSWALK & STOP LINE DETAIL

FEB 2001

ATTACHMENT 9

ATTACHMENT 10

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TECHNICAL MANUAL

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NOVEMBER 1986

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AIR FORCE MANUAL
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HEADQUARTERS
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WATER SUPPLY, WATER DISTRIBUTION

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*Supersedes TM 5-813-5/AFM 88-10, Vol 5, 31 January 1968.

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CHAPTER 1

GENERAL

1-1. Purpose and scope. This manual provides criteria for design and construction of potable water distribution systems for fixed military installations. Within the context of this manual, a water distribution system is considered to consist of all mains, service lines, valves, pumps, hydrants, and ancillary equipment needed to carry water from the source of potable water to the various points of use. Water distribution within an individual building or group of buildings is covered in TM 5-810-5/AFM 88-8, Volume 4. This manual is applicable to all elements of the Army or Air Force charged with planning or performing military construction.

1-2. Definitions. The following definitions, in addition to those given in paragraph 1-4, TM 5-813-1/AFM 88-10, Volume 1 are applicable to this manual.

a. Backflow. The flow of any foreign liquids, gases, or other substances into the distributing pipelines of a potable supply of water from any source or sources not intended.

b. Back-siphonage. The backing up, or siphoning, of a foreign liquid into a potable water system; this occurs when the potable water system, at any point or place, is at a pressure less than atmospheric, with an opening or break in the system, thereby drawing the foreign liquid toward the potable water.

c. Cross connection. Any physical connection which provides an opportunity for nonpotable water to contaminate potable water.

d. Distribution mains. All pipelines of the distribution system, except the small service pipes connecting building systems to the supply.

e. Transmission mains. Those pipelines or conduits which carry water from one point to another without intermediate service connections; e.g., pipelines from a pumping station to a reservoir.

1-3. System planning. The distribution system must reliably and economically supply water, in adequate quantities and at adequate pressures, to all water users. In order to plan or design a water distribution system, the location or point of demand must be known or assumed, and the magnitude of each demand known or estimated; water demands may then be categorized by purpose as domestic, industrial, special, or fire protection. Criteria for determining water demands are discussed in TM 5-813-1/AFM 88-10, Volume 1; AFM 88-10, Chapter 6; and TM 5-813-7/AFM 88-10, Volume 7. Criteria for sizing and locating water treatment plants and water storage facilities are presented in TM 5-813-3/AFM 88-10, Volume 3; and TM 5-813-4/AFM 88-10, Volume 4. Sizing of the water treatment plant, water storage facilities, distribution pumps, or distribution mains, is dependent on the size of the other parts of the system. It is not practical to size individual distribution mains without considering the other elements of the system. The effectiveness of any proposed combination of storage, pumping, and distribution works in meeting projected peak demands is best determined by hydraulic analyses of the system. Such hydraulic analyses, usually performed on digital computers, are very helpful to system planning.

1-4. Cross connections. (Cross connections and backflow prevention for Air Force facilities are defined in AFM 85-21).

a. Avoidance of cross connections. If fires are to be fought with both potable and nonpotable supplies, separate distribution systems must be used to deliver the two types of water to the required area. Hydrants or other connections for each system should be suitably identified to discourage improper use. Standby water reservoirs serving fire protection systems are sometimes filled from both potable and nonpotable supplies. If this is the case, the potable water shall be discharged to the reservoir through an air break not less than 12 inches above the maximum water level of the reservoir. In a similar manner, where potable water is to be used as gland seal on a pump handling nonpotable water, the potable water must be stored in a tank with an air gap between the end of the water supply line and the top of the tank. Special care must also be taken of such items as valve pits and water storage facilities to ensure that surface water runoff cannot enter potable water systems. Other situations that can result in back-siphonage are flexible hose having one end immersed in nonpotable water and the other end connected to a potable water hose bib, potable waterlines entering swimming pools

without air gaps, lawn irrigation systems with sprinkler heads flush with the ground, and improper connections at vehicle wash racks.

b. Prevention of backflow. Devices for the prevention of backflow include air gaps and reduced-pressure-principle backflow preventers. Air gap distances should be at least twice the diameter of the water supply line, and reduced-pressure-principle backflow prevention devices should meet the criteria of American Water Works Association (AWWA) C506 (See app A for references). Double check valves for backflow prevention are not considered suitable and should not be used. Back-siphonage can be prevented with air gaps, atmospheric-type vacuum breakers, or pressure-type vacuum breakers.

CHAPTER 2

PRESSURE REGULATION ALTERNATIVES

2-1. General. The pressure levels for the distribution system are set by chapter 4. Alternative means to maintain these pressures consist of gravity systems, direct pressure systems, pneumatic system or a combination of the above. Pressure regulating valves are available to reduce system pressures if required.

2-2. Gravity pressure systems. This is the preferred method of maintaining adequate pressure in the system. Gravity pressure systems are inherently associated with elevated storage. A storage facility provides a reservoir in which the inflow and outflow of water can better match the hourly consumer demand and can be a supply source during emergency situations such as interruptions in the normal supply service or heavy demands for fire fighting. Reservoirs should be located within or adjacent to load centers (i.e., areas of high demand) of the distribution grid to meet water demands in those areas without causing high velocities and head losses in the distribution mains. The pressure in the system supplying water to the storage facility needs to be sufficient to fill the reservoir. If it is not, booster pumps may be required. Two types of tanks may be used in a gravity pressure system: elevated and ground storage tanks.

a. Elevated tank. Where ground elevations are relatively uniform, an elevated tank will be considered to maintain pressure in lieu of ground storage facilities where practical. The tank will be adequately sized in accordance with TM 5-813-4/AFM 88-10, Vol. 4. The height of the tank will be determined from the topography of the area served, the height of the buildings and the pressure losses in the distribution system. Standard and special designs are available in sizes up to 3,000,000 gallons. Standard design will be utilized except where special conditions warrant other designs. Special designs on Air Force projects will be subject to approval by HQ USAF/LEEEU, Washington, D.C. 20332. In addition, altitude valves, check valves and shut off valves are necessary to control the level of water in the tank and to provision or isolate portions of the distribution system during emergencies. These are to be contained in a valve pit near the base of the tank, protected from freezing, and will provide for appropriate connections to the distribution system.

b. Ground level storage. Ground level storage can consist of steel standpipes and steel or concrete ground storage reservoirs. These are to be designed where there is sufficient difference in ground elevation to maintain adequate pressure in the distribution system. Concrete reservoirs can be designed for any size system, but are more often used for larger sizes, i.e., those exceeding 1,000,000 gallons. Standpipes of 6 to 20 feet in diameter may be installed for small systems. If the differences in natural ground elevations is insufficient to maintain pressures, booster pumps may be required in conjunction with ground storage to increase system pressure.

c. Sizing of storage volume. The maximum and minimum elevations of water in the tank determine the pressure in the distribution system and should be designed accordingly. The required volume determines the surface area of the tank which is based on daily use and fire flow demand. Refer to TM 5-813-4/AFM 88-10, Vol. 4.

2-3. Direct-pressure systems. A direct pressure distribution system is one in which no elevated storage is provided, and the required distribution pressures are maintained only by pumping facilities. A ground level storage tank may be provided to serve as an intake supply for the pumping facilities. Direct-pressure distribution systems will be considered only where the military use or special requirements will not permit the utilization of elevated storage tanks. Caution must be used in design to reduce surge pressure and compensate for variable volume demands. Provisions must be made to ensure the availability of sufficient supply to meet fire and emergency demands. The pumping facilities in a direct-pressure system must have firm capacities equal to or greater than the peak demand rates exerted on the system. The firm capacity of a pumping facility is the total pumping capacity with the largest pump out of service. Automatic controls are available which react to pressure sensors and cycle the pumps according to a sequence which may be predetermined by the operator.

a. Pumping stations. For variable flow requirements, consideration will be given to variable speed pumps, multiple pumps with stage control, flow regulating valves, or flow recirculation. The usual location is at the supply and treatment facility. Additional units may be located within the distribution system. Consideration should be given to providing a by-pass around pumps in the distribution system so that some flow may be maintained even when the pump is out of service. The pumps and associated equipment shall be contained in a vault or pump house to protect the equipment from the environment.

b. Line boosters. Line booster stations may be designed where system head loss dictates their use. This may include distribution system areas that are remote from pumping stations, high rise building areas where normal pressure is inadequate, localized areas of higher elevation or extensions to existing distribution system where the cost of additional elevated storage is prohibitive. These pumps may be submersible turbine pumps, mounted in housings which can be installed in a water main much the same as a regular section of pipe. The pumps may be buried underground. As with all electrical-mechanical devices, they are subject to maintenance needs. Therefore, provision must be made for future maintenance which may include excavation of the installation. Other types of pumps, most commonly centrifugal, may be installed in a vault or pump house. This installation is designed as any other pump station.

c. Multiple pressure levels. In multiple pressure level distribution systems, where pumps are installed in the system, the designer should check for circulation around the pumps. If recirculation of water from the high pressure system to the low pressure system is possible, which would cause the water to be pumped twice, distribution line valves must be closed or check valves should be installed.

2-4. Pneumatic System. A hydropneumatic tank "riding" on the system serves two functions. First, it can act as a reservoir of water for emergency supply for a short period of time such as a supply for a sprinkler head; second, it can act as an air spring or piston and is a reservoir of stored energy to maintain pressure in the system and help avoid short-cycling of the pumps.

a. Applicability. Hydropneumatic distribution systems are applicable where demands are less than 500 gallons per minute. Hydropneumatic tanks will be designed and constructed in accordance with ASME Boiler and Pressure Vessel Code, Section VIII.

b. Pressure settings. The low pressure setting on the hydropneumatic tank is determined by distribution system requirements. The recommended minimum operating pressure is 30 pounds per square inch (psi), at the highest ground elevation in the distribution system. The high pressure setting on the hydropneumatic tank is dependent on the maximum allowable pressure in the distribution system. The recommended maximum operating pressure is 100 psi. For a specific application, the pressure variation in the tank is normally about 20 psi. The low water level (water level at the low pressure setting) must be high enough to provide a water seal. At the low water level, the water remaining in the tank should be at least 10 percent of the capacity of the tank. The high water level should be calculated to provide maximum efficiency. The pumps will be sized to deliver 125 percent of the calculated peak demand of the distribution system. The tank size will be at least 10 times the rated capacity of the pump. The tank will be sized so that the pump cycles not less than 4 times per hour, nor more than 10 times per hour, unless the pump motor horse-power rating exceeds 50, in which case the maximum number of cycles will be 6 per hour. Completely automatic hydropneumatic tank controls are available to maintain proper operating conditions (correct air-water volume ratios) during each pump cycle. An auxiliary air compressor-type, air charging system will be used for tanks larger than 750 gallons and pressures higher than 75 psi. An air volume control valve operation will be used to maintain correct air-water volume ratios for all other applications.

2-5. Pressure regulating valves. Pressure regulating valves function to reduce an existing high pressure to a uniform downstream pressure. Although this function can be accomplished by partially closed line valves, this method requires manual operation or motorized operators with remote control and continuous monitoring. Automatic pressure reducing and sustaining valves are available which react to distribution system pressures. These valves operate on two principles.

a. Direct action. A direct-acting regulator cannot regulate pressure closely if considerable range of variation between the wide open and nearly closed positions is required. The regulated pressure is influenced considerably by variations in the high-pressure side, and a great differential must always exist between the high side and the regulated side. Such regulators give excellent service in small sizes where accurate regulation is not important or where the rate of flow is fairly steady.

b. Pilot operated. In water distribution regulation, it is important to sustain the pressure as load increases. With pilot-operated reducing valves, it is possible to get extremely close regulations at any flow up to the full capacity of the valve wide open. Pilot-operated valves may chatter and perform improperly when flow is very small and the disc or piston is close to the seat. Each valve must be provided with two gate valves, permitting it to be shut off for repairs without interfering with other valves. Pressure regulators, like other automatic equipment, should be inspected weekly to insure good operation and discover the need for preventive maintenance before a serious breakdown occurs.

CHAPTER 3

DISTRIBUTION MAINS

3-1. Main sizes. Maximum and minimum distribution systems pressure requirements are given in chapter 4. Distribution system hydraulic analysis are given in appendix B. Water distribution mains of various materials are readily available in sizes ranging from 6 to 48 inches inside diameter; large pipes up to 144 inches and greater can be specially made. Minimum diameter for distribution mains and fire branches is 6 inches.

a. Domestic requirements. The system should be capable of delivering the peak domestic demand as described in TM 5-813-1/AFM 88-10, Volume 1, plus any special requirements, at pressures not lower than 30 pounds per square inch at ground elevation. The required daily demands should be determined by calculating the effective populations of various areas to be served and applying the appropriate per capita water allowances (TM 5-813-1/AFM 88-10, Volume 1). Guidance on the estimation of demands at special projects is given in TM 5-813-7/AFM 88-10, Volume 7. For small installations not having elevated storage, the peak domestic demand will be determined on a fixture basis (TM 5-810-5/AFM 88-8, Volume 4).

b. Fire Flows. The distribution system will be designed to deliver the necessary fire flow requirements, the required daily demand (TM 5-813-1/AFM 88-10, Volume 1), and any industrial or special demands which cannot be reduced during a fire. When only hose streams are supplying the required fire flow streams, residual ground level water pressures at fire hydrants should be not less than 10 pounds per square inch. If sprinkler systems are used, residual pressures adequate for proper operation of the sprinkler systems must be maintained. Specific guidance as to fire flows and pressure required for various structures and types of fire protection systems is given in AFM 88-10, Chapter 6 for Air Force applications and MIL-HDBK-1008 for Army applications.

c. Friction losses. In computing head losses due to friction in a distribution system, the Hazen-Williams formula, as given below, will be used.

$$V = 1.318\, CR^{0.63}S^{0.54} \qquad \text{(eq 3-1)}$$

where

V = the mean velocity of the flow, in feet per second.

R = the hydraulic radius of the pipe in feet, i.e., the cross-sectional area of a flow divided by the wetted perimeter of the pipe. For a circular pipe flowing full, the hydraulic radius is equal to one-fourth the pipe diameter.

S = the friction head loss per unit length of pipe (feet per feet).

C = a roughness coefficient, values of which depend on the type and condition of pipe. Typical values of this coefficient are shown in table 3-1.

Table 3-1. Pipe materials and valves

Pipe Material	C
Concrete (regardless of age)	130
Cast iron:	
New	130
5 years old	120
20 years old	100
Welded steel, new	120
Wood stave (regardless of age)	120
Asbestos-cement	130
Plastic (PVC, Fiberglass)	130

Values as high as 150 are claimed for plastic pipe. The values shown in table 3-1 are considered practical limits because of losses that may result due to fittings and valves, and because of improper installation. Hydraulic analyses will normally be made using a value of 100 for the roughness coefficient. However, consideration should be given to the use of coefficients greater than 100 when specifying concrete, asbestos-cement, or plastic pipe under conditions that experience has shown will not seriously reduce the carrying capacity of these pipes, within the anticipated economic life of the project. Coefficients greater than 130 should not be used. In some cases, expansions to existing distribution networks, rather than entirely new networks, must be planned. In such instances, it may be desirable to determine the roughness coefficients of the existing pipelines

through a series of coefficients tests. These involve isolating sections of pipeline to the greatest extent possible, measuring the flow through the pipelines, and monitoring the changes in the hydraulic gradient between different points on the same pipes. This information can be used to derive the friction head loss per unit length of pipe, and, in turn, a roughness coefficient can be calculated.

d. Fire-hydrant branches. Fire-hydrant branches (from main to hydrant) should not be less than 6 inches in diameter and as short in length as possible, preferably not longer than 50 feet with a maximum of 300 feet.

3-2. Location of mains.

a. General. Mains should be located along streets in order to provide short hydrant branches and service connections. Mains should not be located under paved or heavily traveled areas and should be separated from other utilities to ensure the safety of potable water supplies, and that maintenance of a utility will cause a minimum of interference with other utilities.

b. Distribution system configuration. The configuration of the distribution system is determined primarily by size and location of water demands, street patterns, location of treatment and storage facilities, and topography. Two patterns of distribution main systems commonly used are the branching or dean end, and gridiron patterns.

(1) *Branching system.* The branching system shown in figure 3-1 evolves if distribution mains are extended along streets as the service area expands. Dead ends in the distribution system are undesirable and should be avoided to the extent possible.

(2) *Gridiron system.* The second distribution configuration is the gridiron pattern shown in figure 3-1. The gridiron system has the hydraulic advantage of delivering water to any location from more than one direction, thereby avoiding dead ends. The use of a gridiron pattern looped feeder system is preferable to the use of a gridiron pattern with a central feeder system because the looped feeder supplies water to the area of greatest demand from at least two directions. A looped feeder system should be used for water distribution systems whenever practicable. Although it is advantageous to have all water users located within a grid system, it is often impracticable to do so. Water is normally delivered to a remote water user, or a small group of users, by a single distribution main. Therefore, the majority of the water users are served within a gridiron system while the outlying water users are served by mains branching away from the gridiron system. Branching mains should be avoided to the greatest extent possible.

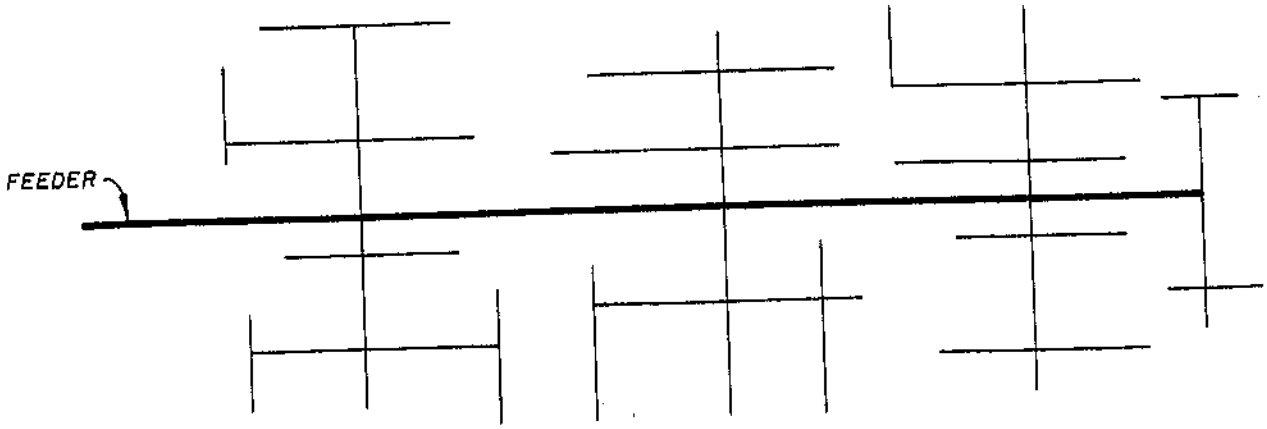
c. Horizontal separation between water mains and sewers. Water mains should be laid horizontally, a minimum of 10 feet, from any point of existing or proposed sewer or drain line. Water mains and sewers must not be installed in the same trench. If any conditions prevent a horizontal separation of 10 feet, a minimum horizontal spacing of 6 feet can be allowed, but the bottom of the water main must be at least 12 inches above the top of the sewer. Where water mains and sewers follow the same roadway, they will be installed on opposite sides of the roadway, if practicable.

d. Water main sewer crossings. Where water mains and sewers must cross, the sewer will have no joint within 3 feet of the water main unless the sewer is encased in concrete for a distance of at least 10 feet each side of the crossing. If special conditions dictate that a water main be laid under a gravity-flow sewer, the sewer pipe should be fully encased in concrete for a distance of 10 feet each side of the crossing, or should be made of pressure pipe with no joint located within 3 feet horizontally of the water main, as measured perpendicular to the water main. Pressure sewer pipe shall always cross beneath water pipe and a minimum vertical distance of 2 feet between the bottom of water pipe and the top of pressure sewer pipe shall be maintained. The sewer must be adequately supported to prevent settling.

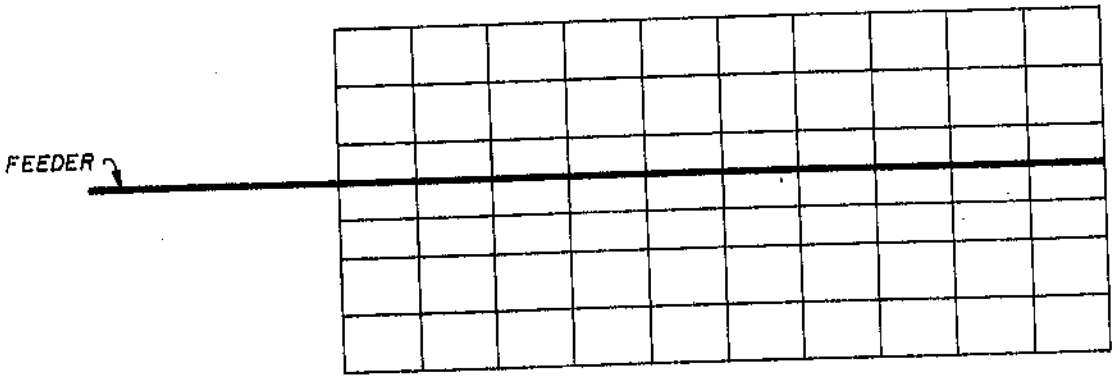
e. Protection in airfield pavement areas. Water mains should not be located under airfield pavement areas if other locations are available and economically feasible. Special protection of the mains are required when alternative locations are not available and it is necessary to locate water mains under pavement areas on which aircraft move under their own power. The amount of protection needed is dependent upon the importance of maintaining a supply of water to the area served by the main, and on the availability of emergency water supplies to the affected area. The degrees of protection should be considered as follows:

(1) *Minimum protection.* The water main must be enclosed in a vented, open-end, outer conduit from which the main can be removed for repairs or replacement. The outer conduit must have sufficient strength to support all foreseeable loadings.

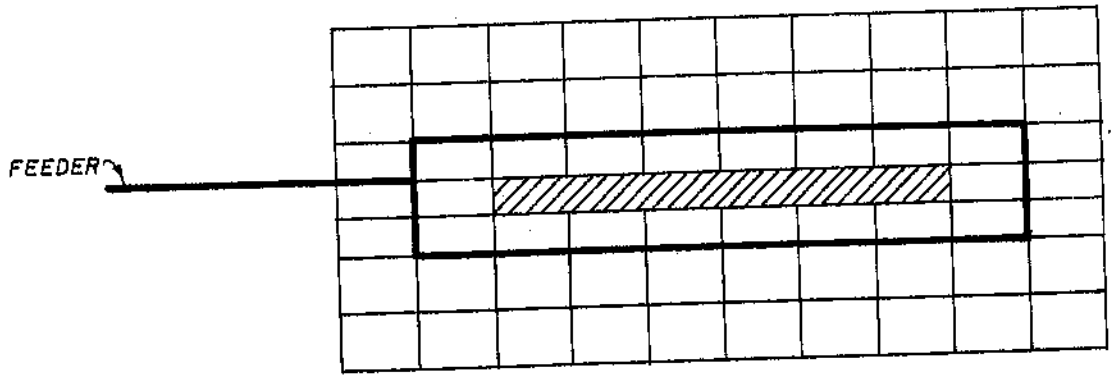
(2) *Intermediate protection.* Intermediate protection requires the water service to be carried under the airfield pavement by dual waterlines enclosed in an outer conduit or, preferably, in separate conduits.



(A) BRANCHING OR DEAD-END PATTERN



(B) GRIDIRON PATTERN WITH CENTRAL FEEDER



(C) GRIDIRON PATTERN WITH LOOPED FEEDER
(AREA OF HIGHEST DEMAND CROSS-HATCHED)

WATER DISTRIBUTION SYSTEM PATTERNS

Figure 3-1. Water distribution system patterns.

(3) *Maximum protection.* Where more than one utility crosses the airfield pavement and individual crossings would be more expensive than a combined crossing, the utilities will be enclosed in a utility tunnel of sufficient size for in-place repairs. Special precautions must be taken in the placement and protection of individual utility lines within the tunnel to ensure that failure of one utility does not affect the service of the others. Special protection of mains is not required where the mains are located beneath pavement areas that are not normally subject to the movement of aircraft under their own power, such as hangar access aprons on which aircraft would be towed.

3-3. Dual water supplies.

a. Applicability. Dual water supply systems consist of independent pipe networks supplying two grades of water to users. The higher quality water is used for domestic purposes such as drinking, cooking, dishwashing, laundry, cleaning, and batching; the lower quality water may be used for toilet flushing, fire fighting, lawn and garden watering, and commercial or industrial uses not requiring high quality water. Dual water supply systems are not feasible except under unusual circumstances. A dual water supply might be utilized when the only available water supply is brackish and the cost of a dual system is less than the demineralization cost of all the water supplied to users; or when only a limited quantity of higher quality water is available, and it is more economical to construct a dual system than to implement the required treatment of the lower quality water. If a dual water supply system is established and the lower quality water use might result in human contact or ingestion (e.g., toilet flushing, lawn and garden watering), both water supplies must be disinfected.

b. Evaluation of dual water supply system. The design of dual water supplies will be determined using results of feasibility studies which have substituted all engineering, economic, energy, and environment factors. If a dual water supply system is installed and a brackish water is used as the lower quality water, metallic pipes and plumbing facilities exposed to the brackish water may have considerably short lifespans than similar facilities exposed to water of better mineral quality. There will be no connection between the two pipe networks of a dual distribution system.

3-4. Recycling used water. There are operations that generate effluent water than can be reused for the same operation after minimal treatment. This does not constitute a dual system. Examples of such effluents are laundry wastes, vehicle washrack waste water, and plating operations waste water. Recycling of such water should be practiced wherever feasible.

CHAPTER 4

DISTRIBUTION SYSTEMS PRESSURES

4-1. General. Water distribution systems should be designed to maintain operating pressures within the system between 40 and 75 pounds per square inch at ground elevation. Minimum pressures of 30 pounds per square inch under peak domestic flow conditions can be tolerated in small areas as long as the distribution system is also capable of meeting fire flow requirements to these areas. Minimum ground-level residual pressures at fire hydrants will be at least 10 pounds per square inch while supplying fire flows. Maximum pressures of 100 pounds per square inch can be allowed in small, low-lying areas not subject to high flow rates and surge pressures. Areas of excessively high or low pressures require that the system be divided into multiple pressure levels.

4.2 Multiple levels. Where multiple-level systems are required, it is desirable to establish the lines of separation so that the pressures in each system will approach the optimum range of 40 to 75 pounds per square inch. Three or more levels will not be used unless distribution pressures in a large area of the two-level system fall below 30 pounds per square inch, or approach or exceed 100 pounds per square inch. In all circumstances, fire flows must be adequate.

4-3. Pressure-reducing valves. Pressure-reducing valves wil be required in areas of the distribution system that have pressures in excess of 100 pounds per square inch. The pressure-reducing valves may be installed on the mains serving these areas or on the individual building service lines in high-pressure areas. If pressure-reducing valves are to be installed on individual service lines, the preferred location is adjacent to, and upstream from, the water meter for each building or immediately inside the building being served. In some cases, it may be necessary to install pressure-reducing valves only on lines to certain plumbing or heating units which are adversely affected by excessive pressures.

4.4 Pressure-relief valves. Pressure-relief valves should be installed in all systems which might be subjected to greater than allowable pressures. In systems with 100-pounds per square inch pumps, the pressure-relief valves should be set to discharge at 120 pounds per square inch; pressures greater than 120 pounds per square inch may be experienced fo brief periods during testing or operation of thes pumps. All pumps driven by variable speed motor or engines should be provided with relief valves and if the shutoff pressure of any pump exceeds 12(pounds per square inch, the pressure-relief valves should be installed and set at approximately 120 pounds per square inch.

4.5 Waterhammer.

a. Definition. Waterhammer is sometimes called surge or transient pressure. The phenomena is caused by rapid changes in flow in closed conduits which cause pressure waves to travel through the liquid, both upstream and downstream from the point of origin.

b. Causes. The most common causes of waterhammer include rapid valve closure, starting and stopping of pumps and conduit failure. Types of valves include main lines, fire hydrant or reservoir fill. Other causes include a sudden stop in usage by a large customer or the sudden joining of a column of water that had been separated by a vacuum.

c. Pressure analysis. Consideration of waterhammer and transient pressure surges is based on the elastic wave theories of Joukowski and Allievi. The basic concepts are:

— the magnitude of the pressure rise is proportional to the changes in fluid velocity and pressure wave.

— the pressure rise is independent of the length and profile of the pipe.

— the velocity at the pressure wave is the same as the velocity of sound through water.

The problem becomes complex in an actual pipeline because the pressure wave is reflected at a line terminus and then travels back to the point of origin, where it may again be reflected. This continues until the wave is dampened by friction. All waterhammer problems ultimately require the determination of line pressure at one or more locations along a pipeline, at one or more points in time. The waterhammer pressure is the result of the combined effect of all direct and reflected pressure waves.

d. Prevention and control. Waterhammer due to valve closure can be minimized by the use of slow closing valves. Surges caused by the starting or stopping of centrifugal pumps can usually be prevented by use of check valves on the pump's discharge line. Other methods of control include pressure relief valves, anticipating pressure relief valves, vacuum relief valves, surge tanks and air chambers.

4-6. Cavitation. Cavitation is a complex phenomenon that may take place in pumps. In a centrifugal pump, as liquid flows through the suction line and enters the eye of the impeller, the velocity increases and pressure decreases. If the pressure falls below the vapor pressure corresponding to the temperature of the liquid, pockets of vapor will form. When the vapor pockets in the flowing liquid reach a region of higher pressure, the pockets collapse with a hammer effect causing noise and vibration. Tests have shown that extremely high instantaneous pressures may be developed in this manner, resulting in pitting various parts of the pump casing and impeller. Conditions may be mild or severe and mild cavitation may occur without much noise. Severe cavitation can result in reduced efficiency and ultimate failure of the pump if steps are not taken to eliminate the cause.

CHAPTER 5

DISTRIBUTION SYSTEM EQUIPMENT

5-1. Valves. The types of valves most frequently used in water distribution are gate, butterfly, ball, plug, globe, and check valves. Applications of the various types of valves and the standards to be used for these valves are given in table 5-1. All valves should have the direction to open shown on their operators.

a. Gate valves. Gate valves may have either a single solid wedge gate or double disc. Solid wedge gates are satisfactory in sizes up to 6 inches, but double disc gates should be used for larger sizes. Because of the excessive wear and leakage of the gates and seats which may result, gate valves should not be used where frequent operation is required. If gate valves are left open for long periods, debris may accumulate in the seats and prevent complete closure, but if left closed for long periods, deposits may prevent opening. Gate valves should be operated periodically to break loose any deposits which might have formed. Large gate valves should be geared to make operation easier. A typical double gate valve is shown in figure 5-1.

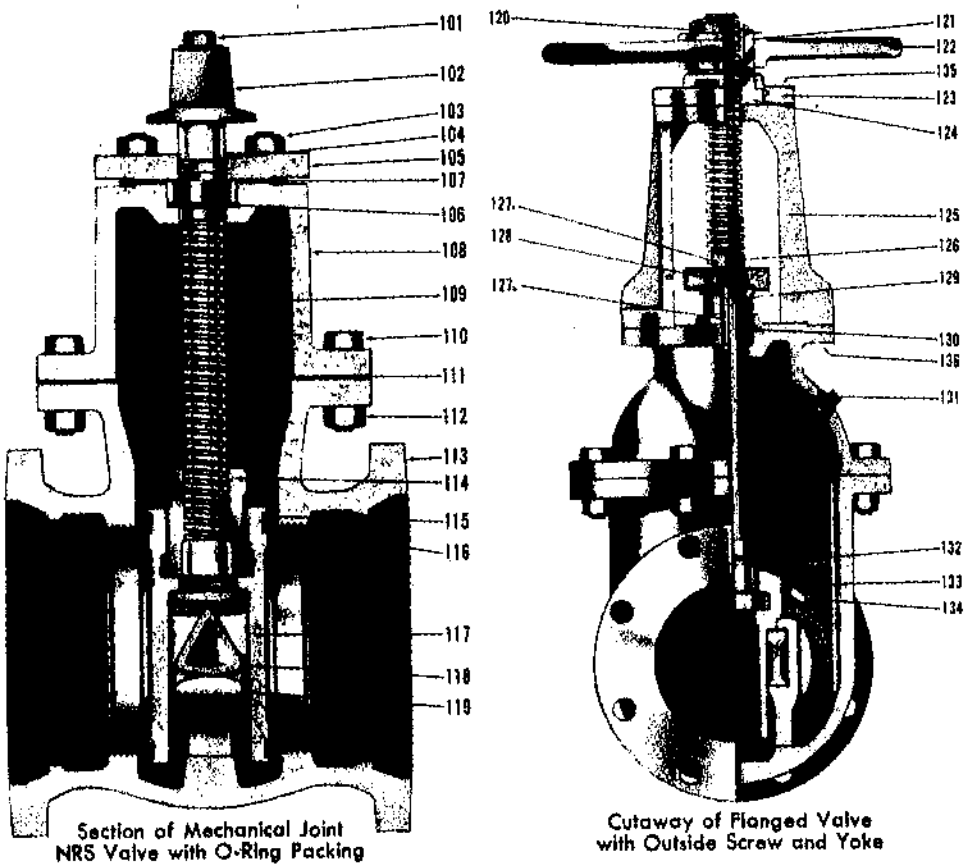
b. Butterfly valves. The advantage of butterfly valves include easy operation, small space requirement, low cost, minimum maintenance, low head loss, driptight shutoff, suitability for throttling, and reliability. A disadvantage is that main cleaning and lining equipment cannot be used in lines containing butterfly valves without removing the valves. Mechanical valve operators will be designed to restrict the rate of closure so that water hammer will not occur in the system in which the valve is installed. A typical butterfly valve is shown in figure 5-2.

c. Ball valves. Ball valves have the advantage of ease of operation, reliability, durability, and capability of withstanding high pressures, but are usually expensive. A typical small-diameter ball valve is shown in figure 5-2.

d. Plug valves. Lubricated and eccentric plug valves are the types of plug valves commonly used. Lubricated plug valves normally have a cylindrical

Table 5-1. Valve applications and standards.

Type	Applications	Sizes to be Used (diameter, inches)	Standard
Gate	Sectionalizing distribution mains. Isolating fire-hydrant branches.	3 or larger	AWWA C500, Standard for Gate Valves - 3 in. through 48 in. - For Water and Other Liquids.
Butterfly, rubber seated	Mains with water pressures less than 150 lb/in².	3 or larger	AWWA C504, Standard for Rubber-seated Butterfly Valves.
Ball	Applications involving throttling or frequent operation. Water service lines.	6 or less	AWWA C507, Standard for Ball Valves, Shaft - or Trunnion Mounted - 6 in. through 48 in. - For Water Pressures up to 300 psi.
Plug	Applications involving throttling or frequent operation. Water service lines.	6 or less	
Globe	Throttling operations. Water service lines.	2 or less	

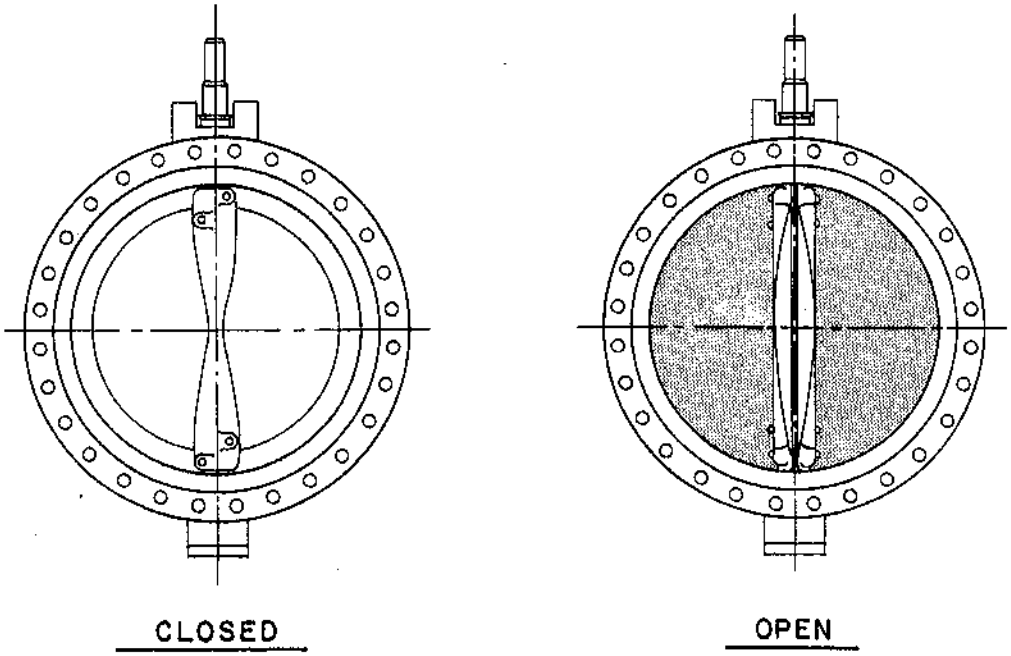


Section of Mechanical Joint NRS Valve with O-Ring Packing

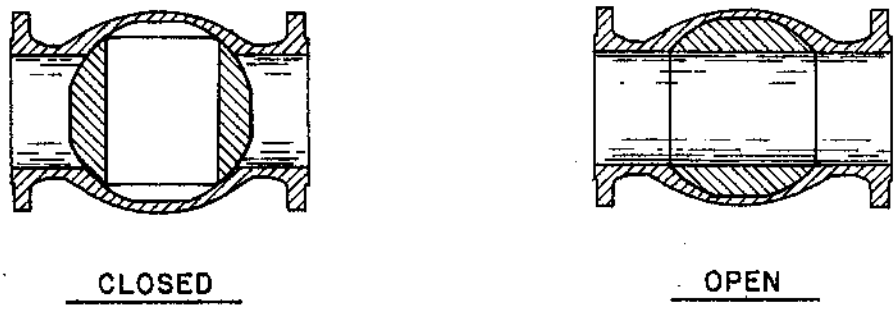
Cutaway of Flanged Valve with Outside Screw and Yoke

	Part	No.	Material
101	Cap Screw	1	Steel
102	Operating Nut	1	Cast Iron
103	O-Ring Plate Bolts & Nuts		Steel
104	O-Rings	2	Rubber
105	O-Ring Plate	1	Cast Iron
106	Low Torque Bearing	1	
107	Stuffing Box Gasket	1	
108	Cover	1	Cast Iron
109	Non-rising Stem	1	Bronze
110	Neck Flange Bolts		Steel—Rust-proofed
111	Neck Flange Gasket	1	Composition
112	Neck Flange Bolt Nuts		Steel
113	Body	1	Cast Iron
114	Gate Nut	1	Bronze
115	Gate Ring	2	Bronze
116	Case Ring	2	Bronze
117	Gate	2	Cast Iron
118	Wedge	2	Bronze
119	Hook	2	Cast Iron
120	Hold Down Nut	1	Bronze
121	Handwheel Key	1	Steel
122	Handwheel	1	Cast Iron
123	O.S.&Y. Retainer Plate	1	Cast Iron
124	O.S.&Y. Stem Nut	1	Bronze
125	O.S.&Y. Yoke	1	Cast Iron
126	Rising Stem	1	Stainless Steel
127a	Follower Nuts	2	Bronze
127b	Follower Studs	2	Steel—Rust-proofed
128	Follower Plate	1	Cast Iron
129	Follower Gland	1	Bronze
130	Packing		Braided Asbestos
131	Test Plug	1	Teflon-coated steel
132	Stem Nut Pin	1	Bronze
133	Pegs	4	Bronze or Nylon
134	Straps	2	Stainless
135	O.S.&Y. R.P. Cap Screws		Steel—Rust-proofed
136	O.S.&Y. Yoke Bolts & Nuts		Steel—Rust-proofed

Figure 5-1. Double disc gate valve.



(A) TYPICAL BUTTERFLY VALVE



(B) TYPICAL SMALL-DIAMETER BALL VALVE

Figure 5-2. (A) Typical butterfly valve and (B) Typical small-diameter ball valve.

or tapered plug intersecting the flow with a rectangular port opening. Round ports can be obtained in the smaller sizes. Specially formulated greases are used both for lubrication and sealing of lubricated plug valves. When operated periodically, these valves are relatively easy to operate and provide a tight shutoff, but the plugs may freeze if not operated for a long period of time. Plug valves are especially good for high pressure applications. Eccentric plug valves are preferable to lubricated plug requirements; eccentric plug valves are also less prone to freeze. Ball and plug valves will not be used on buried pipelines, except when installed in a valve pit. The basic application for the eccentric plug valves are normally on small service lines.

e. Globe valves. Globe valves are particularly well suited to throttling operations and most plumbing fixtures are normally equipped with these valves. Small globe valves normally have rubberized discs and metal seats to provide driptight shutoff, but special discs and seats are available for more severe conditions; and may be used on water service lines 2 inches or less in diameter.

f. Check valves. Any valve used to prevent the reversal of flow is considered a check valve. Most check valves are equipped with plugs or hinged discs which close flow openings when flow is reversed. Rapid and complete valve closing is often ensured by the addition of special weights or springs to the plugs or discs. A newer type of check valve has spring-loaded, wafer-style, semicircular plates mounted on a vertical pivot through a flow port. The springs cause the plates to swing closed at the instant of flow reversal. This wafer-style check valve has the disadvantage of producing relatively high head losses and of showing excessive wear under some operating conditions.

g. Air release and vacuum relief valves. Air release valves are required to evacuate air from the main at high points in the line when it is filled with water, and to allow the discharge of air accumulated under pressure. Excess air allowed to accumulate at high points creates a resistance to flow, and an increase in pumping power requirements results. Vacuum relief valves are needed to permit air to enter a line when it is being emptied of water or subjected to vacuum. Special valves and vacuum relief valves should be installed at high points in the line or where a long line changes slope.

h. Valve location.

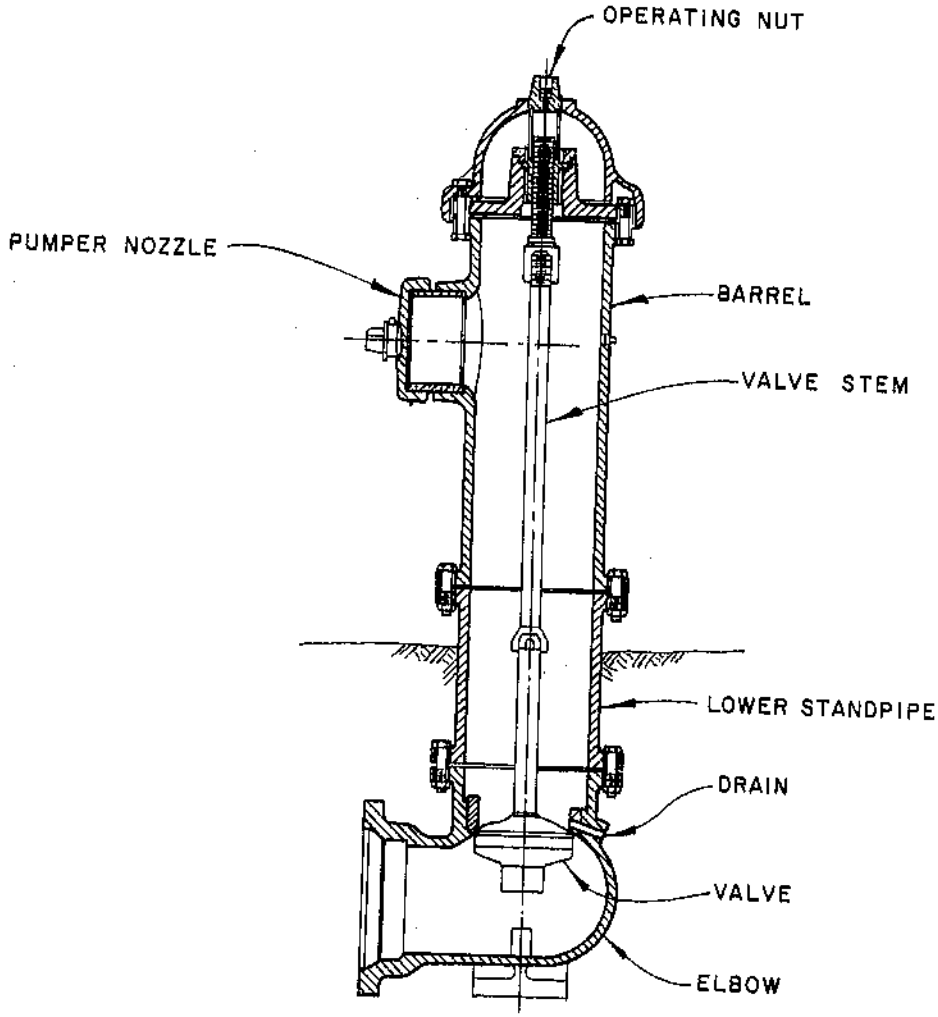
(1) *Shutoff valves.* The purpose of installing shutoff valves in water mains at various locations within the distribution system is to allow sections of the system to be taken out of service for repairs or maintenance without significantly curtailing service over large areas. Valves should be installed at intervals not greater than 5,000 feet in long supply lines, and 1,200 feet in main distribution loops or feeders. All branch mains connecting to feeder mains or feeder loops should be valved as closely to the feeders as practicable so that the branch mains can be taken out of service without interrupting the supply to other locations. In the areas of greatest water demand, or where the dependability of the distribution system is particularly important, maximum valve spacing of 500 feet may be appropriate. At intersections of distribution mains, the number of valves required will normally be one less than the number of radiating mains; the one valve will be omitted from the line which principally supplies flow to the intersection. Valves are not usually installed on branches serving fire hydrants on military installations. As far as practicable, shutoff valves should be installed in standardized locations (e.g., the northeast corner of intersections or a certain distance from the centerline of streets) so they can easily be found in emergencies. For large shutoff valves (approximately 30-inch diameter and larger), it may be necessary to surround the valve operator or entire valve with a vault to allow for repair or replacement. In important installations and for deep pipe cover, pipe entrance access manholes should be provided so that valve internal parts can be serviced. If valve vaults or access manholes are not provided, all buried valves, regardless of size, should be installed with special valve boxes over the operating nut in order to permit operation from ground level by the insertion of a special long wrench into the box.

(2) *Blowoff valves.* Blowoff valves or fire hydrants should be installed at the ends of dead-end mains to allow periodic flushing of the mains. Primary feeder mains and larger distribution mains should have a blowoff valve in each valved section which should be installed at low points in the mains where the flushing water can be readily discharged to natural drainage channels. Blowoff valves must be designed so that operation which will result in erosion or destruction of wildlife is not permitted. Special care must be taken to eliminate the possibility of contaminated water entering the distribution system through blowoff valves which have not been tightly closed.

5-2. Fire hydrants.

a. Types of fire hydrants.

(1) *Dry- and wet-barrel hydrants.* The most common types of fire hydrants are the dry- and wet-barrel varieties. They are similar in configuration



SCHEMATIC OF TYPICAL
DRY-BARREL FIRE HYDRANT

Figure 5-3. Schematic of typical dry-barrel fire hydrant.

and operation, but in the dry-barrel hydrant (AWWA C502), provision is made for draining water from the barrel after the hydrant is shut off. This is normally accomplished by gravity drainage through special drain outlets in the base or barrel of the fire hydrant. A dry-barrle hydrant is shown in figure 5-3. Wet-barrel hydrants (AWWA C503) can be used in areas where the temperature is always above freezing.

(2) *Safety hydrants.* Barrel-type hydrants extending aboveground are available in models which could be damaged by automobiles or trucks without disturbing the main valve. These are the safety or traffic fire hydrants and should be used near heavily traveled roads or intersections where adequate protection of the hydrant cannot be provided.

(3) *Flush-top hydrants.* In cases where the barrel-type aboveground hydrant would interfere with normal traffic, a flush-top hydrant can be utilized. The operating nut and hose nozzles in this type hydrant are located in a cast-iron box below ground level. The top of the box has a horizontal lid which is flush with the adjacent ground surface. However, flush-top hydrants are more difficult to locate than barrel-type hydrants, especially in areas subject to heavy snows, and once located are awkward to uncover and put into operation. Barrel-type hydrants are preferable to flush-top hydrants. Hydrants of all types should have the direction to open shown on their operators.

b. Hydrant nozzles. Nozzles on fire hydrants are either 2-1/2 or 4-1/2 inches in diameter. The 2-1/2 inch nozzle is for direct connection to fire hoses and the 4-1/2 inch nozzle is for use with mobile fire pumper units. Unless unusual conditions dictate otherwise, hydrants with two fire hose nozzles and one pumper nozzle should be used. The outlet nozzles on most hydrants are located at 90-degree angles to each other. The pumper outlet should normally face the street or intersection, and the two fire hose nozzles should face opposite directions, 90 degrees from the pumper nozzle. Hydrants with either more or less than three nozzles should be alined so that the nozzles are readily accessible from the street. Screw threads on hydrant nozzles should comply with the provisions of National Fire Protection Association (NFPA) 1963.

c. Hydrant spacing.

(1) *General.* Hydrant distributions will conform to the standards shown in table 5-2. Hydrant spacings must also conform to the guidelines given in AFM 88-10, Chapter 6 for Air Force applications and MIL-HDBK-1008 for Army applications.

Table 5-2. Hydrant distribution.

Required Fire Flow, gpm	Average Area per Hydrant, square feet
1,000 or less	160,000
1,500	150,000
2,000	140,000
2,500	130,000
3,000	120,000
3,500	110,000
4,000	100,000
4,500	95,000
5,000	90,000
5,500	85,000
6,000	80,000
6,500	75,000
7,000	70,000
7,500	65,000
8,000	60,000
8,500	57,500
9,000	55,000
10,000	50,000
11,000	45,000
12,000	40,000

(2) *Residential areas.* The preferred location for fire hydrants in residential areas is at street intersections. Where additional hydrants are required because of the above hydrant distributions, these additional hydrants will normally be located adjacent to streets approximately halfway between intersections. Each single or duplex family unit will have at least one hydrant within 300 feet and a second hydrant within 500 feet.

(3) *Airfields.* For airfield hangar areas, hydrants will be spaced approximately 300 feet apart, and where economically feasible will be connected to the base distribution system and not to the special system serving deluge sprinkler systems in the hangars. At Air Force double-cantilever hangar areas, hydrants will be connected only to the Base water distribution systen. For aircraft fueling, mass parking, servicing, and maintenance areas, the fire hydrants will be installed along the edge of aircraft

parking and servicing aprons. Hydrants will be spaced approximately 300 feet apart so that every part of the apron may be reached by approximately 500 feet of hose. Hydrants so located are not a hazard to moving aircraft, and no waiver of the provisions of AFR 86-5 is required. One or more hydrants will be located within 300 feet of all operational service points.

(4) *Individually sited buildings.* Where an adequately sized water main is available, or can be made available for an individually sited building such as a Reserve Center, two hydrants will be installed. However, one hydrant at the site is acceptable if the provision of a second hydrant would require extension of a water main beyond the point necessary to serve the domestic demands of the building.

(5) *Remote fuel storage areas.* Fuel storage facilities that are remotely located with relation to public or military installation water systems will generally not have fire hydrant protection. However, where the facility is of a critical nature or is of a high strategic or monetary value that would justify some degree of fire protection, appropriate recommendations will be furnished with necessary supporting information to HQDA (DAEN-ECE-G), WASH DC 20314-1000 or HQ USAF/LEEEU, Washington, D.C. 20332 for consideration.

d. Hydrant location.

(1) Proper clearance should be maintained between hydrants and poles, buildings, or other obstructions so that hose lines can be readily attached and extended. Generally, hydrants will be located at least 50 feet from the buildings protected and in no case will hydrants be located closer than 25 feet to a building, except where building walls are blank firewalls. Hydrants may be located adjacent to blank portions of substantial masonry walls where the chance of falling walls is remote.

(2) Street intersections are preferred location for fire hydrants because fire hoses can then be laid along any of the radiating streets. However, the likelihood of vehicular damage to hydrants is greatest at intersections, so the hydrants must be carefully located to reduce the possibility of damage. Hydrants should not be located less than 6 feet from the edge of a paved roadway surface, nor more than 7 feet. If hydrants are located more than 7 feet from the dege of the paved roadway surface and if the shoulders are such that the pumper cannot be placed within 7 feet of the hydrant, consideration may be given to stabilizing or surfacing a portion of wide shoulders adjacent to hydrants to permit the connection of the hydrant and pumper with a single 10-foot length of suction hose. In exceptional circumstances, it may not be practical to meet these criteria, and hydrants may be located to permit connection to the pumper using two lengths of suction hose (a distance not to exceed 16 feet).

(3) Hydrants should not be placed closer than 3 feet to any obstruction nor in front of any entranceways. The center of the lower outlet should not be less than 18 inches above the surrounding grade and the operating nut should not be more than 4 feet above the surrounding grade.

(4) In aircraft fueling, mass parking, servicing, and maintenance areas, the tops of hydrants will not be higher than 24 inches above the ground with the center of lowest outlet not less than 18 inches above the ground. The pumper nozzle will face the nearest roadway.

e. Hydrant installation. Many problems of hydrant operation and maintenance can be avoided if the hydrant is properly installed. All hydrants should be installed on firm footings such as stone slabs or concrete bases to prevent settling and strains on line joints. Separation of the pipe joints in the elbow beneath the hydrant is sometimes a problem because of forces created by the water pressure across the joint through the elbow. This problem can be alleviated by placing thrust blocks between the elbow and supporting undisturbed soil, or by tying the joint.

f. Hydrant markings. All hydrants at military installations will be marked in accordance with NFPA 291.

5-3. Water pipe materials.

a. Types of materials. Water distribution pipes are available in a variety of materials. Those most commonly used, and most suitable for use at military installations, are asbestos-cement, ductile iron, reinforced and prestressed concrete, steel, and plastic. All water mains and service lines should be designed for a minimum normal internal working pressure of 150 psig plus appropriate allowances for water hammer. External stresses due to earthfill and superimposed loadings will be calculated in accordance with the applicable standards of the American Water Works Association for each kind of pipe (app A). In areas classified as seismic zone 2 or higher, in accordance with TM 5-809-10/AFM 88-3, Chapter 13, pipes with flexible joints will be used. Asbestos-cement pipe, mechanical-joint cast-iron pipe, or rubber-gasket-joint pipe of various kinds (cast iron, steel, plastic, and reinforced concrete) may be used in these areas. The danger of earthquake damage can also be minimized if pipelines are laid in bedrock or coarse-grained sediments. Installation in fine-grained

sediments such as clay and silt should be avoided in earthquake-prone areas if possible.

b. Selection of materials.

(1) In selecting the material to be used for a particular application, the following items should be considered:

(*a*) Ability to withstand maximum anticipated internal pressures and external loads or the most severe combination thereof.

(*b*) Flow resistance of the pipe, both in new condition and after the pipe has been in service for several years.

(*c*) Ease of installation. This involves the unit weight of the pipe, type of joints used, type of bedding required, and whether or not thrust blocking is required.

(*d*) Resistance to external and internal corrosion.

(*e*) Joint tightness.

(*f*) Durability.

(*g*) Ease of tapping for service connections.

(*h*) Cost.

(2) Information on pipe diameter, design, and coatings, linings and fittings for various types of pipe is given in table 5-3 below.

c. Description of materials.

(1) Asbestos-cement pipe.

(*a*) This pipe is usually unaffected by corrosive soil conditions, and is installed in many locations where unprotected cast-iron or steel pipe would suffer excessive corrosion. Standard lengths of asbestos-cement pipe are 13 feet for pipe 8 inches or larger in diameter, and either 10 or 13 feet for pipe 4 or 6 inches in diameter. The three classes of asbestos-cement pipe are: class 100, class 150, and class 200 for pipe 4 inches through 16 inches and classes 30, 35, 40, etc., for pipe 18 inches through 42 inches. These refer to the maximum anticipated internal working pressure, not including sudden surges, to which the pipe is to be subjected. A factor of safety of 4.0 has been used in the design and manufacture of these pipes. They should theoretically be capable of withstanding internal bursting pressures of at least 400 psi (class 100), 600 psi (class 150), and 800 psi (class 200). Techniques for evaluating both internal and external loads are given in AWWA C401, and C403. External loads include both the weight of the backfill supported by the pipe and the weight of superimposed loads, static or dynamic on the pipe. A factor of safety of 2.5 is used in designing for external loads.

(*b*) Asbestos-cement pipe is also grouped into two categories according to the percentage of uncombined calcium hydroxide in the pipe. Type I has no limit on the uncombined calcium hydroxide; type II has 1.0 percent or less. Inasmuch as the uncombined calcium hydroxide may be leached from the walls of a pipe, thereby reducing the strength of the pipe, type II pipe should be used whenever the sum of the pH, the logarithm (base 10) of the alkalinity (in mg/1 as $CaCO_3$), and the logarithm (base 10) of the hardness (in mg/1 as $CaCO_3$), and the water in the pipe is less than 12.0 but greater than 10.0. Type II will be used in all Army and Air Force construction.

(*c*) Installation of asbestos-cement pipe will be in accordance with the provisions of AWWA C603. Direct tapping of asbestos-cement mains is permitted for service connections of 1-inch diameter or smaller. With the use of special service clamps, tapping for service connections up to 2 inches in diameter is permitted.

Table 5-3. Pipe type comparison

Pipe Type	Maximum Diameter (Inches)	Pipe Type	Coatings, Linings And Fittings
Steel	96	M11	C200 series
Ductile Iron	48	C150	C105 C100 series
Concrete	144	M9	C300 series
Asbestos-Cement	16	C401	
	42	C403	C400 series
Glass Fiber Reinforced	144	C950	C950
Polyvinyl Chloride	12	C900	C900

(2) *Ductile-iron pipe.* Ductile-iron pipe of equivalent thickeness is stronger, tougher, and more flexible than the now obsolete gray cast-iron pipe. The prescribed method of determining the required thicknesses of ductile-iron pipe is given in AWWA C150 (ANSI A21.50). Ductile iron shall be used in situations where some pipe deflection may occur, such as in earthquake-prone areas or in soil conditions where settling of the pipe may occur. Ductile-iron pipes are frequently lined with coal-tar enamel or cement mortar to reduce corrosion of interior surfaces (para 7-3). Cleaning and lining of corroded ductile-iron pipe can substantially reduce the head losses in the pipe; pipeline cleaning without lining is not permitted.

(3) *Concrete pipe.* Concrete pipe is strong, durable, corrosion-resistant, and has a smooth interior which allows high flow velocities with minimal head losses. Without special equipment or expertise, concrete pipe is more difficult to tap than cast iron and it should not be used where multiple future tapping for building service may be required. Three types of concrete pipe commonly available are: noncylinder, nonprestressed concrete pipe; nonprestressed concrete cylinder pipe; and prestressed concrete cylinder pipe. Concrete cylinder pipe has a steel cylinder either outside the concrete or embedded in the concrete of the pipe (See AWWA C300, C301 and C302).

(a) Noncylinder, nonprestressed concrete pipe. This pipe has both longitudinal and circumferential reinforcing bars cast in the concrete. It is not as strong as prestressed concrete pipe and should be used only if internal working pressures are not anticipated to exceed 55 pounds per square inch. Information on design and manufacturing parameters for this pipe are contained in AWWA C302.

(b) Nonprestressed concrete cylinder pipe. This pipe is most commonly used in diameters of 24 to 144 inches and lengths of 12, 16, or 20 feet. It is suitable for use when working pressures are less than 260 pounds per square inch. Each section of pipe consists of a welded steel cylinder encased in concrete, with longitudinal and circumferential reinforcing bars in the outer portion of the concrete. This pipe will conform to the requirements of AWWA C300.

(c) Prestressed concrete cylinder pipe. There are two types of prestressed concrete cylinder pipe available. They are the lined-cylinder type with concrete cast inside the steel cylinder, wire wrapped under tension around the steel cylinder, and a concrete or mortar covering over the wire and cylinder; and the embedded-cylinder type with the steel cylinder encased in concrete, wire wrapped on the outer concrete surface, and the wire covered with a coating of cement or mortar. Both types are characterized by high strength and relatively lightweight as compared to other kinds of concrete pipe. The lined-cylinder type is used for pressures up to 250 pounds per square inch and the embedded-cylinder type for pressures up to 350 pounds per square inch. Diameters of the pipes range from 16 to 48 inches for the lined-cylinder type and from 24 to 144 inches for the embedded-cylinder type. The design and manufacturer of both types of prestressed concrete cylinder pipes is covered in AWWA C301.

(d) Concrete pipe joints. Operating experience has shown that rubber-gasketed bell-and-spigot joints provide a long-lasting, water-tight seal when proper installation procedures are followed. Subsequent coating of the joint with mortar ensures watertightness. Other types of joints are also available and may be used.

(4) *Steel pipe.* The properties of steel pipe favoring its use are high strength, and ability to yield or deflect under a load while still resisting the load, the capability of bending without breaking, and the ability to resist shock. Like cast iron, steel pipe is susceptible to corrosion if effective coatings and linings are not applied and maintained. Corrosion products do not adhere to steel pipe and are continually sloughed off, thus allowing further corrosion. By contrast, corrosion products adhere to cast-iron pipe and offer some protection against further corrosion. Steel pipe is generally available in diameters ranging to 144 inches and greater. Maximum allowable working pressures depend on pipe wall thicknesses and may be selected for the entire range of waterworks applications using AWWA Manual of Practice Number 11. In designing steel pipe to withstand internal pressures, a factor of safety of 1.0 is generally used; a factor of safety of 1.5 or 2.0 is recommended in designing for external loads. Steel pipe may be used for transmission, distribution and service lines with adequate protective coatings, and linings and cathodic protection as determined necessary by site conditions. The design and manufacture of steel pipe 6 inches and larger and cast-iron pipe is given in AWWA C101 and C200.

(5) *Plastic pipe.*

(a) Several different types of plastic have been used in the manufacture of water distribution pipes. The most commonly used plastics include ABS (polymers of acrylonitrile, butadiene, and styrene), polyethylene (PE), and polyvinyl chloride (PVC). Inasmuch as PVC pipe is presently the most suitable type of plastic pipe for water distribution, it is the only type covered herein.

(*b*) The advantages of PVC pipe are that it has a very low resistance to flow, it is somewhat flexible and can deflect under earth or superimposed loadings, it does not corrode from electrical or microbial action, and it is relatively lightweight and easy to install. Disadvantages are that it suffers a permanent loss of tensile strength with time, and that the tensile strength of the pipe at any time is decreased by temperature increases. PVC pipe also undergoes significant expansions and contractions with temperature changes, necessitating the use of gasket couplers.

(*c*) PVC pipe is used in sizes of 4 to 12 inches inside diameter. It is available in pressure classes of 100, 150, and 200 pounds per square inch, which correspond to the maximum anticipated internal working pressure for the pipe. A factor of safety of approximately 3.0 is used in the design of PVC pipe for sustained internal pressures; and a factor of safety of 4.0 is used for sudden pressure surges. However, due to the loss of tensile strength with time, these factors of safety decrease correspondingly. Pipe conforming to AWWA C900 with elastomeric gasket bell and spigot joints in 4-inch diameter through 12-inch diameter size, is acceptable for transmission, distribution, and service lines. Transmission, distribution, and service lines less than 4-inch diameter will require schedule 80 pipe with threaded joints or schedule 40, SRD26, 21, 17 or 13.5 pipe with elastomeric-gasket bell joints. The use of plastic pipe should normally be included as an option for contractors bidding on installation of new piping systems.

(*d*) In addition to the above, refer to AFM 88-15 for use of plastic pipe on Air Force facilities.

(6) *Insulating couplings.* If pipes of dissimilar metals must be jointed, a suitable insulating coupling should be used for the joint to prevent galvanic corrosion.

CHAPTER 6

SERVICE CONNECTIONS

6-1. Tapping of water lines.

a. Asbestos-cement lines. Asbestos-cement pipe can be tapped either wet or dry using standard waterworks equipment. The largest size corporation stop which can be tapped directly into asbestos-cement pipe is one inch. Larger outlet sizes up to 2 inches can be secured by using service clamps or bossed sleeves. Tapping sleeves and valves can be used for making taps larger than 2 inches in asbestos-cement pipe under pressure.

b. Concrete lines. New service connections on existing concrete pipelines can be made with or without interruption of service. Concrete pipe is not necessarily more difficult to tap than other pipe materials; however, the cost of pressure tapping the pipeline is considerably greater than incorporating outlets for future connections during pipe manufacture. Fittings are available for making threaded connections from 1/2 to 2 inches in diameter for the various types of concrete pressure pipe. Flanged outlet taps can be made under pressure for branch lines with diameters as large as one size smaller than that of the pipe to be tapped. Step-by-step procedures for small and large pressure connections are available in most manufacturer's literature.

c. Steel lines. Service connections to steel pipe can be readily made with commercially available equipment. This includes service connections both dry and with pipe under internal pressure. Small service connections consist of threaded couplings welded to the steel pipe surface and drilled through with standard drilling equipment. Large diameter service connections are normally made under pressure utilizing a flanged service outlet, a tapping valve, and a standard drilling machine. The service outlet may be either a bolted-in-place service saddle or a fabricated steel service saddle that is welded to the pipe.

d. Plastic lines. Plastic pipe can be direct tapped wet or dry, using standard waterworks equipment, for insertion of corporation stops. However, a special tool has been developed which will minimize PVC shavings and retain the coupon. The largest size corporation stop which can be tapped directly into the pipe is one inch. AWWA thread recommended by these methods is 2 inches. Tapping sleeves and valves can be used for making large taps under pressure, size to size, i.e., 8-inch outlet in 8-inch pipe, etc. Tapping sleeves should be assembled in accordance with the manufacturer's directions.

6-2. Service connection materials.

a. Copper. Copper has been the most widely used material for service piping due to its flexibility, ease of installation, corrosion-resistance, and the capability to withstand high pressure. Although the cost of copper pipe has risen rapidly in recent years, it is still well suited for service connection use.

b. Plastic. Plastic pipe is frequently selected because of its relatively low cost and easy installation. The capabilities of plastic pipe to withstand maximum internal and external loadings and temperatures should be carefully examined before use.

c. Galvanized steel. Galvanized steel pipe has been used for service connections for many years. The main advantage of galvanized steel pipe is its relatively low cost. However, since galvanized steel pipe is rigid and requires threading, it is not easily installed. Also, galvanized steel service connections may have relatively short lives if placed in soils in which corrosion is likely to occur, or if used to carry waters having a negative Langelier index (TM 5-813-3/AFM 88-10, Volume 3). Galvanized steel pipe is generally not used for 2-inch or larger service connections.

d. Other materials. Ductile-iron and asbestos-cement pipes are not generally available in the small sizes required for most service connections, but could be considered for service connections to large water users for which pipe sizes of 3 inches or larger are needed.

6-3. Sizes. The size of the service connection needed in any particular situation should be the minimum size through which water can flow at the maximum required rate without excessive velocity or head loss. A maximum velocity of 10 feet per second is commonly used. In general, head losses through service connections during maximum flows should be small enough to ensure that a residual pressure of 25 pounds per square inch is available for water distribution within the plumbing of each building.

Head losses of 15 pounds per square inch or greater through service connections are considered excessive, even if the 25-psi residual criterion can be met. Although 1/2-inch service connections can be used for facilities requiring very small flows, the minimum size for most installations should be 3/4 inch.

6-4. Installation. Service connection will be installed in as direct a path as possible from the distribution main to the building served, and will enter the building on the side closest to the distribution main. Service connections will be installed below the frost depth. If the size and wall thickness of the main are adequate, smaller service lines may be connected to the main by direct drilling and tapping. This can be accomplished with special machines while maintaining water pressure in the main. Larger service connections (greater than 2 inch) may necessitate the installation of tees or special branch connections into distribution mains, but may be made with the main under pressure with a tapping machine, tapping valve, and sleeve in most cases.

6-5. Service connections at airfields. Water-service connections are required for servicing aircraft at airfields. These connections will be located adjacent to the parking apron at nondispersed stations or adjacent to the servicing apron at dispersed stations.

CHAPTER 7

DISTRIBUTION SYSTEM DESIGN

7-1. Minimum pipe cover. Minimum cover over pipes will be 2 1/2 feet in grassed areas, 3 feet under unpaved driveways or roadways, and 4 feet under railroad tracks. Where frost depths are greater than the above minimums, the cover should be at least equal to the frost depth, particularly for small lines which may not be flowing continuously. Where lines pass under railroads, pipes may be encased in concrete or enclosed in rigid conduit in accordance with the standard practice of the affected railroad or with the criteria contained in Chapter 1, Part 5 of the American Railway Engineering Association's Manual for Railway Engineering. Installation of pipelines and conduits under railroad main lines is usually accomplished by carefully controlled tunneling and jacking. For branch lines or lines used infrequently, open cut installation may be permitted by the railroad. Jacking or tunneling procedures are usually required if a pipeline is to be installed under a major roadway with no disruption of traffic.

7-2. Protection of items penetrating frost zone. Water distribution equipment items penetrating the frost zone are sometimes subject to freezing if protective measures aren't taken. Air vent and vacuum relief valves, blowoff valves, or fire hydrants are particularly susceptible. Freezing should not be a problem with post-indicator valves and valve boxes if they are constructed and maintained so that water doesn't collect in or around them.

a. Air vent and vacuum relief valves. These items can be protected from freezing by installation in pits deep enough to place the valves below the frost zone or by providing heat with electric space heaters, electric heating tape, or other suitable means.

b. Blowoff valves. Blowoff valves should be installed at depths below the frost zone. If terrain conditions permit, the drain line from a blowoff valve should go to a nearby low surface area to allow gravity drainage. The valve discharge must be piped to the atmosphere and drainage provided from the line to the outlet side of the valve. If gravity drainage can't be provided, the blowoff valve should be provided a tee, with foot valve to prevent backflow, discharging into a dry well below the frost line. Alternatives permitting drainage without contamination from ground water or other nonpotable water may be used subject to approval of the Contracting Officer.

c. Fire hydrants. Fire hydrants penetrating the frost zone will be of the dry-barrel variety (para 5-2). Free draining backfill will be placed around the barrel to prevent frost-heave due to moisture around the barrel in the frost zone.

7-3. Cleaning and lining existing water mains.

a. Where incrustations and tubercules have formed on the inside of mains to such a degree that flow through the mains has been materially reduced, it may be advantageous to clean and line these mains. Cleaning is usually accomplished with special mechanical scraping devices which are pulled through the main with a cable or forced through the main by hydraulic pressure. Large mains, over 30 inches, can be cleaned by electrically-driven, manually-operated machines with rotating scraper blades.

b. After a distribution main has been cleaned, it must be lined with cement mortar or a similar substance. The lining is applied by a special machine on wheels which is pulled through the main and fed the viscuous lining substance under pressure. The lining is centrifugally sprayed onto the interior walls of the pipe by the machine, and the finish is smoothed by special mechanized trowels. The applied linings generally vary in thickness from 3/16 to 1/4 inch, but as little as 1/8 inch might be applied to small diameter mains. In places where the lining cannot be applied and troweled by machine, hand application is necessary. During the cleaning and lining of mains, precautions must be taken to protect any valves, hydrants, or branch mains attached to the main being treated.

c. The principal advantages of cleaning and lining of old mains are that the frictional resistance to flow is reduced, thereby increasing flows and pressures; and the resistance of the pipe material to corrosion is improved. However, before a program of main cleaning and relining is initiated, the relative cost and service life must be compared to the complete replacement of deteriorated mains, and the most cost-effective alternative selected. Standards for

the performance of this work are given in AWWA C602.

7-4. Disinfection of water supply system. Disinfection of new distribution mains and disinfection of existing distribution piping affected by construction, or system modifications by construction contract will be in accordance with AWWA C601. In no event will any of the above piping be placed in service prior to verification of disinfection by bacteriological tests as required and evaluated by the supporting medical (health) authority.

7-5. External corrosion.

a. Corrosion of the external surfaces of cast-iron or steel pipes can, under some conditions, be a significant problem. Therefore, ductile-iron or steel pipelines placed in corrosive soils must be protected by coatings of coal-tar or cement mortar. Standards for coal-tar coatings are given in AWWA C203 and AWWA C209. Cement mortar coatings may be applied by mechanical or pneumatic means and should meet the guidelines in AWWA C205.

b. The characteristics of the soil in which a pipe is placed affect the rates of corrosion, with the most corrosive soils being those having poor aeration and high values for acidity, electrical conductivity, dissolved solids, and moisture content. The relative potential for corrosion may be estimated by evaluating the degree of corrosion of pipelines or other metallic objects previously buried in that soil. When this information is not available, resistivity tests of the soil should be conducted as described in chapter 8 of TM 5-811-4/AFM 88-p45 and results evaluated in accordance with paragraph 3-05d therein to determine the required degree of cathodic protection, or restrictions on piping materials permitted to be used.

c. In locations where the soils are known to be very corrosive, it may be desirable to use cathodic protection systems as a supplement to (but not in place of) the above coatings. Requirements for corrosion control and criteria for cathodic protection of buried utilities and structures are given in TM 5-811-4/AFM 88-45. Additional criteria is given in AFM 88-15.

d. Another method of avoiding corrosion of distribution mains is through the use of nonmetallic pipe materials such as asbestos-cement, reinforced concrete, or plastic.

7-6. Thrust blocking. Criteria for determining the magnitudes of thrusts and the relative need for thrust blocking or anchorage are given in appendix C.

7-7. Standard details. Construction details are shown on OCE Standard drawing No. 40-07-22. This drawing is available at HQDA(DAEN-ECE-A) WASH DC 20314-1000.

7-8. Layout map. An up-to-date layout map, to a suitable scale, showing the entire distribution system involved in the design will be maintained.

7-9. Design analysis. The design analysis will indicate the essential elements used in determining sizes and locations of mains, including:

Projected populations and areas in which the populations are located

Locations and magnitudes of special water demands

Location and magnitude of fire demands

Location and size of pump stations

Storage input

Water treatment plant or other input sources

CHAPTER 8

TRANSMISSION LINE DESIGN

8-1. General. This chapter includes procedures specifically related to transmission lines of 12 inches diameter and larger. Service connections are usually not permitted. Interconnections with the distribution system piping should be held to a minimum and are usually over 1,000 feet apart.

8-2. Design procedures. Transmission line design shall include the following procedures.

a. Layout. The new line will be designed to fall within existing utility or street right-of-way where available. The price of acquiring easements through private property must be considered as part of the alternative cost analysis. Easements must be wide enough to allow for initial construction and future maintenance. Installation close to physical features, such as buildings or other utilities, which would cause construction problems or future access problems for maintenance should be avoided. A set of plan and profile drawings shall be prepared which shall show as a minimum the following information:

(1) Survey base line with physical control points.

(2) Easements, rights-of-way, streets, and construction limits, etc.

(3) Existing physical features such as buildings, fences, structures, utilities, trees and drainage systems.

(4) Existing, and proposed if applicable, ground elevations along the centerline of the pipe shall be shown on the profile.

(5) In plan, the proposed pipeline and its relationship to the survey base line.

(6) In profile, the centerline elevation of the proposed pipeline.

(7) Beginning and ending points of the pipeline and all appurtenances.

(8) Construction details of the pipeline, connections, appurtenances, tunneling, bedding and surface restoration, etc. Typical information shown on plan and profile drawings is illustrated in figure 8-1.

b. Diameter vs pumping costs. Pump costs are dependent upon initial cost and horsepower requirements. The total dynamic head of the system is the sum of the suction lift, discharge head, friction head and velocity head, and is represented by the following equation:

$$TDH = H_S + H_D + H_F + \frac{V^2}{2g} \qquad \text{(eq 8-1)}$$

where: TDH = total dynamic head

H_S = suction lift

H_D = discharge head

H_F = friction head

$\frac{V^2}{2g}$ = velocity head

The most economical pipe diameter in a pumped system is determined by comparing pumping costs for various sizes of pipe. Only standard pipeline sizes should be considered. In order to hold friction losses to a minimum and to reduce the possibility of severe waterhammer, the diameter should be sized so that the velocity is 4 feet per second (fps) or less. Under special circumstances when approved by the appropriate authority, the maximum design velocity may exceed 4 fps.

c. Hydraulic calculations. The Hazen-Williams formula is often used to compute flow characteristics. Also, the Darcy-Weisbach equation is used in some computer programs. Depending on requirements, one of the following forms of the Hazen-Williams equation is used:

$$V = 0.55\, C\, D^{0.63}\, S^{0.54} \qquad \text{(eq 8-2)}$$

$$Q = 0.433\, C\, D^{2.63}\, S^{0.54} \qquad \text{(eq 8-3)}$$

$$S = \frac{2.32Q}{C\, D^{2.63}}^{1.85} \qquad \text{(eq 8-4)}$$

$$V = 1.318\, C\, R^{0.63}\, S^{0.54} \qquad \text{(eq 8-5)}$$

where:

V = velocity of flow in feet per second

C = coefficient of roughness

D = diameter of pipe in feet

S = head loss in feet per foot of length

Q = flow in cubic feet per second

R = hydraulic radius in feet

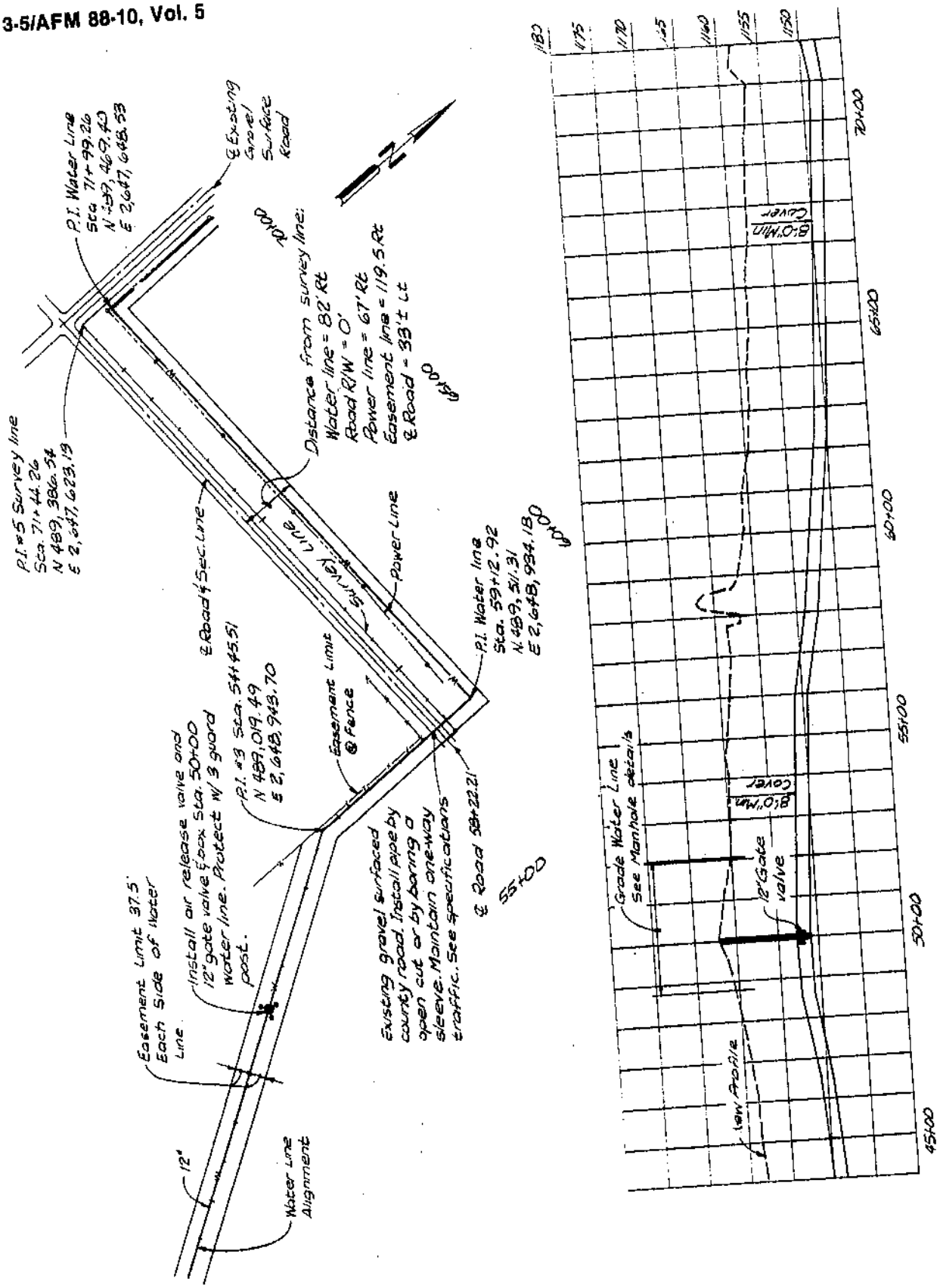


Figure 8-1. Typical plan and profile drawings.

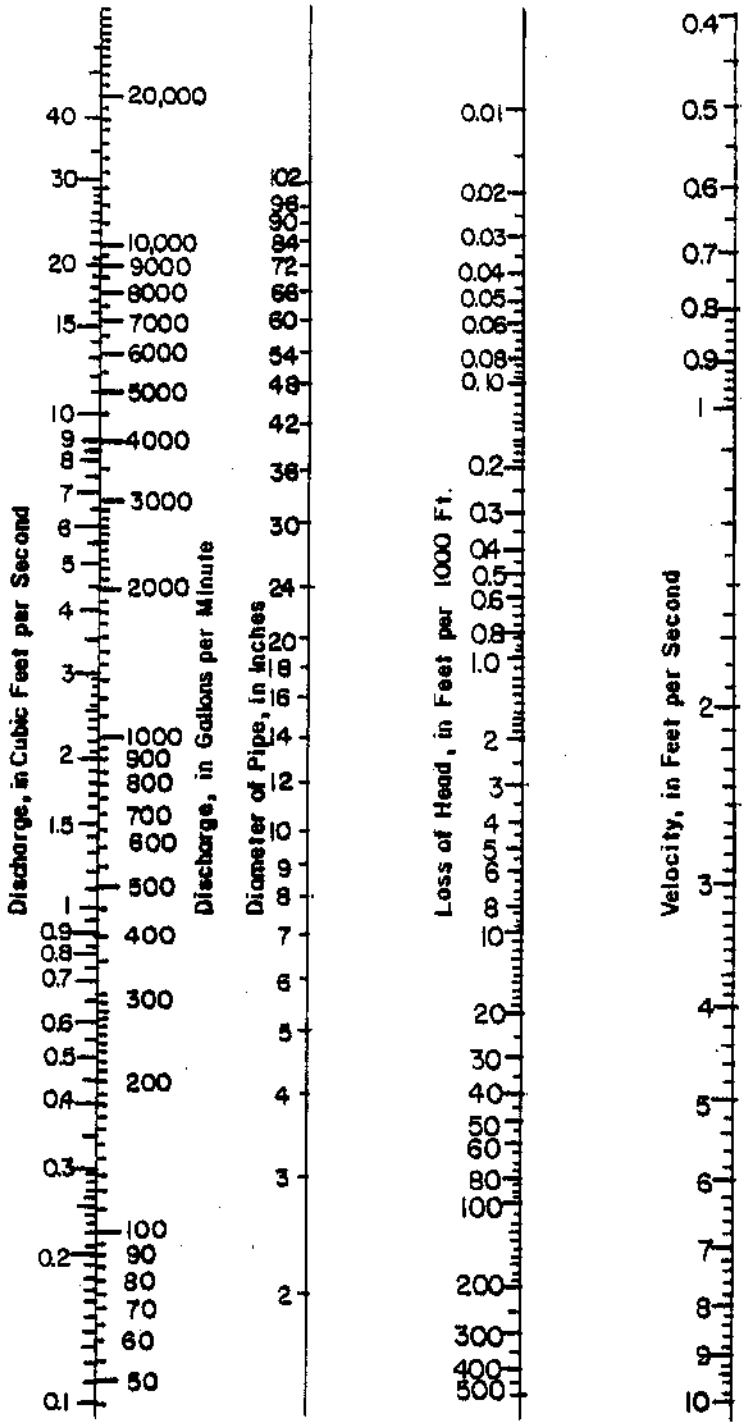


Figure 8-2. Nomograph for Hazen-Williams formula in which C = 100.

Values of C are 140 for smooth lined steel pipe, very smooth concrete pipe, cement lined ductile iron pipe and asbestos-cement pipe; 130 for ordinary ductile iron pipe in good condition; 110 to 120 for ductile or cast-iron pipe in service 5 to 10 years; 100 for older cast-iron pipe; and 40 to 80 for old cast-iron or steel pipe which is severely tuberculated or any pipe with heavy deposits. A quick solution for the equations may be found by use of the nomograph in figure 8-2. It is prepared from the Hazen-Williams formula by using C = 100. For larger or smaller values of C, the discharge or velocity obtained from the nomograph is multiplied by the ratio of the given value of C to 100. If the discharge or velocity is given, it should be multiplied by the ratio of 100 to the known value of C before the nomograph is used.

EXAMPLE 8-1. By using figure 8-2, determine the discharge, in cubic feet per second (cps), from a 12-inch pipe for which C = 120 when the loss of head is 5 feet per 1000 feet.

Solution: The discharge corresponding to the given diameter and loss of head for a value of C = 100 is found first. A straightedge passing through 12 on the diameter line and 5 on the loss-of-head line will intersect the discharge line at 2.5 cfs. Therefore, the discharge is:

$$2.5 \times \frac{120}{100} = 3.0 \text{ cfs}$$

EXAMPLE 8-2. A 30-inch pipe for which C = 130 is to discharge 10,000 gallons per minute (gpm). By using figure 8-2, find the loss of head per 1000 feet of pipe.

Solution: The first step is to determine the discharge that corresponds to a value of C = 100. This is 10,000 × 100/130 = 7,692 gpm. A straightedge through 30 on the diameter line and 7,692 on the discharge line intersects the loss-of-head line at 2.0 feet per 1000 feet.

Valves, bends, and other fittings in a pipeline and sudden enlargements or contractions cause loss of head. If a valve is partly closed, there is greater resistance to the flow and greater loss of head. Table 8-1 shows the loss in pipe fittings and appurtenances, expressed as equivalent lengths of straight pipe as a multiple of the diameter, due to various valves, fittings, contractions, and enlargements.

d. Internal pressure. The internal pressure is the difference in elevation between the conduit and the hydraulic grade line (HGL). The pressure at the beginning of a main may be generated by a pump, reservoir elevation or connection from another pipeline. Pressure losses are due to friction, bends and fittings, and changes in elevation. These are measured above a horizontal datum plane as shown on figure 8-3.

EXAMPLE 8-3. Assuming steady state conditions the pump in figure 8-3 delivers 5,000 gpm at a discharge pressure of 140 feet of head. The pipeline is 24-inch diameter, C = 100, and is 3,625 feet from pump to reservoir. Calculate the internal pressure at Station 20 + 00.

Solution: From figure 8-2, the head loss is found to be 2.7 feet per 1,000 feet. Assume other losses are neglible.

$h_L = 2 \times 2.7 = 5.4$ ft.

Elevation at pump =	230.0	
Discharge pressure =	+ 140.0	(60.0 psi)
Elevation of HGL at pump =	370.0	
Less h_L =	− 5.4	
Elevation of HGL at Station 20 =	365.6	
Pipe Elevation =	− 310.0	
Pressure =	55.6ft.	(24.1 psi)

e. Pipe materials. The materials allowed for use are steel, ductile iron, reinforced concrete, asbestos-cement, glass fiber reinforced and polyvinyl chloride pipe. Mains must be designed for the maximum internal working pressure plus an allowance for waterhammer. Design must include external stress due to earthfill and superimposed loads. Reductions in wall thickness at isolated regions of lower pressure or reduced external stress will not be made due to the possibility of construction personnel installing these sections in the wrong sections of the line. Pipe shall be designed and specified in accordance with applicable AWWA Standards, and specifically as indicated in table 5-3.

f. Anchorage and Expansion.

(1) Thrust restraint at bends and abrupt changes in direction is required. Certain types of pipe such as welded steel are designed as continuous conduits and some ductile iron joint systems are designed as restrained joints which may not require thrust blocking. When required, thrust restraint shall be designed in accordance with appendix C.

(2) Under empty conditions, lightweight conduit such as steel is bouyant and will float. This may occur if the water table is high enough even though the pipeline may be backfilled. If this is likely, the designer must add extra weight to the pipe. This

Table 8-1. Losses in pipe fittings and appurtenances

Description of Pipe Fitting or Appurtenances	Loss in Equivalent Length of Pipe Diameters (d)
Gate Valve	
3/4 Closed	900
1/2 Closed	160
1/4 Closed	35
Full Open	13
Angle Valve Open	170
Globe Valve Open	340
Swing Check Valve	80
Elbows	
90° Standard	
90° Long Radius	20
45° Standard	16
Tee Flow Through Run	20
Standard Tee Take-Off	75
Run of Tee Reduce One-Half	32
Sudden Contraction:*	
d/D = 0.25	15
d/D = 0.5	12
d/D = 0.75	7
Sudden Enlargement:*	
d/D = 0.25	32
d/D = 0.5	20
d/D = 0.75	19
Entrance to Basin	75

*For contractions and enlargements, d is diameter of smaller pipe and D is diameter of larger pipe; resistance is expressed in terms of d.

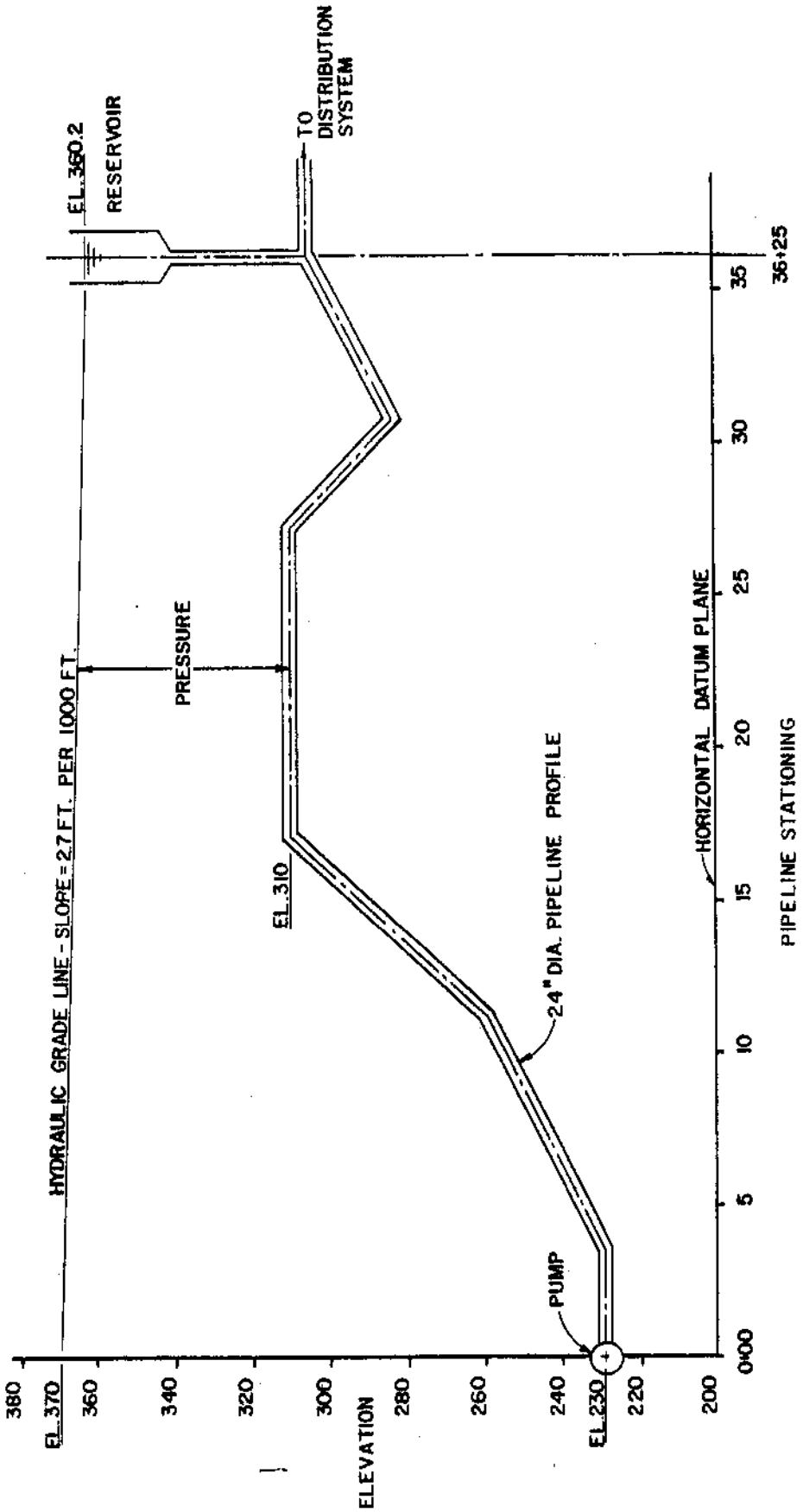


Figure 8-3. Illustration of pipeline pressure.

may be accomplished by the use of reinforced concrete collars, poured in place, and firmly anchored to the pipe.

(3) All pipe materials are subjected to expansion and contraction forces due to temperature changes. In colder climates, water temperature may vary from 32 degrees F. to over 80 degrees F., a range of over 50 degrees. Above ground installations, especially in hot temperature climates may also cause significant temperature variations. In bell and spigot joints, this effect usually may be neglected. However, the effects of expansion and contraction can be significant for long, straight, continuous pipelines. The designer shall include expansion joints designed for the pipe material and/or include appropriate stresses in the calculation for pipe wall thickness where required. However, it is not usually economical to increase the strength or thickness of the pipe wall as the sole means of resisting these stresses.

g. Valving. Sectionalizing valves are to be provided at all connections to the main. This includes pump discharge, distribution connections, fire hydrants, blowoffs, air valves and reservoir connections. Line valves are not usually required to be closer than one mile unless intermediate distribution connections are made. For larger size mains, the use of valves one standard size smaller than the pipeline is allowed as a cost-saving measure, provided that the velocity through the valve does not exceed 11 fps. Many large line valves have an integral by-pass arrangement. Valves may be the same as used in the distribution system, see paragraph 5-1. Valves shall be adequately designed for the actual internal pressure.

h. Air-vacuum valves. Air-release valves eliminate air pocket build up which causes a flow constriction and increased head loss. They are designed to expel air from a line during filling and close automatically when water reaches the valve. Vacuum valves are designed to allow air to enter the main when it is being drained. Also, vacuum valves are required to prevent the possible collapse of thin wall conduit which may be subject to a vacuum under certain conditions such as a break in the pipeline. Combination air release and vacuum valves are to be installed at the following locations:

(1) Peaks, where the pipe slope changes from positive to negative.

(2) Long relatively straight stretches at 1/4-to 1/2-mile intervals.

Air valves are to be sized to exhaust air at the pipe fill rate. Vacuum valves are to be designed to admit air at a rate equal to the flow generated by gravity. Consult manufacturer's literature for capacity and performance data. These valves are to be installed in pairs to prevent problems due to failure at one of the valves.

i. Blow-offs. Blow-offs, with a drain to a disposal area, should be installed near low points and other suitable locations to facilitate draining the conduit and disposal of the water. Blow-offs will be designed with an air-gap to prevent contaminated water from backing up into the main.

j. Hydrants. Hydrants for fire fighting purposes are not normally installed on transmission mains. If they are, design should be as specified in paragraph 5-2. Hydrants may be installed to facilitate filling and disinfection. For this purpose, a hydrant may be located adjacent to each line valve.

k. Access manholes. Manholes for access to the inside of large mains facilitate the construction and inspection of pipelines large enough to be entered by a workman. The minimum pipeline size is usually 20-inch diameter. They are useful if located adjacent to air valves, blow-offs, and line valves. Access manholes are to be designed as pipeline tees and fitted with a bolted blind flange.

l. Flow measurements. The design should allow for measurement of the volume of flow in the main. This may be done by pitot tube which requires the installation of a 1-inch corporation in the top of the main, or by a venturi installed as part of the pipeline or other commercially available equipment or methods. Sufficient straight pipe without flow interruption shall be provided ahead of and following the point of measurement as required by the manufacturer of the device.

m. External corrosion. The design, if the same as for distribution mains, refer to paragraph 7-5. Also use references cited in paragraph 8-2*e*.

n. Area restoration. Upon completion of the pipeline, the trench will be backfilled and compacted to prevent settlement. The surface will be brought to grade to match existing or design elevations. In previously grassy areas, the surface will be seeded or sodded. In paved or sidewalk areas, restoration shall match the original surface treatment as close as possible.

8-3. Filling procedures. Water should be admitted to the new transmission main at the lowest available point and be allowed to fill the pipe slowly up to higher elevations. Each section of main between line valves shall be filled separately and checked before proceeding to the next section. The progress of water in the pipeline shall be carefully and continuously monitored. It is usually neither feasible

nor necessary to begin the filling process prior to the completion of construction of the entire pipeline.

a. On mains longer than a few thousand feet, where it would be unwieldy to continuously refer to construction drawings, a special profile drawing may be prepared at a smaller scale; e.g., 1″ = 100′ or 1″ = 200′. This profile drawing should show pipeline stationing, all appurtenances and other major physical and design features.

b. Prior to commencement of filling operations, all blow-offs, access manholes, other appurtenances, and temporary construction feaures should be checked to make sure they are closed and sealed. Check to see that air-release valves are free of debris and the control valves are open. Fire hydrants may be opened for additional air release and flushing purposes.

c. The rate of fill shall be carefully monitored and controlled. Use of two-way radios is desirable on longer pipelines. The point of fill should be continuously manned and personnel should be prepared to close valves in the event of leaks or other problems.

d. Water may be admitted through line valves on smaller lines. On larger mains, hydrants, distribution connections, or bypass connections of 6-inch or 8-inch diameter should be used. In any case, the valves being used must be capable of being closed under the conditions of flow with full head on one side only.

e. Progress shall be monitored by checking air-release valves and flow from hydrants. Hydrants may be closed when full-barrel flow is achieved without pulsing or surging. Each appurtenance must be checked for leaks during the filling process.

f. The filling process does not have to be a 24-hour-around-the-clock operation. It can be stopped any time, and later resumed. However, it cannot be carried on without being continuously monitored.

g. Upon completion of the filling process, the connection used shall be closed and each appurtenance shall be checked for leaks. Each section of main between line valves shall be individually filled, checked and disinfected before proceeding to the next section, and before putting it into service. Test pressures shall be in accordance with applicable AWWA Standards for the type of pipe used and the design pressure.

8-4. Syphons. Under special circumstances, a pipeline may be designed as a syphon. In these cases, a section of the main will be above the hydraulic grade line and therefore is under negative pressure. This design condition requires the specific approval of the installation's Facilities Engineer. Certain design details require special attention.

a. Pipe material and thickness. The pipe material and wall thickness shall be specifically designed for negative pressure. This requires a rigid pipe wall. Thin wall pipe, such as steel, may collapse under these conditions if not specially designed for negative pressure.

b. Air-vacuum valves. Air release and vacuum valves would defeat the design of a pipeline syphon. Their use must be carefully considered and should be limited to reaches of positive pressure if at all.

C900	Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch, for Water
C950	Glass-Fiber-Reinforced Thermosetting - Resin Pressure Pipe
M8	A Training Course in Water Distribution
M9	Installation of Concrete Pipe
M11	Steel Pipe - Design and Installation

National Fire Protection Association (NFPA), 470 Atlantic Avenue, Boston, Massachusetts 02210

291	Marking of Hydrants
1963	Screw Threads and Gaskets for Fire Hose Connections

APPENDIX A

REFERENCES

Government Publications

Department of the Army, the Navy, and the Air Force

MIL-HDBK-1008	Fire Protection for Facilities, Engineering, Design, and Construction

Department of the Army and the Air Force

TM 5-810-5/AFM 88-8, Chap.4	Plumbing
TM 5-809-10/AFM 88-3, Chap. 13	Seismic Design for Building
TM 5-811-4/AFM 88-45	Civil Engineering Corrosion Control-Cathodic Protection Design
TM 5-813-1/AFM 88-10, Vol. 1	Water Supply: Sources and General Considerations
TM 5-813-3/AFM 88-10, Vol. 3	Water Supply: Water Treatment
TM 5-813-4/AFM 88-10, Vol. 4	Water Supply: Water Storage
TM 5-813-7/AFM 88-10, Vol. 7	Water Supply for Special Projects
AFM 85-21	Operation and Maintenance of Cross Connection Control and Backflow Prevention Systems
AFR 86-5	Planning Criteria and Waivers for Airfield
AFM 88-10, Chap. 6	Water Supply: Water Supply for Fire Protection
AFM 88-15	Air Force Design Manual—Criteria and Standards of Air Force Construction

Non-Government Publications

American Railway Engineering Association (AREA), 59 East Van Buren Street, Chicago, Illinois 60605

Manual for Railway Engineering (each chapter issued and dated separately)

American Society of Mechanical Engineers (ASME), United Engineering Center, 345 E. 47th St., New York, New York 10017

Boiler and Pressure Vessel Code and Interpretations:

Section VIII	Pressure Vessels, Division 1

American Water Works Association (AWWA), 6666 West Quincy Avenue, Denver, Colorado 80235

C101	Thickness Design of Cast-Iron Pipe
C150	Thickness Design of Ductile Iron Pipe
C200	Steel Water Pipe 6 Inches and Larger
C203	Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
C205	Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 inch and Larger - Shop Applied
C209	Cold Applied Tape Coatings for Special Sections, Connections, and Fittings for Steel Water Pipelines
C300	Reinforced Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids
C301	Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids
C302	Reinforced Concrete Pressure Pipe - Noncylinder Type, for Water and Other Liquids
C401	Selection of Asbestos - Cement Distribution Pipe, 4 inch, through 16 inch, for Water and Other Liquids
C403	Selection of Asbestos-Cement Transmission and Feeder Main Pipe
C500	Gate Valves - 3 in. through 48 inch for Water and Other Liquids
C502	Dry Barrel Fire Hydrants
C503	Wet Barrel Fire Hydrants
C504	Rubber-Seated Butterfly Valves
C506	Backflow Prevention Devices - Reduced Pressure Principle and Double Check Valve Types
C507	Ball Valves, Shaft - or Trunnion - Mounted - 6 in. through 48 inch - for Water Pressures up to 300 psi
C601	Disinfecting Water Mains
C602	Cement-Mortar Lining of Water Pipelines 4 in. (100 mm) and Larger in Place
C603	Installation of Asbestos - Cement Pipe

APPENDIX B

DISTRIBUTION SYSTEM HYDRAULIC ANALYSES

B-1. General. The sizing and location of mains, pump stations, and elevated storage facilities are dependent upon hydraulic analyses of the distribution system. The two major techniques used in analysis of distribution networks are reduction into equivalent pipes and Hard Cross Analysis. For all but the very smallest systems, these analyses are best performed on computers.

B-2. Equivalent Pipes. The equivalent pipe techniques is a means of reducing a complex pipe network into a simpler configuration. It involves the substitution of one pipe of specific diameter and variable length or specific length and variable diameter for a series of different size pipes or several parallel pipes, as long as there are no inputs or withdrawals of water between the end points of the system. Application of the equivalent pipe method is best demonstrated by example. Referring to figure B-1, assume that the pipe network shown is to be converted to an equivalent 8-inch pipe. The following procedure should be used.

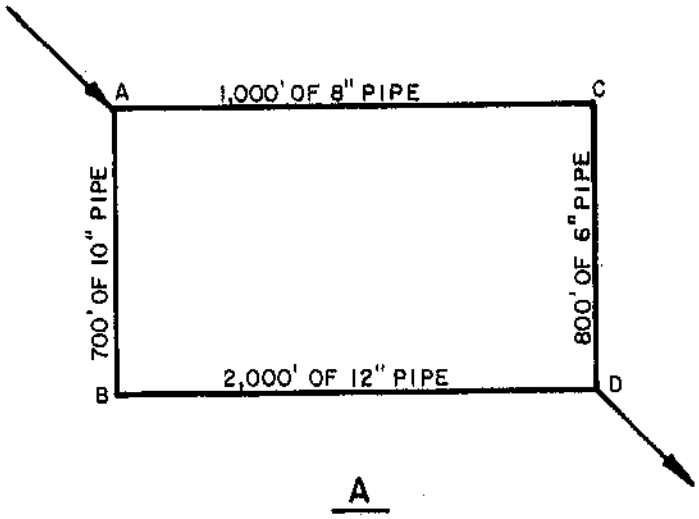
a. Series of different size pipes will be converted. An example is ACD and ABD in part (A) of figure B-1 being converted to equivalent 8-inch pipes. A flow rate will be assumed through each branch, the resulting loss of head calculated through the branch, and the length of 8-inch pipe substituted, which will give the same total loss of head through each branch. For example, assume that 200 gpm flows through branch ACD and 400 gpm through ABD. Using tables or nomograms based on the Hazen-Williams formula, the loss of head through section AC is 1.51 feet per 1,000 feet of pipe length (assume C = 100 for all pipes), so the total loss of head through pipe AC is (1.51/1000) × 1000 = 1.51 feet. Likewise, the loss of head through pipe CD at a flow of 200 gpm is 6.1 feet per 1,000 feet of pipe length, which gives a loss of head through CD of (6.1/1000) × 800 = 4.9 feet. Hence, the total loss of head through ACD is 6.4 feet. The length of 8-inch pipe which will have the same total loss of head at the same flow is 6.4 ÷ (1.51/1000) = 4,240 feet. The two pipes of branch ACD can be replaced by 4,240 feet of 8-inch pipe. The total loss of head through ABD at a flow of 400 gpm is $(1.83 \times \frac{700}{1000}) + (0.75 \times \frac{2000}{1000}) = 2.78$ feet. At the same flow of 400 gpm, an 8-inch pipe has a loss of head of 5.44 feet per 1,000 feet of length, so the length of 8-inch pipe equivalent to section ABD is (2.78/5.44) × 1000 = 511 feet. Part (B) of figure B-1 shows the configuration of the system after branches ACD and ABD have been converted to equivalent 8-inch pipes.

b. The 8-inch equivalent pipes for ACD and ABD will be converted into a single equivalent 8-inch pipe. Since it is known that water passing through ACD must have the same loss of head as water passing through ABD, a constant loss of head value can be assumed. For purposes of this example, a loss of head of 10 feet between A and D is arbitrarily chosen. At this total loss of head, the loss of head per 1,000 feet of length in ACD is 2.36 feet and in ABD is 19.6 feet. Referring again to nomographs or tables based on the Hazen-Williams equation, it can be determined that the flows producing these losses of head are 255 gpm in ACD and 800 gpm in ABD. Thus, the total flow from A to D with a loss of head of 10 feet is 1,055 gpm. At this total flow, the loss of head through a single 8-inch pipe is 32.5 feet per 1,000 feet of length. For a total loss of head of 10 feet from A to D at a total flow of 1,055 gpm, a single 8-inch pipe would be (10/32.5) × 1000 = 308 feet long. Part (C) of figure B-1 shows the single 8-inch pipe which is equivalent to section ABCD shown in part (A) of figure B-1.

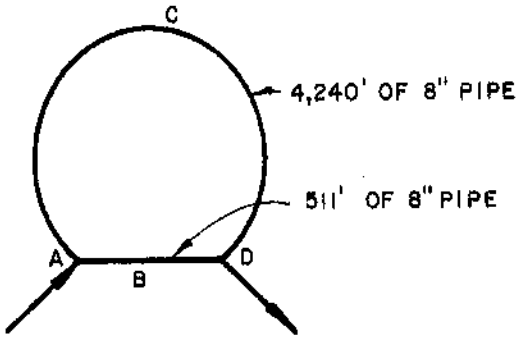
B-3. Alternative equivalent pipe procedure. Several variations of the equivalent pipe procedure are possible. The following is an alternative procedure for converting the pipe network of figure B-1 to a single equivalent 8-inch pipe, assuming that C = 100 for all pipes.

a. Arbitrarily select a rate of flow to be passed through both branches A, C, and D and branches A, B, and D. For this example, a flow of 0.5 mgd is used.

b. Calculate the losses of head through branches A, C, and D and branches A, B, and D.



A



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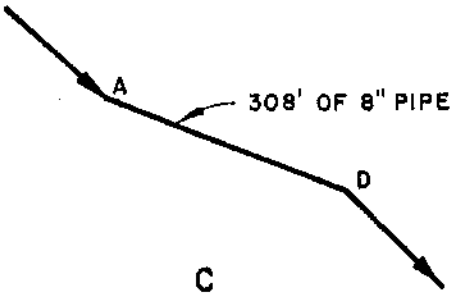


C

EQUIVALENT PIPE NETWORKS
(NOT TO SCALE)

Figure B-1. Equivalent pipe networks.

Pipe	Diameter (inches)	Loss of Head Per 1,000 ft.	Length (feet)	Loss of Head (feet)
AC	8	4.18	1,000	4.18
CD	6	16.9	800	13.52
AB	10	1.41	700	0.987
BD	12	0.58	2,000	1.16

Loss of head through A, C, and D = 4.18 ft. + 13.52 = 17.70 ft.

Loss of head through A, B, and D = 0.987 ft. + 1.16 ft. = 2.147 ft.

c. Adjust the flow in branch ABD for the same loss of head as in branch ACD. This can be done with the following formula.

$$\frac{Q_2}{Q_1} \quad \frac{HL_2}{HL_1}^{0.54} \qquad \text{(eq B-1)}$$

where

Q_1 = initial flow in pipe

Q_2 = final flow in pipe

HL_1 = initial friction loss of head through the pipe

HL_2 = final friction loss of head through the pipe

Thus:

$$Q_2 = Q_1 \quad \frac{HL_2}{HL_1}^{0.54} = 0.5 \quad \frac{17.7}{2.147}^{0.54}$$

Q_2 = 1.56 mgd in ABD (loss of head = 17.7 ft.)

d. Find the total rate of flow through branches ABD and ACD with a loss of head of 17.7 feet in both branches. The total flow is equal to 1.56 mgd + 0.5 mgd = 2.06 mgd.

e. Determine the length of 8-inch pipe which will have a loss of head of 17.7 feet at a rate of flow of 2.06 mgd. At this rate of flow in an 8-inch pipe, the loss of head is 57.3 feet per thousand feet of pipe length. The total equivalent pipe length is:

Length of equivalent 8-inch pipe =

$$\frac{17.7}{57.3} \times 1{,}000 = 309 \text{ feet.}$$

B-4. Hardy Cross analysis. Equivalent pipe techniques can be used for finding flows or losses of head in simple systems, but more complex networks involving multiple withdrawal points and crossover pipes require different methods of solution. The Hardy Cross Analysis is one means of network analysis by which accurate determination of rates of flow and losses of head through a system can be computed. It involves application of corrections to assumed values of flow or head until the system is in hydraulic balance. If flows are to be balanced, the correction factor to be applied to network flows is found by solving:

$$\Delta Q = -\frac{\Sigma H}{n\Sigma\,(H/Q)} \qquad \text{(eq B-2)}$$

where Q = flow in a particular pipe

H = loss of head in that pipe

n = 1.85

In order to use the Hardy Cross Analysis, the following guidelines must be observed:

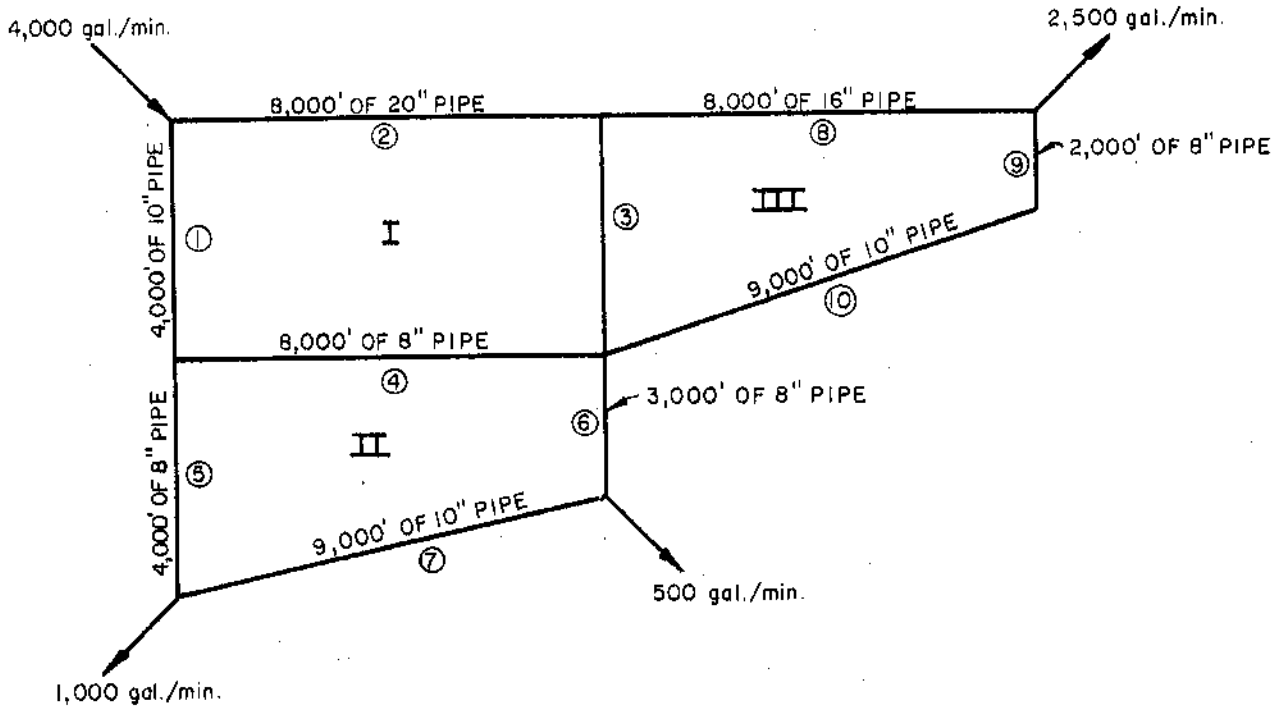
a. The configuration of the pipe network to be analyzed must be known or estimated. This includes pipe lengths, pipe diameters, and coefficients of roughness.

b. The locations and magnitudes of inflows and outflows to and from the system must be known or estimated.

c. Flows in either a clockwise or counterclockwise direction may be considered positive and those in the opposite direction will be negative. For example, if clockwise flows are assumed to be positive, counterclockwise flows will be negative. The same rule also applies for values of losses of head. Thus, the terms in the numerator of the above equation will always have the appropriate sign. The term in the denominator must always have a positive value because corresponding H and Q values have the same sign, therefore H/Q is always positive.

d. The sign of the calculated correction, ΔQ, must be observed when modifying the flows in a pipe loop. Pipes appearing in more than one loop are subject to the combined corrections for the loops in which they appear. An example of the Hardy Cross Analysis is shown in figure B-2 and in table B-1. Figure B-2 gives the configuration of the pipe network and inflows and withdrawals from the network. The initial flow assumptions are shown in table B-2. All pipes are assumed to have a roughness coefficient of 100; final flow values are shown in table B-3.

B-5. Other methods of hydraulic analysis. Other hydraulic analysis techniques may be used if appropriate. Such techniques may include, but are not limited to, Newton Raphson network analysis and network simulation with analog computers.



EXAMPLE PIPE NETWORK FOR
HARDY CROSS ANALYSIS
(NOT TO SCALE)

Figure B-2. Example pipe network for Hardy Cross Analysis.

Table B-1. Computations for Hardy Cross Analysis.

Trial 1

Loop Number	Pipe Number	Pipe Diam. (in.)	Pipe Length (ft)	Initial Flow (gal/min)	Loss of Head (ft)	$\frac{H}{Q}$	$nS\frac{H}{Q}$	SH	DQ (gal/min)	Adjusted Flow (gal/min)
I	1	10	4,000	−1,000	− 40.0	0.040			− 62	−1,062
	2	20	8,000	+3,000	+ 21.0	0.007			− 62	+2,938
	3	8	4,000	+1,000	+118.4	0.118			−388	+ 612
	4	8	8,000	− 500	− 65.6	0.131	0.548	33.8	+174	− 326
II	4	8	8,000	+ 500	+ 65.6	0.131			−174	+ 326
	5	8	4,000	− 500	− 32.8	0.066			−236	− 736
	6	8	3,000	+1,000	+ 88.8	0.089			−236	+ 764
	7	10	9,000	+ 500	+ 25.0	0.050	0.622	146.6	−236	+ 264
III	3	8	4,000	−1,000	−118.4	0.118			+388	− 612
	8	16	8,000	+2,000	+ 29.5	0.015			+326	+2,326
	9	8	2,000	− 500	− 16.4	0.033			+326	− 174
	10	10	9,000	− 500	− 25.0	0.050	0.400	−130.3	+326	− 174

Trial 2

Loop Number	Pipe Number	Pipe Diam. (in.)	Pipe Length (ft)	Initial Flow (gal/min)	Loss of Head (ft)	$\frac{H}{Q}$	$nS\frac{H}{Q}$	SH	DQ (gal/min)	Adjusted Flow (gal/min)
I	1	10	4,000	−1,062	− 44.8	0.042			+ 16	−1,046
	2	20	8,000	+2,938	+ 20.3	0.007			+ 16	+2,954
	3	8	4,000	+ 612	+ 47.7	0.078			− 46	+ 566
	4	8	8,000	+ 326	− 29.8	0.091	0.403	− 6.6	+ 62	− 264
II	4	8	8,000	+ 326	+ 29.8	0.091			− 62	+ 264
	5	8	4,000	− 736	− 67.3	0.091			− 46	− 782
	6	8	3,000	+ 764	+ 54.0	0.071			− 46	+ 718
	7	10	9,000	+ 264	+ 7.7	0.029	0.522	+ 24.2	− 46	+ 218
III	3	8	4,000	− 612	− 47.7	0.078			+ 46	− 566
	8	16	8,000	+2,326	+ 38.8	0.017			+ 62	+2,388
	9	8	2,000	− 174	− 2.3	0.013			+ 62	− 112
	10	10	9,000	− 174	− 3.6	0.021	0.239	− 14.8	+ 62	− 112

Table B-1. Computations for Hardy Cross Analysis—Continued.

Trial 3

Loop Number	Pipe Number	Pipe Diam. (in.)	Pipe Length (ft)	Initial Flow (gal/min)	Loss of Head (ft)	$\frac{H}{Q}$	$nS\frac{H}{Q}$	SH	DQ (gal/min)	Adjusted Flow (gal/min)
I	1	10	4,000	−1,046	− 43.5	0.042			+ 5	−1,041
	2	20	8,000	+2,954	+ 20.5	0.007			+ 5	+2,959
	3	8	4,000	+ 566	+ 41.1	0.073			− 8	+ 558
	4	8	8,000	− 264	− 20.1	0.076	0.366	− 2.0	+ 2	− 262
II	4	8	8,000	+ 264	+ 20.1	0.076			− 2	+ 262
	5	8	4,000	− 782	− 75.2	0.096			+ 3	− 779
	6	8	3,000	+ 718	+ 48.3	0.067			+ 3	+ 721
	7	10	9,000	+ 218	+ 5.4	0.025	0.488	− 1.4	+ 3	+ 221
III	3	8	4,000	− 566	− 41.1	0.073			+ 8	− 558
	8	16	8,000	+2,388	+ 40.9	0.017			+ 13	+2,401
	9	8	2,000	− 112	− 1.0	0.009			+ 13	− 99
	10	10	9,000	− 112	− 1.6	0.014	0.209	− 2.8	+ 13	− 99

Trial 4

Loop Number	Pipe Number	Pipe Diam. (in.)	Pipe Length (ft)	Initial Flow (gal/min)	Loss of Head (ft)	$\frac{H}{Q}$	$nS\frac{H}{Q}$	SH	DQ (gal/min)	Adjusted Flow (gal/min)
I	1	10	4,000	−1,041	− 43.2	0.041			+ 7	−1,034
	2	20	8,000	+2,959	+ 20.5	0.007			+ 7	+2,966
	3	8	4,000	+ 558	+ 40.0	0.072			− 3	+ 561
	4	8	8,000	− 262	− 19.8	0.076	0.363	− 2.5	+ 5	− 257
II	4	8	8,000	+ 262	+ 19.8	0.076			− 5	+ 257
	5	8	4,000	− 779	− 74.7	0.096			+ 2	− 777
	6	8	3,000	+ 721	+ 48.6	0.067			+ 2	+ 723
	7	10	9,000	+ 221	+ 5.5	0.025	0.488	− 0.8	+ 2	+ 223
III	3	8	4,000	− 558	− 40.0	0.072			− 3	− 561
	8	16	8,000	+2,401	+ 41.3	0.017			+ 4	+2,405
	9	8	2,000	− 99	− 0.8	0.008			+ 4	− 95
	10	10	9,000	− 99	− 1.3	0.013	0.204	− 0.8	+ 4	− 95

Table B-2. Initial flow assumptions

Pipe number	Flow (gal/min)	Direction of flow
1	– 1,000	Counterclockwise
2	+ 3,000	Clockwise
3	+ 1,000	Clockwise (Loop 1)
4	– 500	Counterclockwise (Loop 1)
5	500	Counterclockwise
6	+ 1,000	Clockwise
7	+ 500	Clockwise
8	+ 2,000	Clockwise
9	– 500	Counterclockwise
10	– 500	Counterclockwise

Table B-3. Final flow values

Pipe number	Flow (gal/min)	Direction of flow
1	– 1,034	Counterclockwise
2	+ 2,966	Clockwise
3	+ 561	Clockwise (Loop 1)
4	– 257	Counterclockwise (Loop 1)
5	777	Counterclockwise
6	+ 723	Clockwise
7	+ 223	Clockwise
8	+ 2,405	Clockwise
9	– 95	Counterclockwise
10	– 95	Counterclockwise

APPENDIX C

THRUST RESTRAINT

C-1. General requirements. Thrust forces occur in watermains when the pipeline changes directions, stops, or changes size. On pipelines with unrestrained joints, as used in ductile iron pipe installations, thrust blocks or restrained joints are required. For welded steel pipelines, flanged joints and lugged joints in concrete and ductile iron pipelines, other forms of anchorage are not usually required. All thrust anchorages shall be designed for a safety factor of not less than 1.5 under maximum pressure loading. The magnitude of hydrostatic thrust may be determined from the following formula:

$$\text{At bends: } T = 2\pi r^2 p \sin\frac{\Delta}{2} \qquad \text{(eq C-1)}$$

$$\text{At dead end or branch: } T = \pi r^2 p$$

where:

T = thrust in pounds

r = radius of pipe joints in inches

p = water pressure in psi

Δ = bend deflection angle

C-2. Thrust blocks. Thrust block size is calculated based on the bearing capacity of the soil:

$$\text{Area of block} = L \times D = \frac{T}{a}(F.S.) \qquad \text{(eq C-2)}$$

where:

L = length of block in feet

D = depth of block in feet

T = thrust in pounds

a = safe bearing valve for soil in psf

F.S. = factor of safety

EXAMPLE C-1. Calculate the thrust block bearing area required for a 12-inch pipe of a 90-degree bend, internal pressure of 120 psi including surge, allowable soil bearing pressure of 3000 psf.

Solution:

$$T = 2\,(3.14)\,(36)\,(120)\,(\sin 45) \qquad \text{(eq C-1)}$$

$$T = 19{,}180 \text{ lbs}$$

$$L \times D\,\frac{19180}{3000} \qquad (1.5) \qquad \text{(eq C-2)}$$

$$L \times D = 9.59 \text{ s.f.}$$

for D = 2.5 ft., L = 3.8 ft.

Design of thrust blocks for vertical bends is the same as for horizontal bend. For top bends, the block must be sized to adequately resist the vertical component of thrust with the dead weight of the block, bend, water in the bend and overburden. Steel straps are used to tie the pipe to the thrust block when the block is placed below the pipe, and reinforcing steel may be necessary to resist tensile forces within the block.

C-3. Restrained joints. Restrained joints are used as an alternate to thrust blocks to avoid uncertainties such as excavation behind a block. For ductile iron pipe, the length to be restrained is calculated as follows:

$$L = \frac{4\pi r^2 p\,(F.S.)\tan\frac{\Delta}{2}}{(2f\tan\frac{\Delta}{2}) + (D\,s)} \qquad \text{(eq C-3)}$$

where:

L = length to be restrained on each side of bend in feet

r = radius of pipe in inches

p = water pressure in psi

F.S. = factor of safety

Δ = bend deflection angle

D = pipe outside diameter in feet

f = conduit frictional resistance in plf

s = passive soil pressure in psf

Conduit frictional resistance is calculated from the following equation, using values in Table C-1 and table C-2.

$$f = A\,f_c\,C_s + \pi\,w\,RHD\tan(f_p\,\Delta) \qquad \text{(eq C-4)}$$

where:

A = conduit surface area in sq. ft. per lin. ft.

f_c = ratio of pipe cohesion to soil cohension

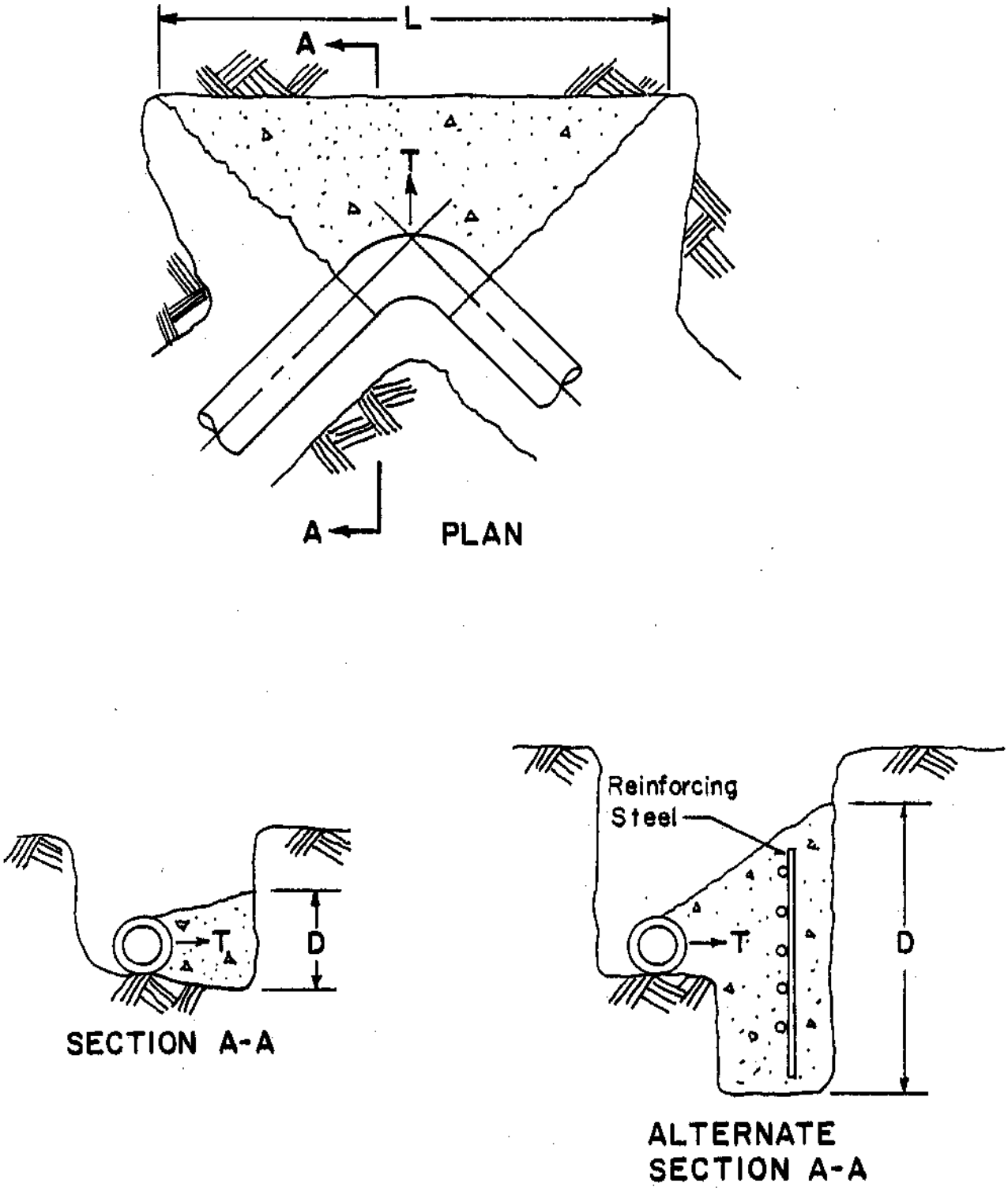


Figure C-1. Typical thrust blocking.

C_s = soil cohesion in psf

w = soil unit weight in pcf

R = reduction factor

H = cover above conduit in feet

f_p = ratio of pipe friction angle to soil friction angle

Passive soil pressure is calculated according to the Rankine Theory by the following equations:

$$s = w\left(H + \frac{D}{2}\right)N + 2\,C_s\sqrt{N} \qquad \text{(eq C-5)}$$

$$N = \tan^2\left(45° + \frac{\Delta}{2}\right) \qquad \text{(eq C-6)}$$

EXAMPLE C-2. Calculate the restrained length for a 24-inch ductible iron pipe.

Given: D = 2.15 feet

r = 12.52 inch

p = 250 psi

F.S. = 1.5

Δ = 45 degrees

w = 110 pcf

H = 3.5 feet

C_s = 500 psf

Cohesion moist granular soil, friction angle of 17 degrees, from Table C-1:

f_p = 0.65

f_c = 0.35

Solution:

$$N = \tan^2(45 + 22.5) \qquad \text{(eq C-6)}$$

$$= 5.83$$

$$s = (110)(3.5 + 1.1)(5.83) + (2)(500)(2.41) \qquad \text{(eq C-5)}$$

$$= 2950 + 2410$$

$$= 5360 \text{ psf}$$

$$A = \pi D = (3.14)(2.15) = 6.75 \text{ sq. ft./lin. ft.}$$

$$f = (6.75)(0.35)(500) + (3.14)(110)(.75)(3.5)(2.15)\tan(0.65)(45)$$

$$= 1181 + 2273 \text{ plf}$$

$$L = \frac{(4)(3.14)(157)(250)(1.5)(.414)}{(4)(2273)(.414) + (2.15)(5360)} \qquad \text{(eq C-3)}$$

$$= 20.0 \text{ feet}$$

For normal pipe lengths of 18 feet, restrain two joints on each side of bend.

Table C-1. Soil friction and cohesion factors

Soil Description	Friction Angles (degrees)	C_s	f_p	f_c
Sand, dry well graded	44.5	0	0.76	0
Sand, saturated, well graded	39	0	0.80	0
Silt, dry, passing 200 sieve	40	0	0.95	0
Silt, saturated, passing 200 sieve	32	0	0.75	0
Cohesive granular soil wet to moist	13 - 22	385-920	0.65	0.35
Clay, wet to moist	11.5 - 16.5	460-1,175	0.50	0.50
at maximum compaction			0.50	0.80

Table C-2. Reduction factors

Existing Conditions	Reduction Factor
General Construction - backfill soils compacted to critical void ratio	2/3
Well compacted backfill and selected backfill	3/4
Shallow cover - H less than one half of D	1/2

BIBLIOGRAPHY

American Society of Civil Engineers. *Pipeline Design for Water and Wastewater.* Committee on Pipeline Planning, Pipeline Division, New York, N.Y. (1975)

American Water Works Association *A Training Course in Water Distribution.* AWWA M8, Denver, Colorado (1962).

American Water Works Association, *AWWA Standard for Dry-Barrel Fire Hydrants.* AWWA C503, Denver, Colorado (1973).

American Water Works Association, *AWWA Standard for Wet-Barrel Fire Hydrants.* AWWA C503, Denver, Colorado (1975).

American Water Works Association, *Installation of Concrete Pipe.* AWWA Manual M9, Denver, Colorado (1961).

American Water Works Association, *Installation, Operation, and Maintenance of Fire Hydrants.* AWWA Manual M17, Denver, Colorado (1970).

American Water Works Association, *Recommended Practice for Backflow Prevention and Cross-Connection Control.* AWWA Manual M14, Denver, Colorado (1966).

American Water Works Association, *Sizing Water Service Lines and Meters.* AWWA Manual M22, Denver, Colorado (1975).

American Water Works Association, *Steel Pipe - Design and Installation.* AWWA M11, Denver, Colorado (1974).

Angele, Gustave J., Sr., *Cross Connections and Backflow Prevention.* American Water Works Association, Denver, Colorado (1974).

Becker, Robert J.; Rossum John R. and Russelman, Heinz B.; "Main Disinfection Methods and Objectives - Joint Discussion." *Journal of the American Water Works Association,* 61:79 (1969).

Benjes, H.H. AND Vansant, R.E., "How to Select Valves for Water and Wastewater Service." *Water and Wastes Engineering,* Volume 5, No. 5 (May 1968).

Carl, Kenneth J., "Choice, Distribution, and Location of Hydrants." *Water and Wastes Engineering,* Volume 5, No. 5 (May 1968).

Clark, J.W.; Vlessman, Warren, Jr.; and Hammer, M.J., *Water Supply and Pollution Control* (2nd Edition). International Textbook Company, Scranton, Pennsylvania (1971).

Eide, Owen F., "Minimum Service Standards". *Journal of American Water Works Association,* 64:295 (1972.

Fair, G.M.; Geyer, J.C.; and Okun, D.A.; *Elements of Water Supply and Wastwater Disposal.* John Wiley & Sons, Inc., New York, N.Y. (1971).

Hammer, Mark, J., *Water and Waste-Water Technology.* John Wiley & Sons, Inc., New York, N.Y. (1975).

Insurance Services Office, *Grading Schedule for Municipal Fire Protection.* Insurance Services Office, New York, N.Y. (1973).

Kachadoorian, Reuben, "Earthquake" Correlation Between Pipeline Damage and Geologic Environment." *Journal of the American Water Works Association,* 68:165 (1976).

Larson, T.E., "Deterioriation of Water Quality in Distribution Systems." *Journal of the American Water Works Association,* 58:1307 (1966).

Linsley, Ray K. and Franzini, Joseph B., *Water-Resources Engineering* (2nd Edition), McGraw-Hill Book Company, New York, N.Y. (1972).

Nesbeitt, William D., "PVC Pipe in Water Distribution: Reliability and Durability". *Journal of the American Water Works Association,* 67:576 (1975).

Pentecost, Frank C., "Design Guidelines for Distribution Systems." *Journal of the American Water Works Association,* 66-332 (1974).

Rossie, W.L., Jr., "Control of Water Quality in Transmission and Distribution Systems." *Journal of the American Water Works Association,* 67:425 (1975).

Smith, Wayne W., "How to Anchor Mains Against Thrust Forces." *Water Works Engineering,* 116:96 (1963).

Symons, George E., *Pipes and Piping.* Water and Wastes Engineering Manual of Practice Number Two, Reuben H. Donnelly Corporation, New York, N.Y. (1967).

Symons, George E., *Pumps and Pumping.* Water and Wastes Engineering Manual of Practice Number One, Reuben H. Donnelly Corporation, New York, N.Y. (1966).

Symons, George E., *Valves, Hydrants, and Fittings.* Water and Wastes Engineering Manual of Practice Number Four, Reuben H. Donnelly Corporation, New York, N.Y. (1968).

Twort, A.C.; Hoather, R.C. and Law, F.M.; *Water Supply.* American Elsevier Publishing Company, Inc., New York, N.Y. (1974).

Uhlig, Herbert H., editor, *Corrosion Handbook.* John Wiley & Sons, Inc., New York, N.Y. (1948).

University of Southern California, *Manual of Cross-Connection Control.* Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, Los Angeles, California (1974).

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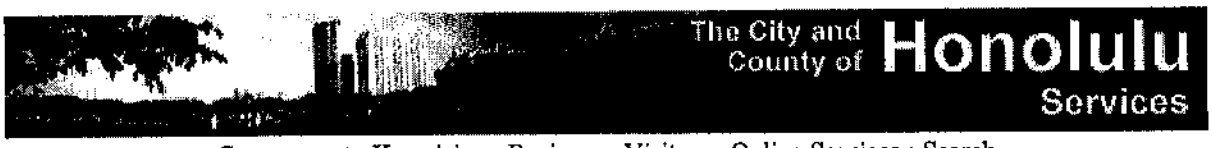
ATTACHMENT 11

MUNICIPAL BOOKSTORE LIST
CITY AND COUNTY OF HONOLULU

ATTACHMENT II



Prudential Locations Surf Hawaii's #1 Real Estate site...

Municipal Book Store

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City Hall Annex
Honolulu, HI 96813

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The Municipal Bookstore accepts cash, personal /company checks and charge cards (VISA & MasterCard only). Checks should be made payable to the **'City and County of Honolulu'.** Please note that publications and prices are subject to change without notice. Purchase by mail is subject to additional postage and handling fees. Please call to confirm price and availability.

BOOK LIST

CODE	DATE	TITLE	PRICE
19A	11/2000	BEST MGMT PRACTICE MANUAL	2.50
12	06/99	BIENNIAL REPORT, SECOND	2.00
3	10/83	BLDG. BOARD OF APPEALS, RULES OF	.50
55B	07/00	BLDG. CODE; Hon. Amend. To 1997 UBC	1.50
5C	1997 ED.	BLDG. CODE, UNIFORM VOL. 1, 1997 ED.	45.85
51A	1997 ED.	BLDG. CODE, UNIFORM VOL. 2, 1997 ED.	45.85
52C	1997 ED.	BLDG. CODE, UNIFORM VOL. 3, 1997 ED.	55.50
10A	2000 ED.	CHARTER OF HONOLULU, 1973, Revised	4.50
15D	09/84	DETAILS FOR PUBLIC WORKS CONSTR. STD.	3.00
17A	05/90	DETAILS, PARKS STANDARD	1.65
66	09/00	ELECTRICAL CODE OF C&C OF HONOLULU	1.00
6A	1999 ED.	ELECTRICAL CODE, NATIONAL	41.30
13	06/95	ENERGY EFFICIENCY STDS., BUILDING	1.50
77E	08/92	FIRE CODE OF HONOLULU, AMEND. 1988 UFC	1.00
7	N/A	FIRE CODE, UNIFORM ***NOT AVAILABLE	N/A
46	1992	GENERAL PLAN OBJECTIVES & POLICIES	1.50
33D	01/96	HOUSE NUMBER TAX MAP KEY LISTING	8.00
36A	10/97	HOUSING CODE OF HONOLULU	1.00

SHT 1 OF 2

40E	05/99	LAND USE ORDINANCE	8.50
49A	4/00	PERMIT REGISTER	3.50
54	01/95	PLANNING COMMISSION, RULES	1.00
88C	07/00	PLUMBING CODE OF HON., AMEND.TO '97 UPC	1.00
8B	1997 ED.	PLUMBING CODE, UNIFORM (Soft Cover)	54.00
57	04/99	SCP *- EAST HONOLULU	7.00
56	08/97	SCP - EWA DEVELOPMENT PLAN	7.00
58	10/99	SCP - KOOLAU LOA	10.00
59	07/00	SCP - WAIANAE	10.00
9C	04/99	SOIL EROSION CONTROL STDS. & GUIDELINES	2.00
99C	11/96	SOIL EROSION CONTRL S & G, SUPP. 1	.50
65C	09/86	SPECIFICATIONS FOR PUBLIC WORKS, STD.	3.00
67E	01/00	STORM DRAINAGE STANDARDS	2.00
70C	01/96	STREET INDEX, ISLAND OF OAHU	3.00
73	05/95	SUBDIVISION RULES AND REGULATIONS	1.00
78C	1997 ED.	TRAFFIC CODE OF C&C OF HONOLULU	3.00
81	01/80	TSUNAMI PRONE AREAS, CONSTR STD.	2.50
86B	1991	WATER SYSTEM EXT. CORR. CNTR. STDS ., V3	2.00
85F	1985	WATER SYSTEM STD. & APP. MATRL LIST V1&2	6.00
92A	07/93	WWM DESIGN STDS V. 1-SEWERS & PUMP STNS.	1.25
93A	07/84	WWM DESIGN STDS V. 2 - TREATMENT PLANTS	3.80

***Sustainable Communities Plan**

MARCH 2000

Return to Division of Purchasing Home Page

(As of march 20, 2001)

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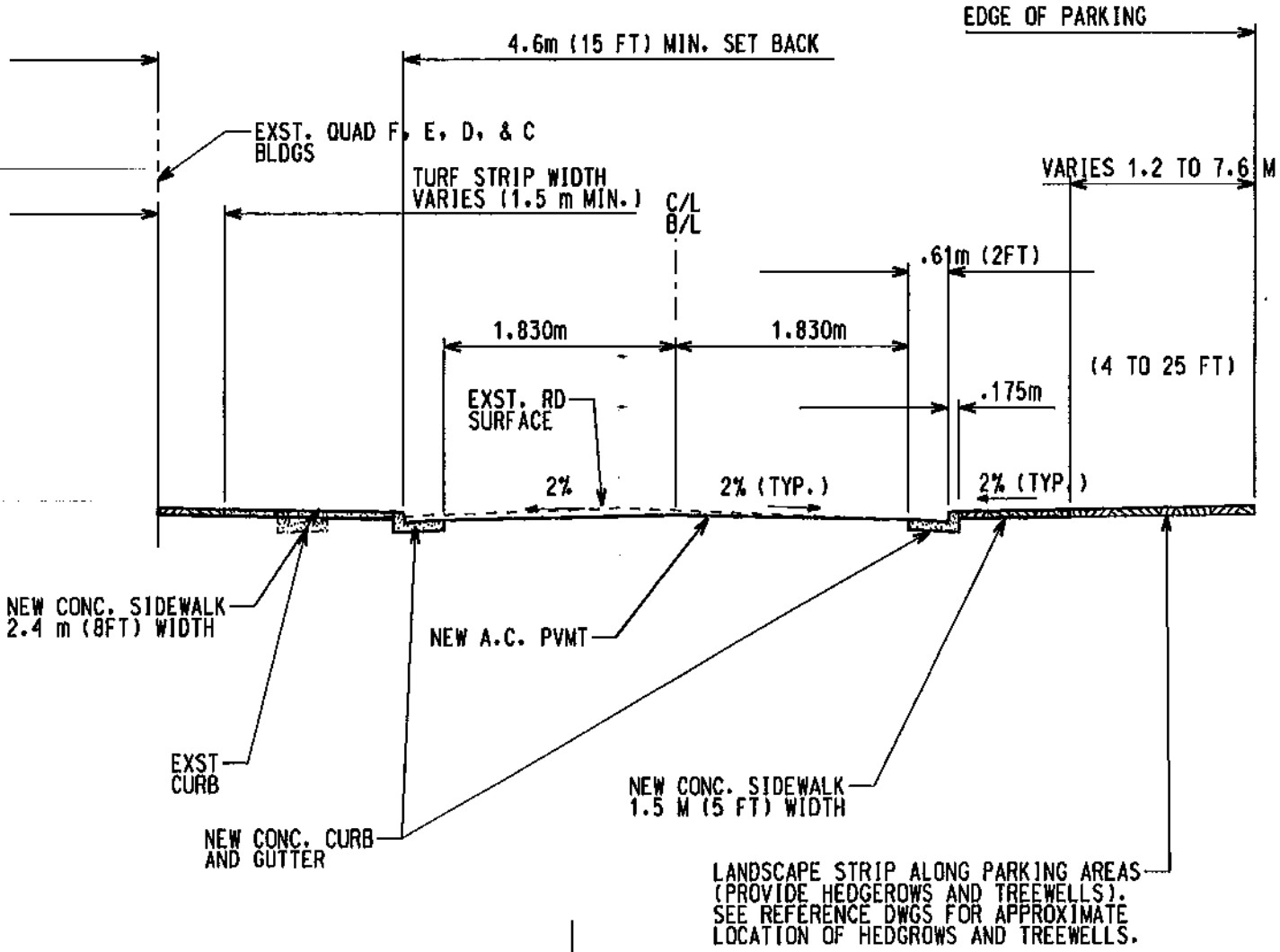
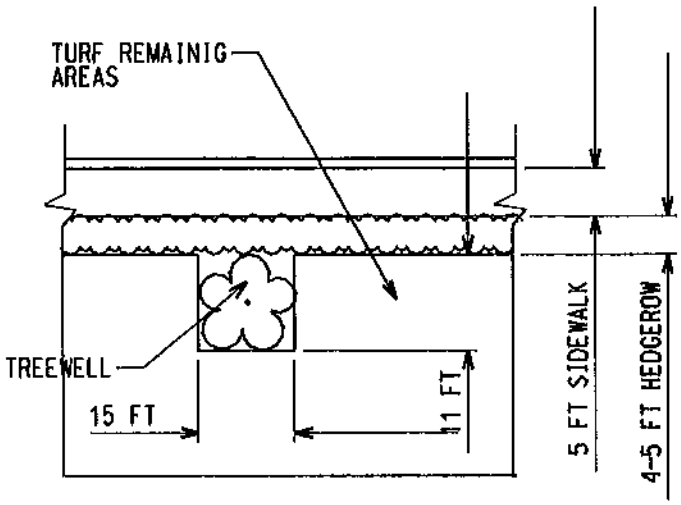
SHT 2 OF 2

ATTACHMENT 12

FOOTE AVENUE
TYPICAL ROAD SECTION





TYPICAL LANDCAPE STRIP ALONG SOUTH SIDE OF FOOTE AVE.

SCALE: NOT TO SCALE

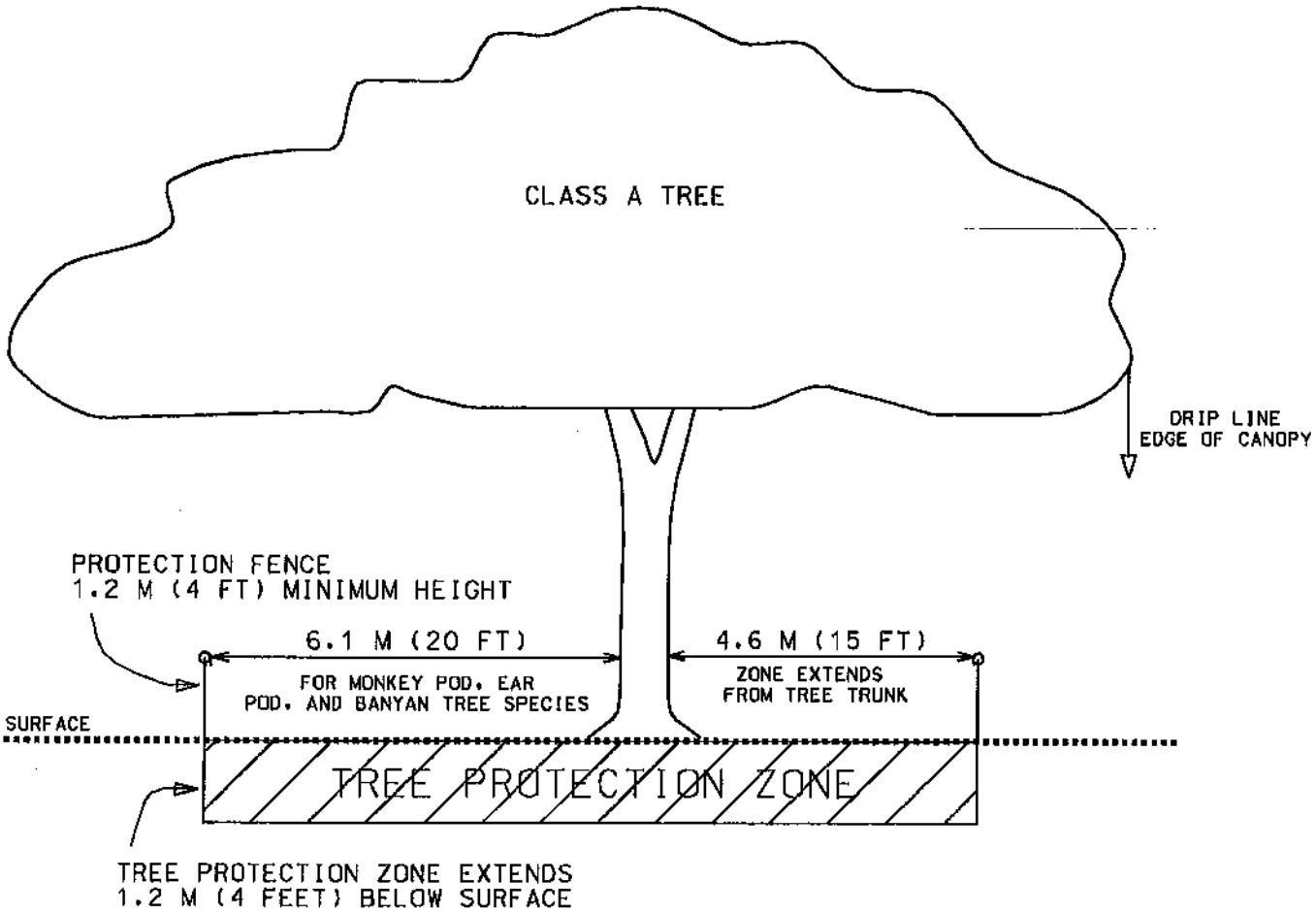
FOOTE AVENUE TYPICAL ROAD SECTION

FY01 MCA PN 52265 WBR & BUP PN 52266 WBR, PHASE 4A, RENOVATE QUAD F SCHOFIELD BARRACKS, OAHU, HAWAII	
FOOTE AVENUE TYPICAL ROAD SECTION	
FEBRUARY 2001	ATTACHMENT 12

SHT

ATTACHMENT 13

TREE PROTECTION DURING
DEMOLITION AND CONSTRUCTION



FY01 FHNC PN 48456 REPLACE FAMILY HOUSING, AREAS "I", "J", "U" AND "W"	
TREE PROTECTION ZONE	
OCTOBER 2000	ATTACHMENT 13

SHT

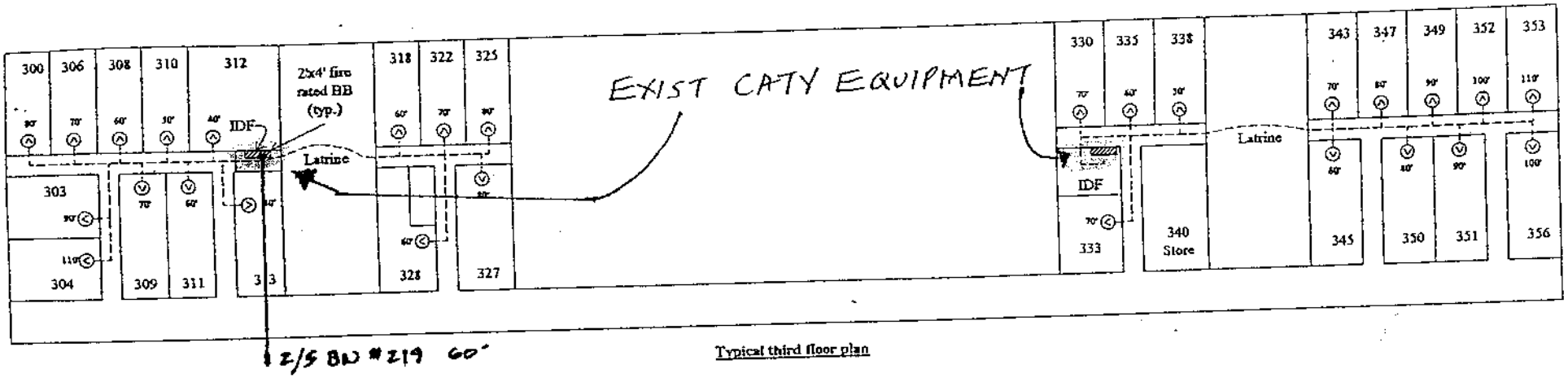
ATTACHMENT 14

CABLE TV POINT OF CONNECTION

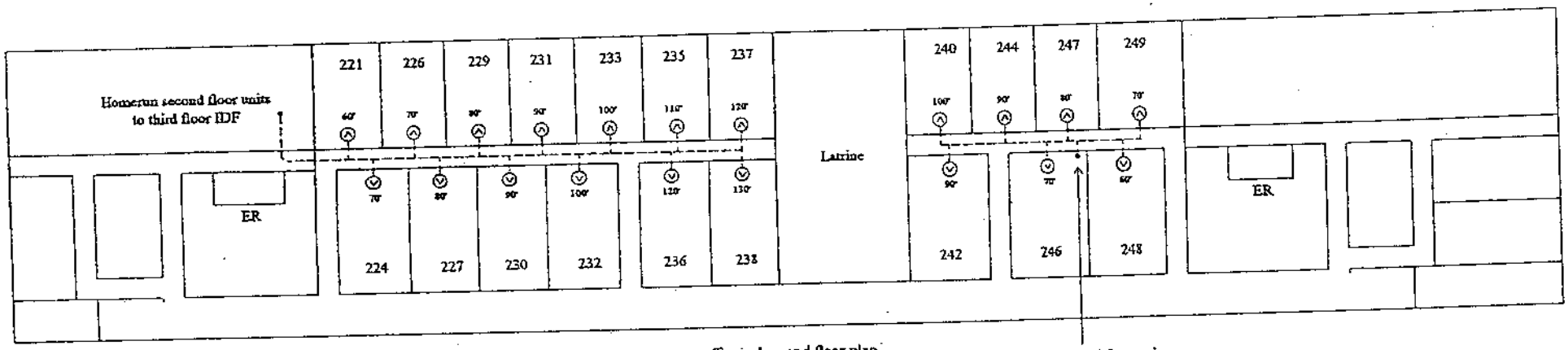
P.O.C. FOR
BLDGS 649 & 652
COMM H.H.
WAINAE AVE.
234
182
143'
233
829
22
4582
061
47
234
185
CR

ATTACHMENT 15

EXIST CATV EQUIPMENT FOR BLDG 649



Typical third floor plan

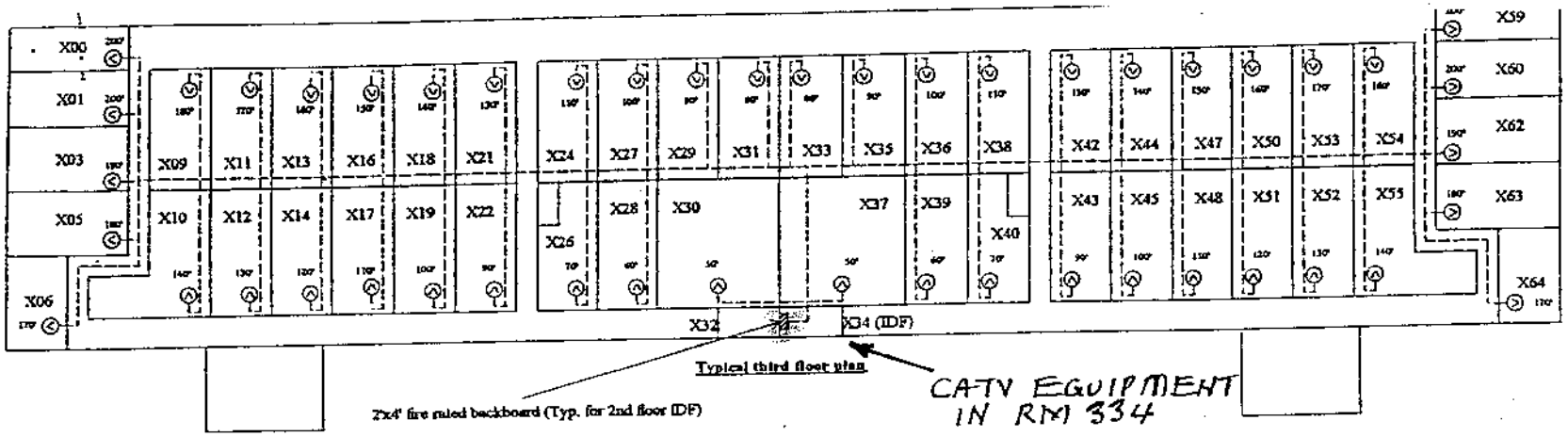


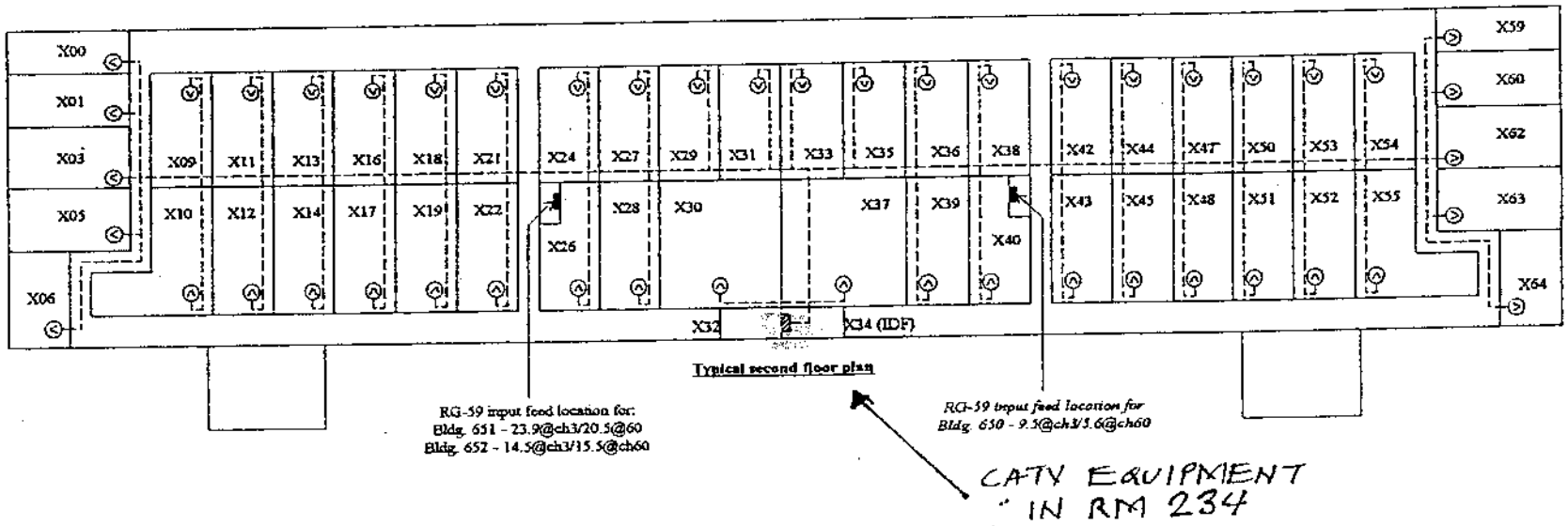
Typical second floor plan

EXIST CATV EQUIPMENT FOR BLDG 649.

ATTACHMENT J 6

EXIST CATV EQUIPMENT FOR BLDG 650, 651, 652





EXSIT CATV EQUIPMENT
FOR BUILDINGS 650, 651, 652

ATTACHMENT 17

SCHOFIELD BARRACKS MASTER PLAN MAPS, DRAFT REPORT, FY96 OMA FAMILY HOUSING MASTER PLAN AND INFRASTRUCTURE STUDY, ARMY STORM DRAINAGE INFRASTRUCTURE STUDY FOR SCHOFIELD BARRACKS

STORM DRAINAGE MAP LEGEND

STORM DRAINAGE SYSTEM

- 012 — DRAINLINE WITH LINE SIZE IN INCHES AND DIRECTION OF FLOW
- (ABANDONED) — ABANDONED DRAINLINE
- 0-T3-12 — DRAINAGE INLET WITH DRAINAGE STRUCTURE NUMBER
  - NUMBER
  - AREA OR SHEET NUMBER
  - TYPE
- 0-300-2 — DRAIN MANHOLE WITH DRAINAGE STRUCTURE NUMBER
  - NUMBER
  - AREA OR SHEET NUMBER
  - TYPE
- DRAINAGE CLEAN-OUT
- HEADWALL

NATURAL FEATURES

- STREAM/DITCH AND DIRECTION OF FLOW

ROADS, TRAILS

- PAVED ROAD
- UNPAVED ROAD
- SIDEWALK, CURB

STRUCTURES

- 1350 — STRUCTURE AND BUILDING NUMBER

MAN MADE FEATURES

- BOUNDARY LINE
- FENCE
- WALL
- HORIZONTAL/VERTICAL CONTROL

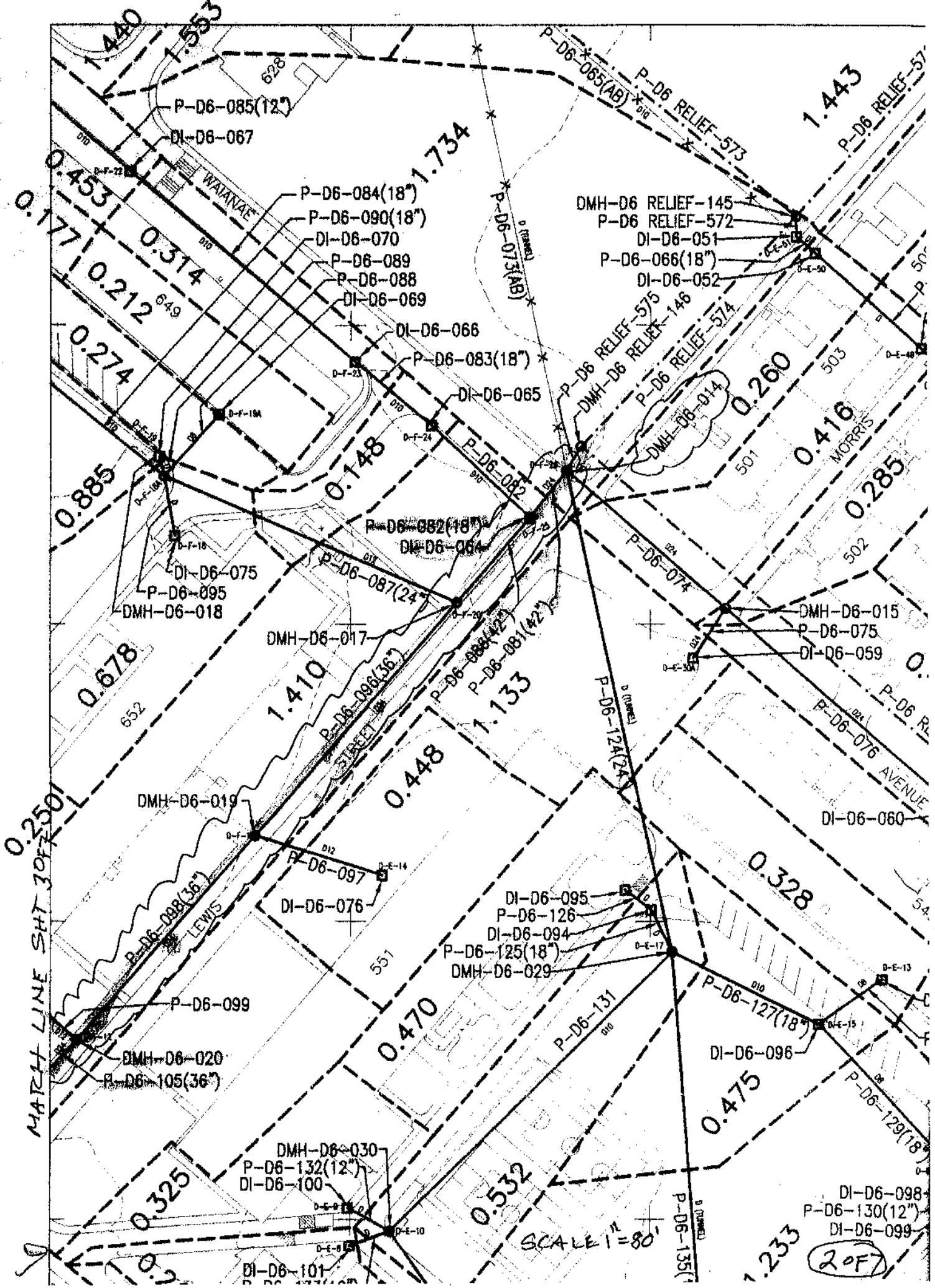
STORM DRAINAGE MASTER PLAN LEGEND

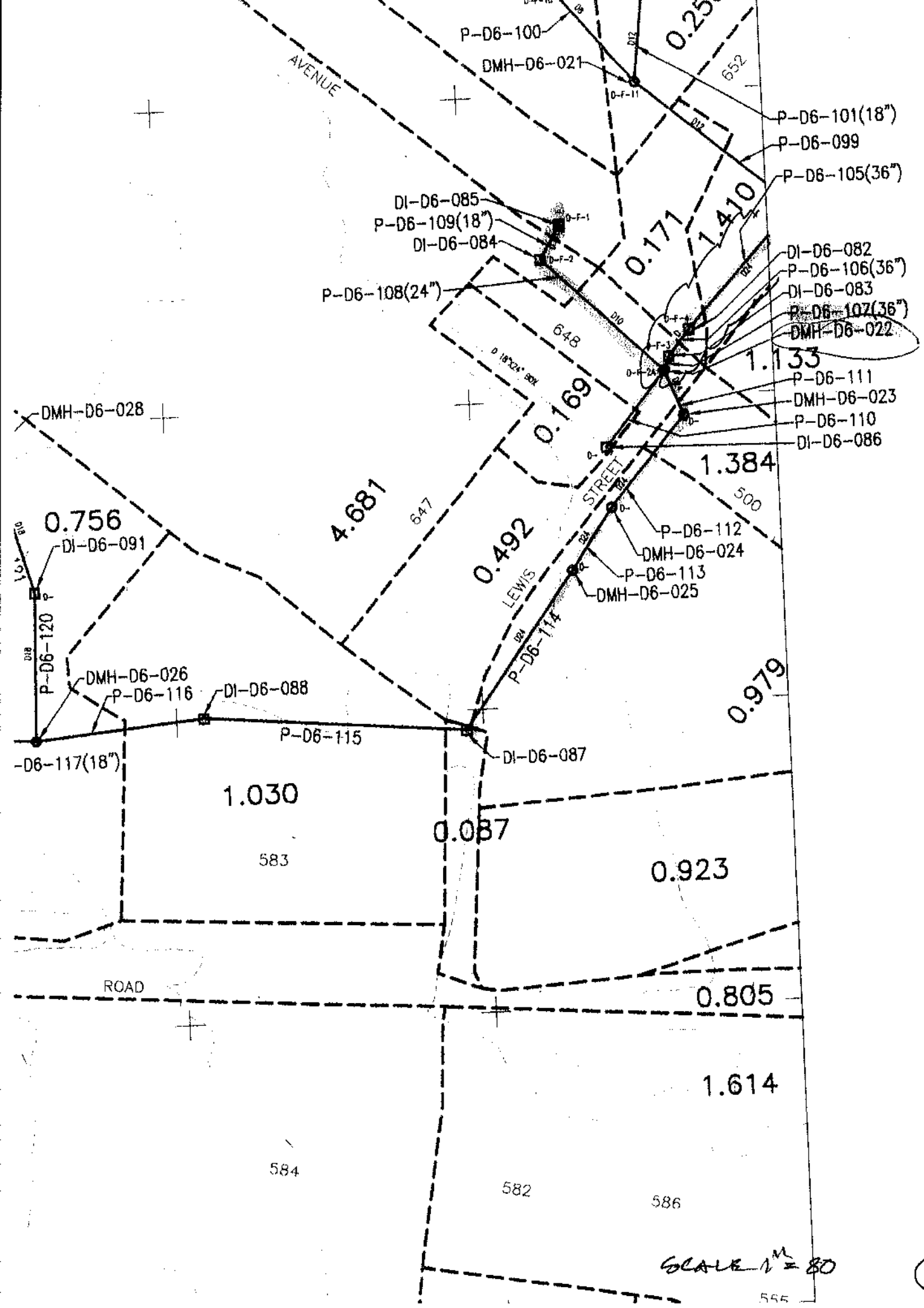
- 0-D1-003 — OUTLET-DRAINAGE AREA 1-NUMERICAL DESIGNATION 3
- P-D2-014 — PIPE-DRAINAGE AREA 2-NUMERICAL DESIGNATION 14
- P-D2-014(24") — PIPE14 INADEQUATE (24" IS ADEQUATE SIZE)
- D1-D3-041 — DRAIN INLET-DRAIN AREA 3-NUMERICAL DESIGNATION 41
- DMH-D3-018 — DRAINMANHOLE-DRAIN AREA 3-NUMERICAL DESIGNATION 18
- LIMITS OF DRAINAGE BASIN
- 9.224 — AREA OF DRAINAGE BASIN IN ACRES

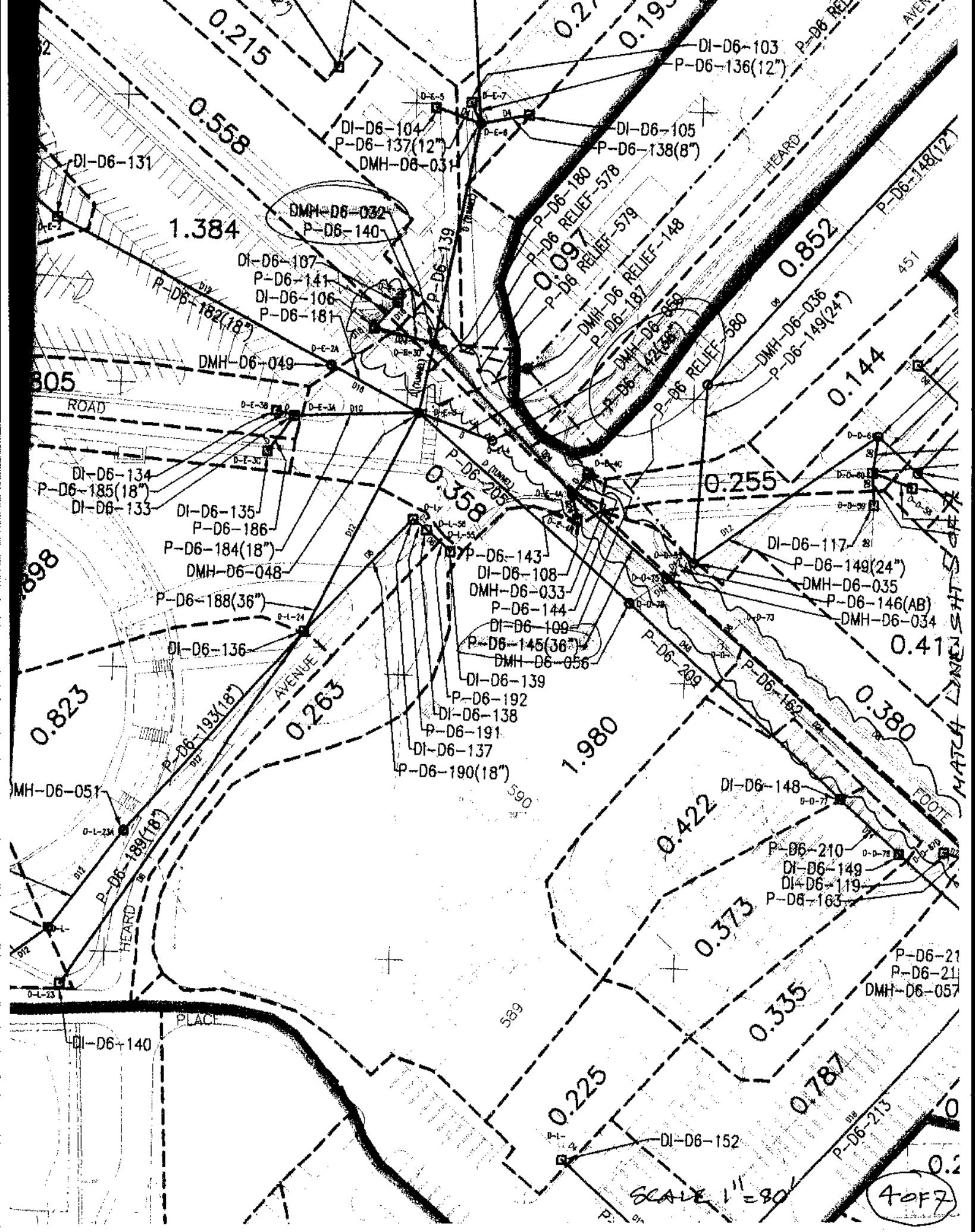
C

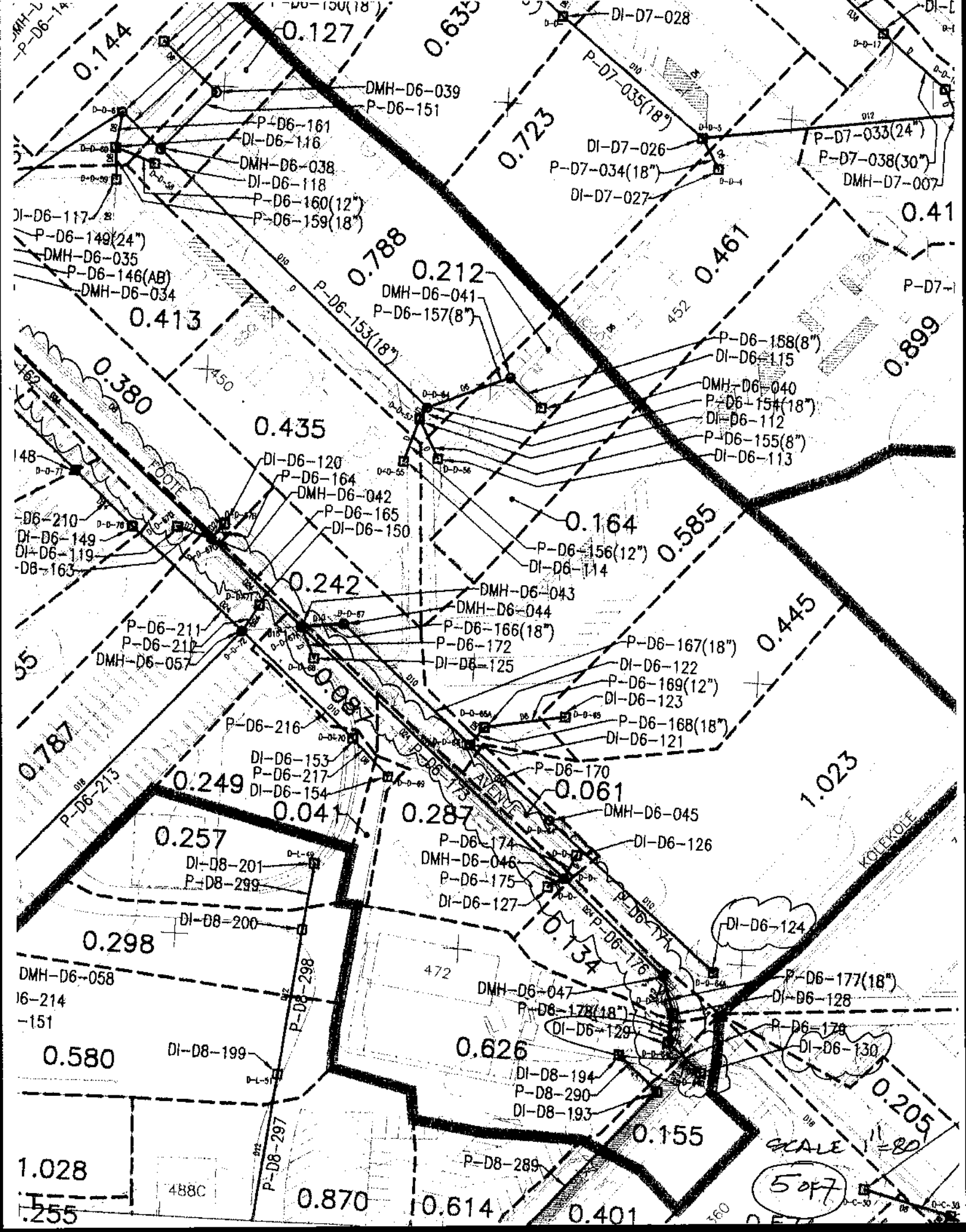
B

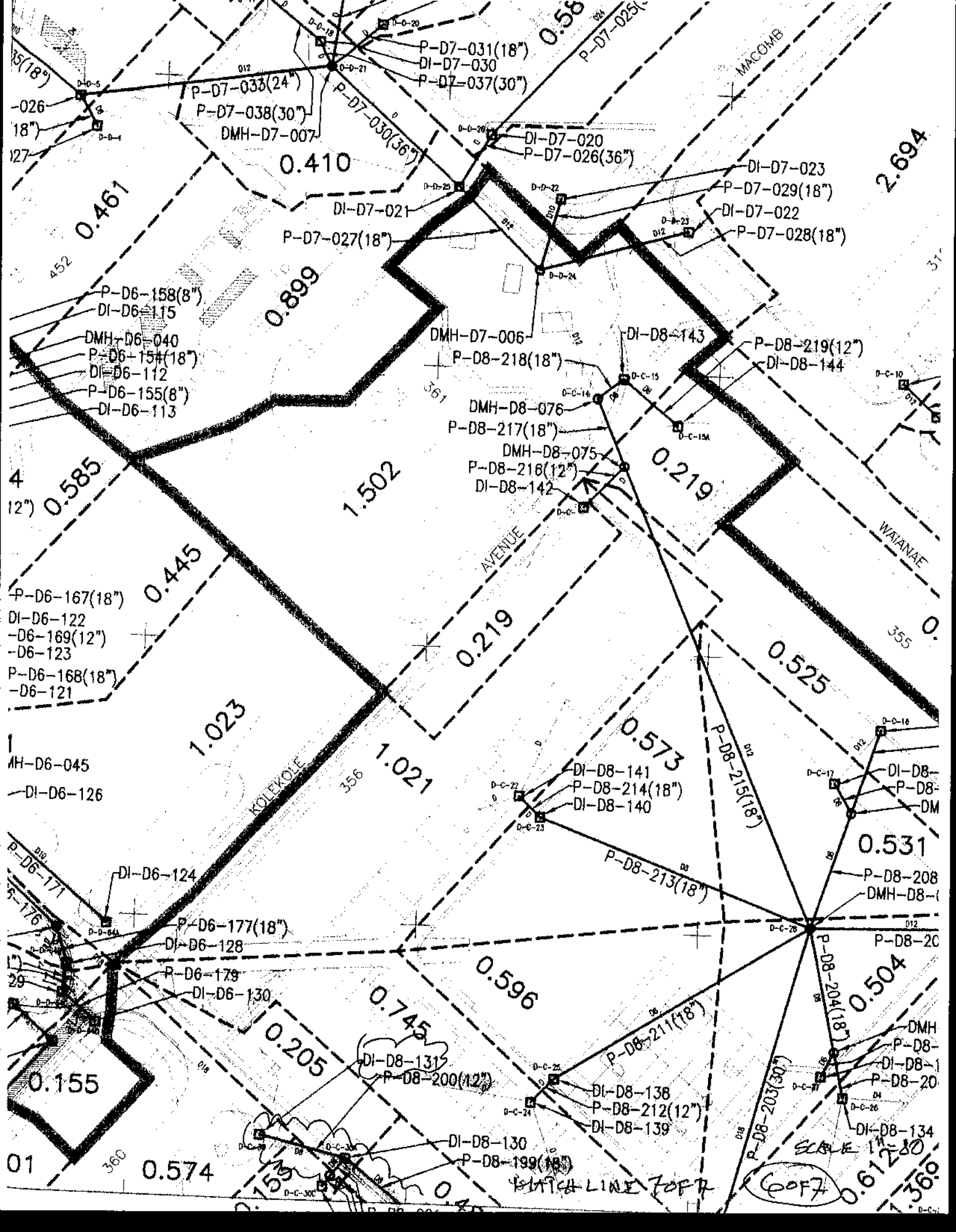
1 of 7

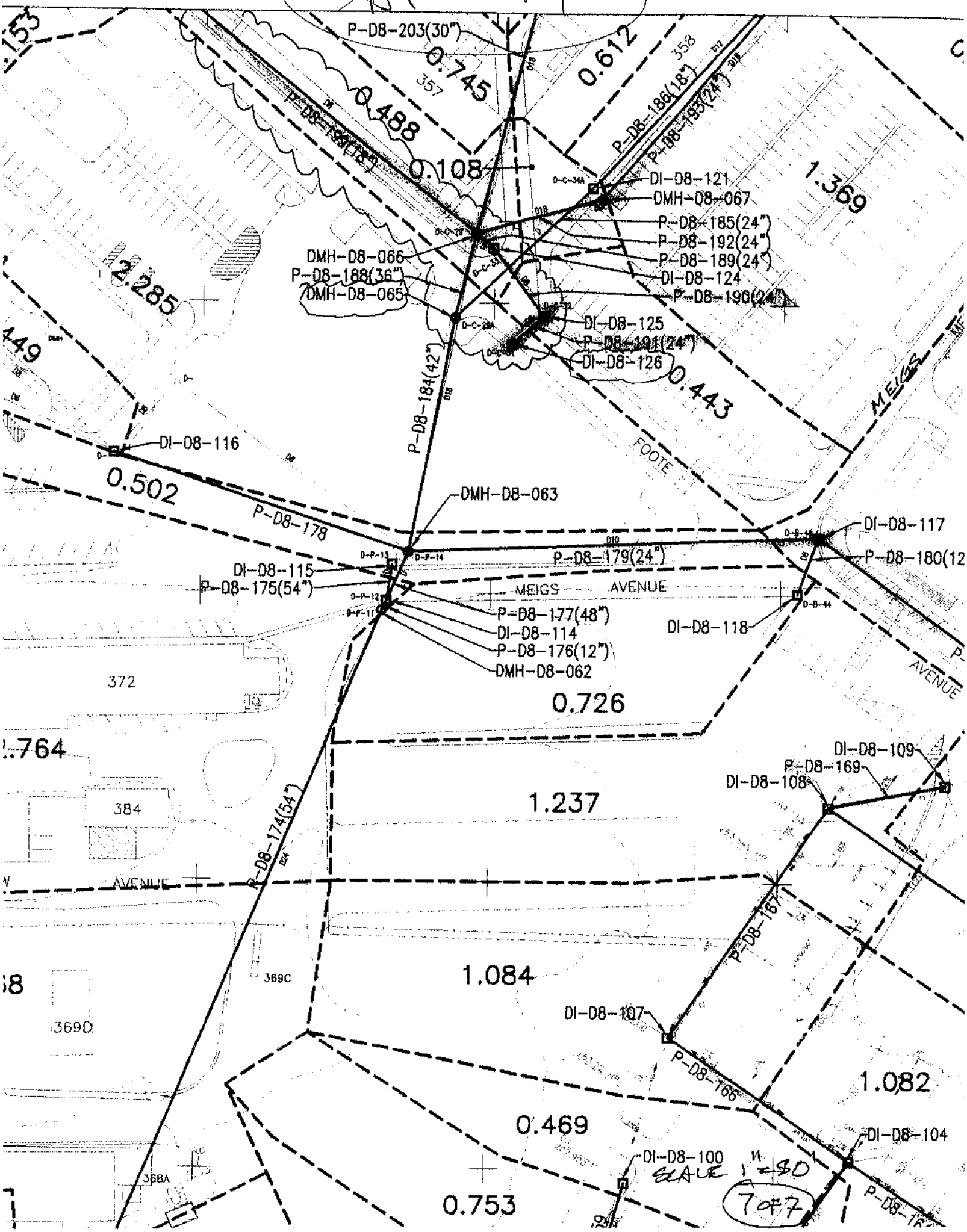

P-D6-085(12")
DI-D6-067
WAIANAE
P-D6-084(18")
P-D6-090(18")
DI-D6-070
P-D6-089
P-D6-088
DI-D6-069
DI-D6-066
P-D6-083(18")
DI-D6-065
P-D6-065(AB)
P-D6 RELIEF-573
P-D6-073(AB)
DMH-D6 RELIEF-145
P-D6 RELIEF-572
DI-D6-051
P-D6-066(18")
DI-D6-052
P-D6 RELIEF-575
DMH-D6 RELIEF-146
P-D6 RELIEF-574
DMH-D6-014
P-D6-082
P-D6-082(18")
DI-D6-064
P-D6-087(24")
DI-D6-075
P-D6-095
DMH-D6-018
DMH-D6-017
P-D6-086(42")
P-D6-081(42")
P-D6-096(36")
STREET
P-D6-074
DMH-D6-015
P-D6-075
DI-D6-059
P-D6-076
AVENUE
DI-D6-060
P-D6-124(24")
DMH-D6-019
P-D6-097
DI-D6-076
P-D6-098(36")
LEWIS
DI-D6-095
P-D6-126
DI-D6-094
P-D6-125(18")
DMH-D6-029
P-D6-127(18")
DI-D6-096
P-D6-129(18")
P-D6-131
P-D6-099
DMH-D6-020
P-D6-105(36")
MARAH LINE SHT 30F7
DMH-D6-030
P-D6-132(12")
DI-D6-100
DI-D6-101
DI-D6-098
P-D6-130(12")
DI-D6-099
P-D6-135
SCALE 1"=80'
2 OF 7
1.440
1.553
1.734
1.443
0.453
0.177
0.314
0.212
0.274
0.885
0.148
0.260
0.416
0.285
0.678
1.410
1.133
0.448
0.250
0.328
0.470
0.475
0.325
0.532
1.233
628
649
503
501
502
652
551


P-D6-100
DMH-D6-021
AVENUE
0.25
652
P-D6-101(18")
P-D6-099
P-D6-105(36")
DI-D6-085
P-D6-109(18")
DI-D6-084
P-D6-108(24")
0.171
1.410
DI-D6-082
P-D6-106(36")
DI-D6-083
P-D6-107(36")
DMH-D6-022
1.133
648
0.169
P-D6-111
DMH-D6-023
P-D6-110
DI-D6-086
DMH-D6-028
1.384
500
STREET
4.681
647
0.492
LEWIS
P-D6-112
DMH-D6-024
P-D6-113
DMH-D6-025
P-D6-114
0.756
DI-D6-091
P-D6-120
DMH-D6-026
P-D6-116
DI-D6-088
P-D6-115
-D6-117(18")
DI-D6-087
0.979
1.030
583
0.087
0.923
ROAD
0.805
1.614
584
582
586
555
SCALE 1" = 80


0.215
0.558
1.384
0.097
0.852
0.144
0.255
0.358
0.263
1.980
0.823
0.380
0.422
0.373
0.335
0.787
0.225
DI-D6-103
P-D6-136(12")
DI-D6-104
P-D6-137(12")
DMH-D6-031
DI-D6-105
P-D6-138(8")
DI-D6-131
DMH-D6-032
P-D6-140
DI-D6-107
P-D6-141
DI-D6-106
P-D6-181
P-D6-182(18")
P-D6-180
P-D6 RELIEF-578
P-D6 RELIEF-579
DMH-D6 RELIEF-148
P-D6-187
DMH-D6-036
P-D6-149(24")
P-D6-148(12")
DMH-D6-049
P-D6 RELIEF-580
DI-D6-134
P-D6-185(18")
DI-D6-133
DI-D6-135
P-D6-186
P-D6-184(18")
DMH-D6-048
P-D6-188(36")
DI-D6-136
P-D6-143
DI-D6-108
DMH-D6-033
P-D6-144
DI-D6-109
P-D6-145(36")
DMH-D6-056
DI-D6-139
P-D6-192
DI-D6-138
P-D6-191
DI-D6-137
P-D6-190(18")
DI-D6-117
P-D6-149(24")
DMH-D6-035
P-D6-146(AB)
DMH-D6-034
P-D6-193(18")
DMH-D6-051
P-D6-189(18")
DI-D6-148
P-D6-210
DI-D6-149
DI-D6-119
P-D6-163
DMH-D6-057
DI-D6-140
DI-D6-152
P-D6-213
P-D6-205
P-D6-209
P-D6-162
P-D6-139
ROAD
AVENUE
HEARD
PLACE
FOOTE
589
590
451
SCALE 1" = 80'
4 OF 7


0.144
0.127
0.635
DI-D7-028
P-D7-035(18")
0.723
DMH-D6-039
P-D6-151
P-D6-161
DI-D6-116
DMH-D6-038
DI-D6-118
P-D6-160(12")
P-D6-159(18")
DI-D6-117
P-D6-149(24")
DMH-D6-035
P-D6-146(AB)
DMH-D6-034
DI-D7-026
P-D7-034(18")
DI-D7-027
P-D7-033(24")
P-D7-038(30")
DMH-D7-007
0.41
0.788
0.212
0.461
DMH-D6-041
P-D6-157(8")
P-D6-153(18")
0.413
P-D6-158(8")
DI-D6-115
0.899
DMH-D6-040
P-D6-154(18")
DI-D6-112
P-D6-155(8")
DI-D6-113
0.380
0.435
DI-D6-120
P-D6-164
DMH-D6-042
P-D6-165
DI-D6-150
0.164
0.585
P-D6-156(12")
DI-D6-114
DI-D6-149
DI-D6-119
0.242
DMH-D6-043
DMH-D6-044
P-D6-166(18")
P-D6-172
DI-D6-125
P-D6-211
P-D6-212
DMH-D6-057
0.445
P-D6-167(18")
DI-D6-122
P-D6-169(12")
DI-D6-123
0.087
P-D6-216
P-D6-168(18")
DI-D6-121
0.787
DI-D6-153
P-D6-217
DI-D6-154
P-D6-170
0.061
1.023
0.249
0.041
0.287
DMH-D6-045
0.257
P-D6-174
DI-D6-126
DMH-D6-046
P-D6-175
DI-D6-127
DI-D8-201
P-D8-299
DI-D8-200
0.298
0.134
DI-D6-124
DMH-D6-058
P-D6-177(18")
DMH-D6-047
DI-D6-128
P-D6-178(18")
DI-D6-129
P-D6-178
DI-D6-130
0.580
DI-D8-199
0.626
DI-D8-194
P-D8-290
DI-D8-193
0.205
0.155
SCALE 1" = 80'
1.028
P-D8-289
488C
0.870
0.614
0.401
5 of 7


P-D7-031(18")
DI-D7-030
P-D7-037(30")
P-D7-033(24")
P-D7-038(30")
DMH-D7-007
P-D7-030(36")
DI-D7-020
P-D7-026(36")
DI-D7-023
P-D7-029(18")
DI-D7-022
P-D7-028(18")
DI-D7-021
P-D7-027(18")
P-D6-158(8")
DI-D6-115
DMH-D6-040
P-D6-154(18")
DI-D6-112
P-D6-155(8")
DI-D6-113
DMH-D7-006
P-D8-218(18")
DI-D8-143
P-D8-219(12")
DI-D8-144
DMH-D8-076
P-D8-217(18")
DMH-D8-075
P-D8-216(12")
DI-D8-142
P-D6-167(18")
DI-D6-122
P-D6-169(12")
P-D6-123
P-D6-168(18")
P-D6-121
DI-D6-126
DI-D8-141
P-D8-214(18")
DI-D8-140
P-D8-215(18")
P-D8-213(18")
P-D8-208
DMH-D8-
P-D8-20
DI-D6-124
P-D6-177(18")
DI-D6-128
P-D6-179
DI-D6-130
P-D8-211(18")
P-D8-204(18")
DI-D8-131
P-D8-200(12")
DI-D8-136
P-D8-212(12")
DI-D8-139
DI-D8-130
P-D8-199(18")
DI-D8-134
P-D8-203(30")
SCALE 1" = 80'
MATCH LINE 7 OF 7
6 OF 7
MACOMB
WAIANAE
AVENUE
KOLEKOLE
0.410
0.461
0.899
1.502
0.585
0.445
0.219
0.219
0.525
1.023
1.021
0.573
0.531
0.596
0.745
0.205
0.504
0.155
0.574
2.694
0.612
1.360


P-D8-203(30")
0.745
0.612
0.488
0.108
1.369
2.285
0.443
0.502
0.726
1.237
1.084
1.082
0.469
0.753
DI-D8-121
DMH-D8-067
P-D8-185(24")
P-D8-192(24")
P-D8-189(24")
DI-D8-124
P-D8-190(24")
DMH-D8-066
P-D8-188(36")
DMH-D8-065
DI-D8-125
P-D8-191(24")
DI-D8-126
P-D8-184(42")
DI-D8-116
DMH-D8-063
P-D8-178
DI-D8-117
P-D8-179(24")
P-D8-180(12
DI-D8-115
P-D8-175(54")
MEIGS AVENUE
P-D8-177(48")
DI-D8-114
P-D8-176(12")
DMH-D8-062
DI-D8-118
FOOTE
MEIGS
AVENUE
DI-D8-109
P-D8-169
DI-D8-108
P-D8-174(54")
P-D8-167
DI-D8-107
P-D8-166
DI-D8-104
DI-D8-100
SCALE 1"=50'
7 of 7

REVISED DRAFT INSPECTION REPORT

Volume I

Asbestos Survey, Analysis and Report for:
Quad F - Buildings 649, 650, 651 and 652
Schofield Barracks, Island of Oahu, Hawaii

Contract No: DACA83-00-D-0012
Task Order No: 0012

PREPARED FOR:
U.S. Army Corps of Engineers
Pacific Ocean Division
Fort Shafter, Oahu, Hawaii

Through:
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I. EXECUTIVE SUMMARY

Edward K. Noda & Associates, Inc. (EKNA) was retained by Wil Chee Planning, Inc., HMSA Center, 1400 Rycroft Street, Suite 928, Honolulu, Hawaii 96814 , to conduct an investigative asbestos survey of Quad F - Buildings 649, 650, 651 and 652 at Schofield Barracks, Island of Oahu, Hawaii, for visible and accessible asbestos-containing building materials (ACBM) which may be required to be abated prior to any renovation activities.

EKNA's certified asbestos inspectors Christine Arouh, Steven Chun, William Harris, Prudy Stoudt-McRea, Kennyson Thomas and Doug Tisdell conducted an investigative survey from January 8th through 17th, 2001 of Quad F - Buildings 649, 650, 651 and 652. EKNA collected eight hundred seventy nine (879) suspect asbestos-containing building material (ACBM) samples and identified two hundred fifty one (251) distinct material types from Buildings 649, 650, 651 and 652.

The investigative asbestos survey found the following ACBMs in the following buildings. Materials found to contain greater than one percent asbestos are indicated in **bold** print (an asterisk indicates a friable material). Revised/additional identified materials types are indicated by a (☛).

Building 649

12"x12" Vinyl Floor Tile (VFT) - Beige w/Olive Specks and Mastic
12"x12" VFT - Tan w/Brown Specks and Mastic
12"x12" VFT - Olive Marbled and Mastic
12"x12" VFT - Lt. Green w/Specks and Mastic
12"x12" VFT - Brown w/Dark Brown Streaks and **Mastic**
12"x12" VFT - Off-White w/Brown Streaks and **Mastic**
12"x12" VFT - Off-White Marbled and **Mastic**
12"x12" VFT - Tan w/Black Streaks and **Mastic**
12"x12" VFT - Lt. Brown w/Specks and **Mastic**
12"x12" VFT - Baby Blue w/Light Specks and **Mastic**
Floor Tile Mastic Only - Black
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 1st Flr (Restrooms)
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 2nd Flr (Private-Bathrooms)
Cementitious Panel - Above Doors and Windows
Composition Built-up Roofing Material - Type I - Flashing
Composition Built-up Roofing Material - Type II - Flashing
Beige Paint w/Black Asphaltic Undercoat
Mastic/sealant at 2' Dia. Large Air Vent - Flashing (Main Roof)
Mastic/sealant at 3' Dia. Large Air Vent - Flashing (Upper Roof)
Mastic/sealant at 6"-8" Gas Vent - Main Roof
***Vibration Cloth - White Woven Fabric**

***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
HVAC Vent Sealant - Black

Building 650

12"x12" VFT - Beige w/Olive Streaks and Mastic
12"x12" VFT - Olive Green w/Grey Streaks and Mastic
12"x12" VFT - Brown w/Light Brown Streaks and **Mastic**
12"x12" VFT - Beige w/Grey Streaks and **Mastic**
12"x12" VFT - Blue w/White Streaks and **Mastic**
12"x12" VFT - Grey w/ Blue & White Streaks and **Mastic**
12"x12" VFT - Blue w/ Grey Marbling and **Mastic**
12"x12" VFT - Dark Brown w/Brown Streaks and **Mastic**
9"x9" VFT - Green and **Mastic**
9"x9" VFT - Black and **Mastic**
VFT - Green - 2nd Layer and **Mastic**
Floor Tile Mastic Only
☛ **Wall Patch Compound - Cementitious/Asphaltic**
☛ **Wall Patch Compound - Cementitious - 10 Ft. High Patch**
☛ **Wall Plaster - Cementitious Exterior - Type II**
Cementitious Panel - Above Doors & Windows
Composition Roof Flashing - Type I - Main Roof
Beige Paint W/Asphaltic Undercoating (Silver Paint) - Main Roof
Mastic/Sealant at Gas Vents and Air Ducts - Main Roof
Mastic/Sealant at Mounting Points - Main Roof
***Vibration Cloth - White Woven Material**
***Fiberglass Pipe Insulation - Hangar** (Northwest Heater Room)
***Pipe Insulation - <6 Linear Feet**
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 3rd Floor
HVAC Vent Sealant - Black

Building 651

12"x12" VFT - Beige w/Olive Specks and Mastic
12"x12" VFT - Off-White w/Brown Streaks and Mastic
12"x12" VFT - Olive Marble and Mastic

12"x12" VFT - Light Green w/Specks and Mastic
12"x12" VFT - Tan w/Brown & White Specks and Mastic
12"x12" VFT - White w/Dark Grey Stripes and Black Mastic
12"x12" VFT - White w/Dark Grey Streaks and **Black Mastic**
12"x12" VFT - Lt. Blue w/White Streaks **and Mastic**
VFT - Tan w/Olive Streaks
☛ **Wall Plaster - Cementitious Exterior - Type II**
Cementitious Wall Plaster - Restrooms 1st Floor
Cementitious Wall Plaster - Restrooms 2nd Floor
Cementitious Panel - Above Doors and Windows
Mastic/sealant at Mounting Points - Main Roof
Mastic/Sealant at Roof Vents - 8"-10" - Main Roof
***Vibration Cloth- Woven Fabric - White**
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 3rd Floor
Black Mastic on HVAC System

Building 652

12"x12" VFT - Light Green w/Green Marble and Mastic
12"x12" VFT - Brown w/Brown Streaks I and Mastic
12"x12" VFT - Olive Green w/Grey & White Streaks and Mastic
12"x12" VFT - Tan w/Olive Streaks and Mastic
12"x12" VFT - Beige w/Grey Streaks and Mastic
12"x12" VFT - Brown w/Brown Streaks II and **Mastic**
12"x12" VFT - Tan w/Brown Streaks and **Mastic**
12"x12" VFT - Medium Brown w/Black Streaks and **Mastic**
9"x9" VFT - Medium Brown and Mastic
9"x9" VFT - Cocoa Brown and Mastic
Cementitious Plaster-Hollow Plaster & Lathe Wall System 1st Floor, Restrooms
Cementitious Plaster-Hollow Plaster & Lathe Wall System 2nd Flr., Private Restroom
Cementitious Plaster-Hollow Plaster & Lathe Wall System 3rd Flr., Private Restroom
Cementitious Plaster-Troweled on CMU and Concrete Walls 1st Floor, East Hallway
☛ **Exterior Cementitious Wall Plaster Type II, 1st Floor**
Cementitious Panel - Above Doors and Windows
Composition Built-Up Roofing Material - Type II - Lower Roof
Composition Built-Up Roofing Material - Type II - Flashing
Beige Paint w/Black Asphaltic Undercoat
Mastic/sealant at 2"-4" Pipe Mounts - Flashing

Mastic/sealant at Main Roof Hatches - Flashing
Mastic/sealant at 6"-8" Dia. Vent Pipes - Flashing
***Vibration Cloth - Type I - Woven Fabric - White**
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, (Hot Water Heater Room)
***White Powder Pipe Insulation** 1st Floor
***White Plaster Pipe Insulation** 2nd Floor

II. INTRODUCTION

The objective of this field survey and report was to assess the existence and extent of ACBM in Building 649, 650, 651 and 652 Schofield Barracks, which are scheduled to be renovated.

EKNA's scope of work included an investigative asbestos survey, collection and testing of suspect asbestos-containing material samples, and provide a written report summarizing the survey with test results for Quad F - Buildings 649, 650, 651 and 652, Quad I - Buildings 745 & 746 and Quad J Building 847 & 855 "DIVARTY" Dinning Facility at Schofield Barracks.

EKNA's investigative ACBM survey is segregated into the following three (3) volumes and addresses each identified building listed below:

Volume I Quad F - Building 649, 650, 651 and 652

Volume II Quad I - Buildings 745 and 746

Volume III Quad J - Buildings 847 and 855 "DIVARTY" Dinning Facility

Building 649, 650, 651 and 652 are 3-story concrete structures which provide office space on the first floor (Building 649 - 1st and 2nd floor) and living quarters on the second and third floors (Building 649 - 3rd floor only). The primary hot water heater for each building is located on its respected first floor. The chilling tower and associated chilled water system (machine room) for Quad F is located at Building 649.

III. SURVEY METHODOLOGY

EKNA's certified asbestos inspectors Christine Arouh, Steven Chun, William Harris, Prudy Stoudt-McRea, Kennyson Thomas and Doug Tisdell (see Appendix E for Inspector Certificates) conducted an investigative survey of accessible building materials for the presence of suspect ACBM. During the survey eight hundred seventy nine (879) suspect ACBM samples were collected from two hundred fifty one (251) distinct material types at Quad F - Buildings 649, 950, 951 and 952 (see Table 1 for per building breakdown).

Table 1

Building Number	Samples Collected	Additional Samples Collected	Homogeneous Material Identified	Additional Homogeneous Material Identified
649	209	0	63	0
650	223	7	69	1
651	201	3	53	1
652	222	14	61	3
Total(s)	855	24	246	5

AHERA is the federal law (40 CFR 763) instituted to regulate asbestos in schools. In addition to AHERA, the EPA has issued a document titled "Guidance for Controlling Asbestos-Containing Materials in Buildings" (Document number EPA 560/5-85-024) for buildings which are not governed by AHERA legislation. During an asbestos assessment, one of the most important characteristics of a material that AHERA & EPA addresses is "friability". AHERA describes "friable" as those materials that when dry may be crumbled, pulverized, or reduced to powder by hand pressure. The term includes previously non-friable material after it becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure. In addition, AHERA regulations require that for any homogenous sampled material (i.e., materials with similar location, function, thickness and color), if one sample of a given material tests positive for asbestos (greater than one percent asbestos), the entire homogenous material is considered positive for asbestos.

AHERA regulations require that for an Homogeneous Sampling Material (HSM), if one sample tests positive for asbestos, the entire HSM type is considered asbestos-containing. For this reason, EKNA directs the laboratory to stop analysis at the first positive result (asbestos content in excess of one percent) for each homogeneous material type, if more than one sample is presented for an HSM.

The appearance of each material and date of installation were considered to ensure that materials known to have been installed at different times would be sampled as a separate HSM.

After completing an inventory of building materials, EKNA collected samples of each suspect material. Drawings are provided in each applicable appendices that depict the locations of all samples collected.

The number of samples collected was determined by the extent of HSM within the building space, in accordance with the sampling protocol contained in 40 CFR 763. HSM is analogous to the homogeneous area as defined by 40 CFR 763. In general, an HSM is identified as that area or amount of suspect ACBM which is uniform in color and texture. For example, the pipe runs of a domestic hot water system would be a single HSM provided that the material does not differ in appearance, color, or texture throughout the system. When a system or area appears to consist of dissimilar materials, then the system or area is separated into as many HSMs as necessary to define all suspect materials present.

If two HSM are similar in appearance or texture and cannot be described uniquely, a type number is assigned to differentiate them. For example, if distinct but HSM are similar in appearance, the first is identified as Type I and the second as Type II (e.g., Brown 12"x12" Vinyl Floor Tile - Type I, Brown 12"x12" Vinyl Floor Tile - Type II, etc.). This procedure minimizes the potential of incorrect conclusions based exclusively upon the appearance of the material or the construction period during which it was installed.

Each sample was placed in an individual sample bag, sealed and labeled with a unique sample identification number. Sample locations are depicted in scale drawings of the buildings in Appendix A through Appendix F. All samples were submitted to NVL Laboratories, Inc. of Seattle, Washington, for analysis to determine asbestos content. NVL Laboratories, Inc. participates in the National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP) mandated by EPA under the AHERA regulations. A copy of the laboratory certification is provided in Appendix H.

The samples were analyzed according to EPA methods described in EPA 660/R-93/116 utilizing Polarized Light Microscopy (PLM). Using the PLM method, the analyst is able to determine the type and concentration of asbestos in each sample. The concentration is provided as a percentage of the total area (total area is determined by the field of view while observed through the microscope) of the sample material. The limit of detection for this particular method is less than one percent (>1%). As with most analyzing techniques there is a variance associated with PLM analysis and for this reason the results are presented as a reliable range. Where results are reported as "<1%" or "Trace", this indicates that at least one asbestos fiber was detected. Where results are reported as "No Asbestos Detected" or "ND", no asbestos fibers were found.

Each layer in a sample is viewed and analyzed by NVL as a distinct material, and analysis results reported with the asbestos percentages determined by the analyst in each layer of the suspect material. The individual layer information is important in that for many cases of multi-layered samples, only a single layer of the entire sample may contain asbestos. By referencing the layer description in the Bulk Asbestos Fiber Analysis, the user can distinguish the layer(s) in

which asbestos occurs. Analysis results and the extent of materials which tested >1% asbestos content is shown in each applicable appendix.

IV. SURVEY FINDINGS

The result of EKNA's investigative ACBM survey of Quad F - Buildings 649, 650, 651 & 652 is reported per building into a particular appendix (see "Table of Contents" for listing). Each appendix consist of the following (if applicable):

Introduction	-Identifying the Building name and /or designated number. -Brief description of the surveyed building.
Summary of Identified ACBM	
Survey Findings	-Total suspected asbestos samples collected. -Listing of all suspect materials submitted for analysis
Remarks and Comments	
Microstation Drawings	-Identifying Asbestos Sample Locations -Identifying the Extent of Identified ACBM's
Floor Tile Log	-Identifying all suspect and asbestos-containing vinyl floor tile
Photo Log	-Identifying all suspect and asbestos-containing homogeneous materials
Chain of Custody Forms and Asbestos Bulk Analysis Forms	
NESHAP Point Count Method Result Forms	

V. DISCUSSIONS

The National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations require that all regulated asbestos-containing building material (RACM) be removed from a facility prior to demolition or renovation activities that would break up, dislodge, or similarly disturb the materials, or preclude access to the material for subsequent removal. NESHAP regulations define RACM as: friable asbestos materials, Category I non-friable ACBM, (vinyl tile, mastics, adhesives, asphalt roofing materials, packing and gaskets) that will be or have been subject to sanding, grinding, cutting, or abrading, or Category II non-friable ACM (all remaining types of non-friable ACM not included in Category I) that have a high probability of becoming, or have become, crumbled, pulverized, or reduced to powder by hand pressure or the forces expected to

act on the material in the course of demolition or renovation operations.

The EPA interpretation of the NESHAP regulations state that, in general, Category I and Category II non-friable materials will not release significant amounts of asbestos fibers during normal renovation activities. However, non-friable ACM which will be subject to sanding, grinding, abrading, drilling, cutting or chipping must be treated as if it were friable.

Under normal circumstances non-friable Category I and Category II ACMs in good condition (such as the mastics and roofing materials located in this survey), need not be removed prior to renovation or demolition activities. However, the local landfill may exercise discretion as to whether to permit disposal of non-friable Category I and II ACMs as a general construction waste. On Oahu, construction demolition waste landfills generally require the handling and disposal of non-friable Category I and II ACMs as though they were friable Category I ACMs.

If the amount of RACM present in an area to be renovated exceeds 260 linear feet, 160 square feet, or 35 cubic feet, the following general actions are required:

> A Notification of Demolition and Renovation must be sent to the EPA and to the Hawaii State Department of Health, Clean Air Branch, at least ten working days prior to beginning work.
>
> A licensed asbestos abatement contractor is required to perform the work. Workers must have received from eight to thirty two hours of training (dependent on type of work conducted), be medically examined and certified fit to wear a respirator, have been individually fitted to personally issued respirators, and operate under the supervision of a competent person as defined in 29 CFR 1910.1101.
>
> Various engineering controls for the prevention of visible and/or airborne emissions must be implemented.
>
> Asbestos-containing waste must be thoroughly wetted and properly sealed, labeled, transported and disposed of in a permitted landfill.

VI. RECOMMENDATIONS

Demolition of Building 649, 650, 651 and 652 will result in disturbance of asbestos-containing materials and abatement is generally required prior to demolition. Due to the quantity and extent of the ACM, a licensed abatement contractor will be required to perform this work.

We recommend that construction specifications detailing work practices, protective measures, and engineering controls to be employed in disturbance of each type of ACBM be prepared and incorporated into the construction documents. Additionally, we recommend that air monitoring

at the work area perimeter ("area" air monitoring) be employed to verify the cleanliness of the contractor's work practices and engineering controls, and to ensure that asbestos fibers in concentrations exceeding the Permissible Exposure Limit are not present at the site upon completion of the abatement contractor's work in each work area.

Abatement of friable Category I materials should be carried out in full containment, which includes protection of non-ACM surfaces by two layers of plastic sheeting, sealing of passages to areas outside the work area, negative air pressure within the work area, HEPA-filtered exhaust, and provision of a three-room decontamination facility.

Disturbance of non-friable Category I and Category II ACBM (ACBM which is not thermal system insulation or surfacing material, including vinyl floor tile mastics, sink insulation, and composition roofing), is subject to less severe restrictions during conduct of work. These materials are less likely to generate airborne asbestos fibers during abatement work.

Work practices for disturbance of non-friable materials (flooring mastic, window caulking and sink insulation) should include HEPA filtered air exhaust from the work area, use of wet methods, intact removal to the extent possible and OSHA-required monitoring of asbestos fiber concentrations in the breathing zone air of all workers. Polyethylene sheeting should be placed on walls adjacent to areas in which non-friable flooring materials will be disturbed, and workers should enter and exit through a decontamination facility.

Exterior non-friable Category I and Category II materials may be abated using wet methods, intact removal to the extent possible, and worker entry and exit through a decontamination facility. Abatement exterior workers shall wear respiratory protection and personal air monitoring of abatement workers breathing zone would be required.

Where results are reported as "<1%" or "Trace", this indicates that at least one asbestos fiber was detected. Although these material types are not considered asbestos-containing materials, caution should be exercised if/when disturbing these materials. Work practices which may involve sawing, cutting, drilling abrading, etc. of these materials should be evaluated for their potential for airborne asbestos fiber release.

EKNA concludes that the "Exterior Cementitious Wall Plaster 1st Floor" is non-asbestos. Caution should be exercised and work practices evaluated if/when disturbing the exterior plaster walls, identifying the extent of asbestos-containing "Wall Patch Compounds" and "Wall Plaster - Cementitious Exterior - Type II" cannot be completely identified due to the exterior surface paint, that restricts identification.

VII. LIMITATIONS

This survey addressed identification of accessible asbestos and non-asbestos materials in areas within the agreed upon scope of work for this project of Quad F - Buildings 649, 650, 651 and 652, Quad I - Buildings 745 and 746 and Quad J - Buildings 847 and 855, Schofield Barracks, Island of Oahu, Hawaii and was limited to visible and accessible suspect asbestos-containing building materials (ACBMs) which may be required to be abated prior to any renovation/demolition activities. A possibility does exist that ACBM may be present in areas which were not surveyed, or inaccessible areas.

Some examples of inaccessible areas may be inaccessible tunnels containing pipe/valve insulation and asbestos materials within solid wall cavities. If suspect materials beyond those identified in this report are encountered during renovation/demolition activities, samples should be collected and submitted for analysis immediately. Materials at other locations which are the same in manufacture, texture, color, thickness, etc. as those which have been identified as ACBMs should also be assumed to be ACBMs.

This Asbestos Containing Building Material Survey Report provides information on the visible and accessible suspect asbestos containing materials sampled of Quad F - Buildings 649, 650, 651 and 652 at Schofield Barracks, Island of Oahu, Hawaii. It should not be construed as a final statement of the presence and condition of all asbestos containing materials at the subject property.

The information set forth is based solely on the agreed upon scope of services. This information is based on personal observation and the results of the asbestos-containing material survey. Edward K. Noda and Associates, Incorporated expressly disclaims any and all liability representations, expressed, or implied, contained in, or for omissions from this report, or any other written or oral communication which might be interpreted as establishing the total extent of all liability present at the subject property.

Our services have been performed with the usual thoroughness and competence of the consulting profession, in accordance with the standards of professional services at this time. No other warranty or representation, either expressed or implied, is included or intended.

EDWARD K. NODA & ASSOCIATES, INC.

APPENDIX A

BUILDING 649

I Introduction

Building 649 is a 3-story concrete structure which provides office space on the first and second floors, third floor consist of a theater and living quarters. Building 649 is currently vacant. A primary hot water heater and storage tank, and a chilled water plant are located on the first floor of the building and a cooling tower is located on the main roof.

II Summary of Identified ACBM

Materials found to contain greater than one percent (>1%) asbestos by laboratory analysis are listed below. An asterisk preceding the material description indicates the material is considered friable or potentially friable.

12"x12" Vinyl Floor Tile (VFT) - Beige w/Olive Specks and Mastic
12"x12" VFT - Tan w/Brown Specks and Mastic
12"x12" VFT - Olive Marbled and Mastic
12"x12" VFT - Lt. Green w/Specks and Mastic
12"x12" VFT - Brown w/Dark Brown Streaks and **Mastic**
12"x12" VFT - Off-White w/Brown Streaks and **Mastic**
12"x12" VFT - Off-White Marbled and **Mastic**
12"x12" VFT - Tan w/Black Streaks and **Mastic**
12"x12" VFT - Lt. Brown w/Specks and **Mastic**
12"x12" VFT - Baby Blue w/Light Specks and **Mastic**
Floor Tile Mastic Only - Black
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 1st Flr (Restrooms)
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 2nd Flr (Private-Bathrooms)
Cementitious Panel - Above Doors and Windows
Composition Built-up Roofing Material - Type I - Flashing
Composition Built-up Roofing Material - Type II - Flashing
Beige Paint w/Black Asphaltic Undercoat
Mastic/sealant at 2' Dia. Large Air Vent - Flashing (Main Roof)
Mastic/sealant at 3' Dia. Large Air Vent - Flashing (Upper Roof)
Mastic/sealant at 6"-8" Gas Vent - Main Roof
***Vibration Cloth - White Woven Fabric**
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
HVAC Vent Sealant - Black

III Survey Findings

EKNAs inspectors, Christine Arouh, Steven Chun, William Harris, Prudy Stoudt-McRea, Kennyson Thomas and Doug Tisdell (see Appendix E for Inspector Certificates) identified sixty three (63) distinct material types and submitted two hundred nine (209) suspect samples for laboratory analysis. Material types sampled are listed below. Materials found to contain >1% asbestos are indicated in **bold** print, an asterisk indicates a friable or potentially friable material. Materials found to contain less than one percent (>1%) asbestos are indicated in *italic* print.

12"x12" Vinyl Floor Tile (VFT) - Beige w/Olive Specks and Mastic
12"x12" VFT - Tan w/Brown Specks and Mastic
12"x12" VFT - Olive Marbled and Mastic
12"x12" VFT - Lt. Green w/Specks and Mastic
12"x12" VFT - Brown w/Dark Brown Streaks and **Mastic**
12"x12" VFT - Off-White w/Brown Streaks and **Mastic**
12"x12" VFT - Off-White Marbled and **Mastic**
12"x12" VFT - Tan w/Black Streaks and **Mastic**
12"x12" VFT - Lt. Brown w/Specks and **Mastic**
12"x12" VFT - Baby Blue w/Light Specks and **Mastic**
12"x12" VFT - Med. Grey Marbled and Mastic
12"x12" VFT - Tan and Mastic
12"x12" VFT - Gray w/Black Streaks
VFT - Brown w/Brown Streaks
Floor Tile Mastic Only - Black
Gypsum Wall Board and Joint Compound, 1st Floor
Gypsum Wall Board and Joint Compound, 2nd Floor
Gypsum Wall Board and Joint Compound, 3rd Floor
Wall Insulation-Grey Fluffy Material, 1st Floor
Wall Insulation-Grey Fluffy Material, 2nd Floor
Wall Insulation-Grey Fluffy Material, 3rd Floor
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 1st Flr (Restrooms)
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 2nd Flr (Private-Bathrooms)
Cementitious Plaster-Hollow Plaster and Lathe Wall Sys. 3rd Flr (Private Bathrooms)
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 2nd Flr (Exterior Restrooms)
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 3rd Flr (Exterior Restrooms)
Cementitious Plaster-Troweled on CMU and Concrete Walls 1st Floor
Cementitious Panel - Above Doors and Windows
Exterior Plaster
4" Cove Base - Black with Mastic
4" Cove Base - Brown with Mastic
2'x4' Ceiling Tile - Fissure Type I, 1st Floor
2'x4' Ceiling Tile - Fissure Type I, 2nd Floor

2'x4' Ceiling Tile - Fissure Type I, 3rd Floor
2'x4' Ceiling Tile - Fissure Type III
2'x4' Ceiling Tile - Fissure Type IV
2'x4' Ceiling Tile - Pinhole
Ceiling Insulation - Fluffy Material - Brown
Composition Built-up Roofing Material - Type I
Composition Built-up Roofing Material - Type I - Flashing
Composition Built-up Roofing Material - Type II
Composition Built-up Roofing Material - Type II - Flashing
Composition Built-up Roofing Material - Type III
Composition Built-up Roofing Material - Type III - Flashing
Composition Built-up Roofing Material - Roof Patch
1'x1' Air Vent Flashing
3"x3" Metal Service Piping Mounts - Mastic
18"x18" Cooling Tower Mounts - Mastic
Beige Paint w/Black Asphaltic Undercoat
Mastic/sealant at 2' Dia. Large Air Vent - Flashing (Main Roof)
Mastic/sealant at 3' Dia. Large Air Vent - Flashing (Upper Roof)
Mastic/sealant at 6"-8" Gas Vent - Main Roof
***Vibration Cloth - White Woven Fabric**
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
Fiberglass Pipe Insulation - Hangers, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
Fiberglass Pipe Insulation - Hangers, 1st Floor
Fiberglass Duct Insulation - Adhesive
HVAC Vent Sealant - Black
Metal Duct Sealant - Gray
Flue Fire Brick - Orange

IV Remarks and Comments

Review "Volume I, Asbestos Survey, Analytical and Report for: Quad F - Buildings 649, 650, 651 and 652 - Schofield Barracks, Oahu, Hawaii", "Discussion" and "Recommendations". See "Survey Methodology" for survey protocol.

Further analysis of the *Exterior Plaster* and *Cementitious Plaster-Hollow Plaster and Lathe Wall Sys. 3rd Flr (Room Bathrooms)* by "NESHAP Point Count Method" indicates that these material types contains <1% asbestos and is considered **non-regulated asbestos-containing materials**, see "NESHAP Point Count Method Results Forms".

Although these material types are not considered asbestos-containing materials, caution should be exercised if/when disturbing these materials. Proposed work methods which may involve sawing, cutting, drilling abrading, etc. of these materials should be evaluated for their potential for airborne asbestos fiber release.

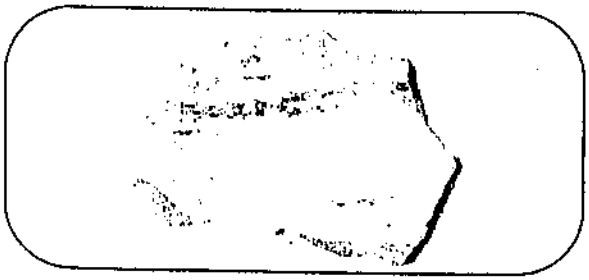
Caution should be exercised if/when disturbing the exterior plaster walls, asbestos-containing "Wall Patch Compounds" and "Wall Plaster - Cementitious Exterior - Type II" were identified on building 650, 651 and 652. Asbestos-containing plaster patches may exist at locations that are not identified due to the exterior surface paint, that restricts identification of possible wall plaster patches.

Building 649

Floor Tile Log

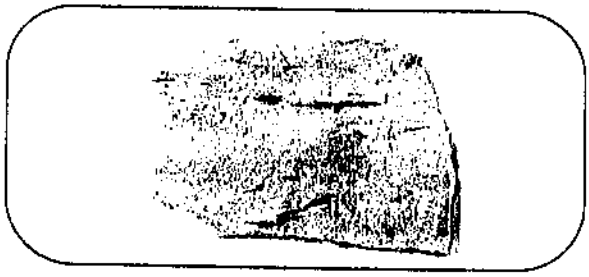
Vinyl Floor Tile Log
Quad F - Building 649

Bold indicates asbestos-containing vinyl floor tile and/or mastic.



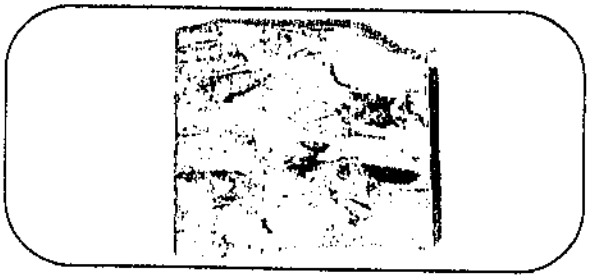
12"X12" Vinyl Floor Tile
Medium Gray Marbled

12"X12" Vinyl Floor Tile
Beige w/Olive Specks and Mastic

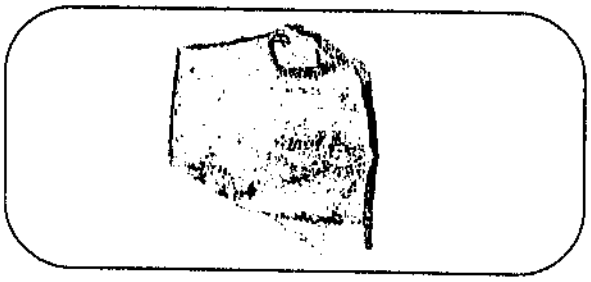


12"X12" Vinyl Floor Tile
Tan

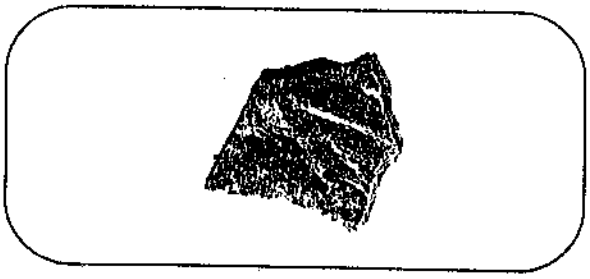
12"X12" Vinyl Floor Tile
Brown w/Dark Brown Streaks and **Mastic**



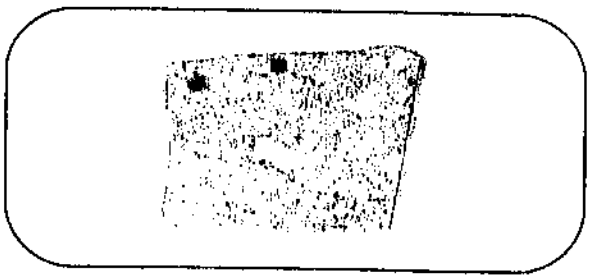
12"X12" Vinyl Floor Tile
Tan w/Brown Specks and Mastic



12"X12" Vinyl Floor Tile
Off-White w/Brown Streaks and Mastic



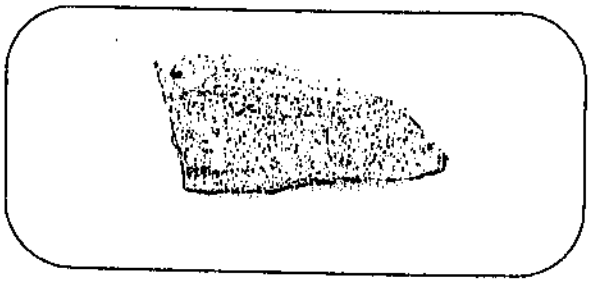
12"X12" Vinyl Floor Tile
Olive Marbled and Mastic



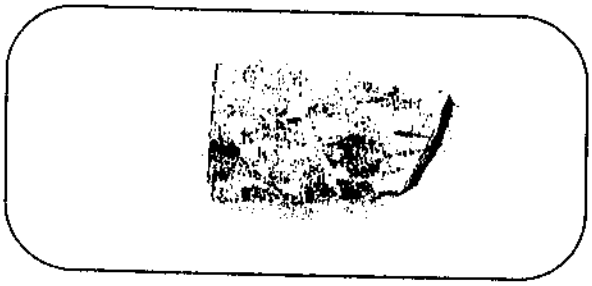
12"X12" Vinyl Floor Tile
Off-White Marbled and **Mastic**

Vinyl Floor Tile Log
Quad F - Building 649

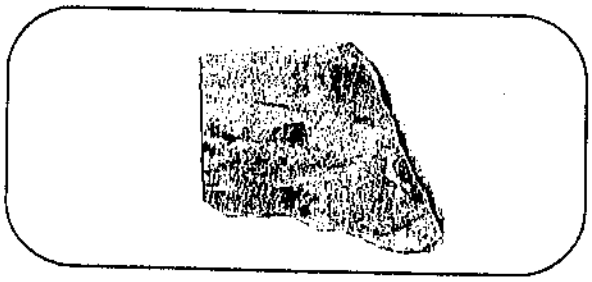
Bold indicates asbestos-containing vinyl floor tile and/or mastic.



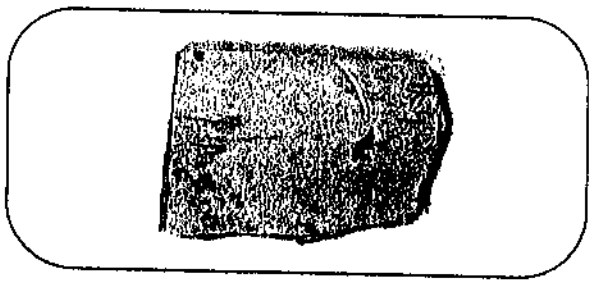
12"X12" Vinyl Floor Tile
Tan w/Black & Brown Streaks and **Mastic**



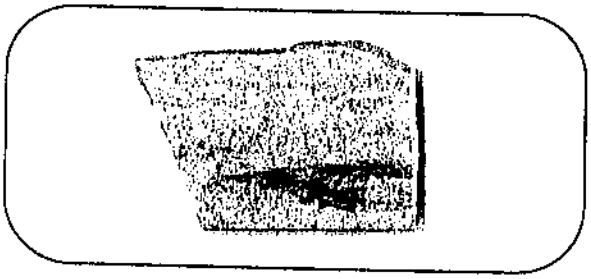
12"X12" Vinyl Floor Tile
Light Green w/Specks and Mastic



12"X12" Vinyl Floor Tile
Light Brown w/Specks and **Mastic**



12"X12" Vinyl Floor Tile
Baby Blue w/Light Specks and **Mastic**



12"X12" Vinyl Floor Tile
Gray w/Black Streaks and Mastic

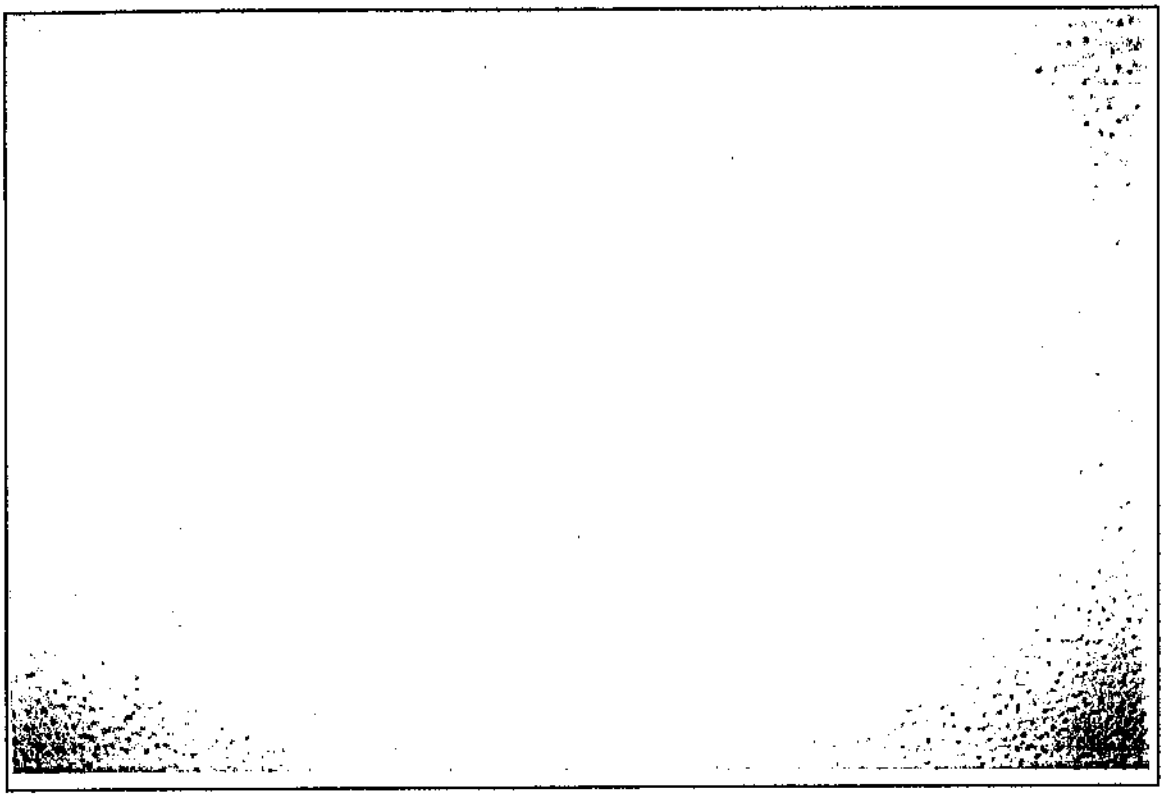
No Visual
Samples

Vinyl Floor Tile
Brown w/Brown Streaks

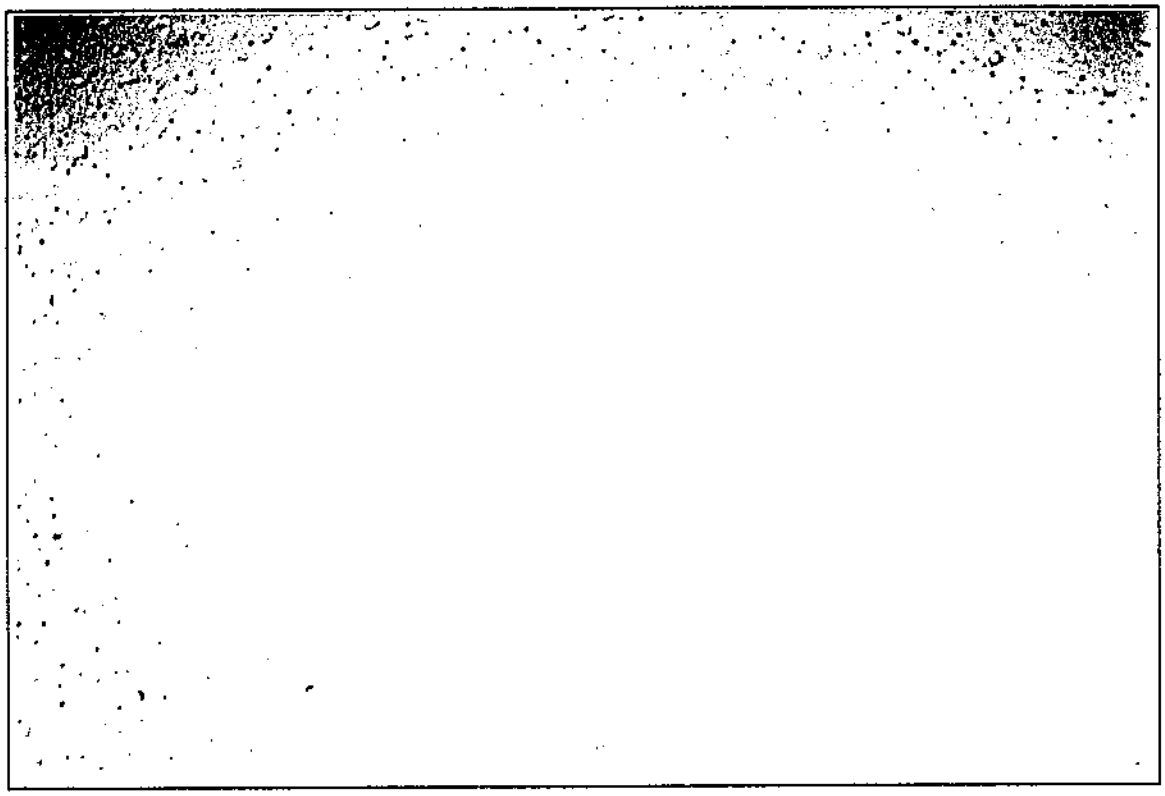
Building 649

Photo Log

BUILDING 649 - PHOTO LOG



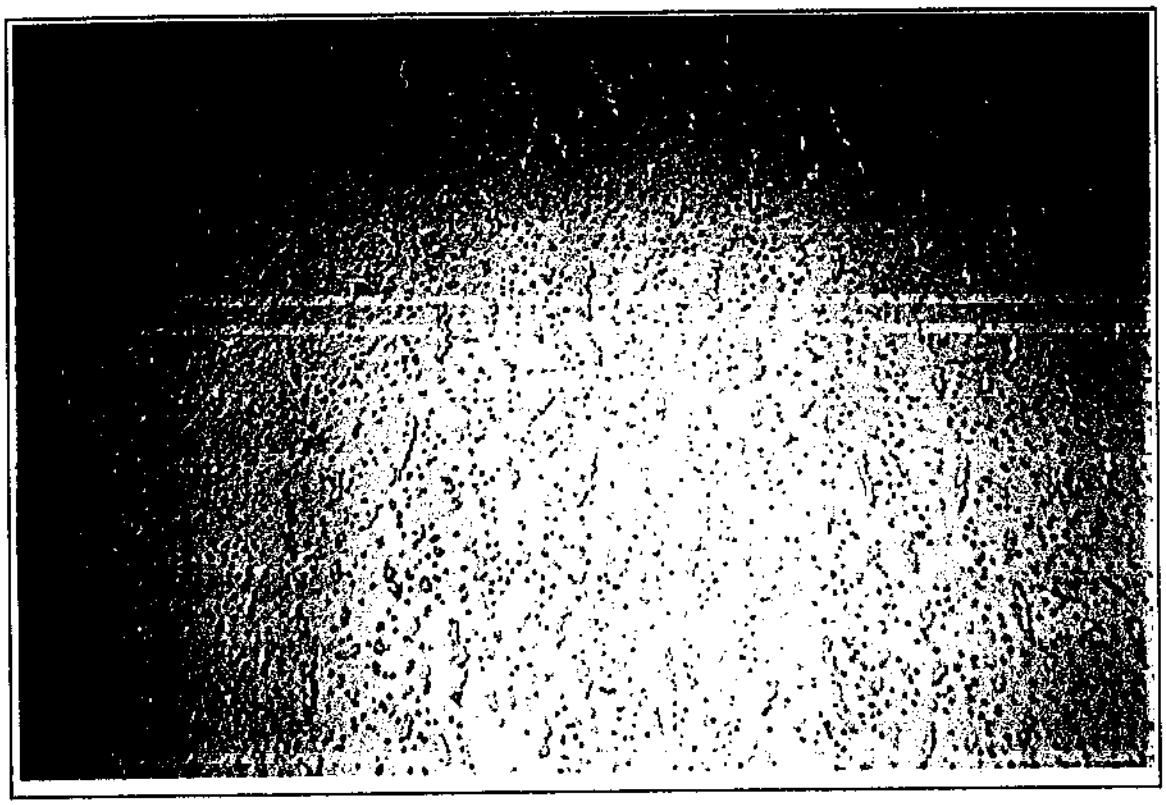
2'x4' Ceiling Tile - Fissure Type I



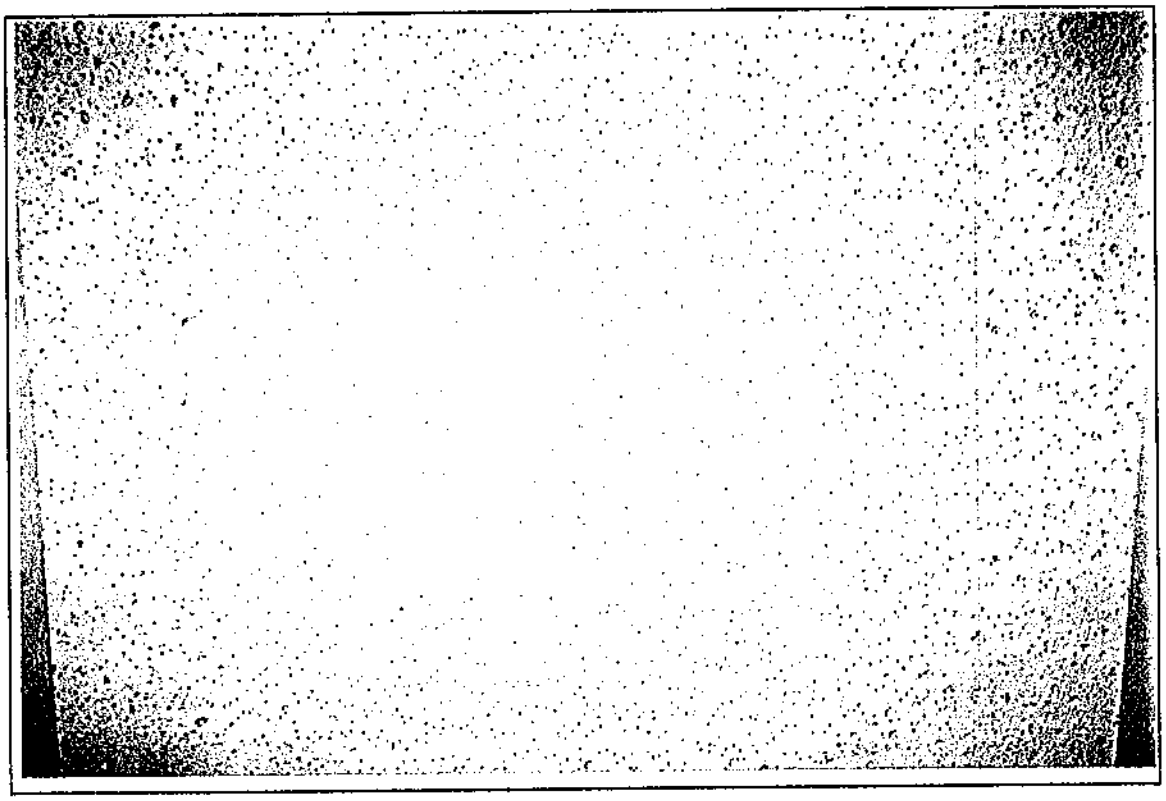
2'x4' Ceiling Tile - Fissure Type III

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 649 - PHOTO LOG



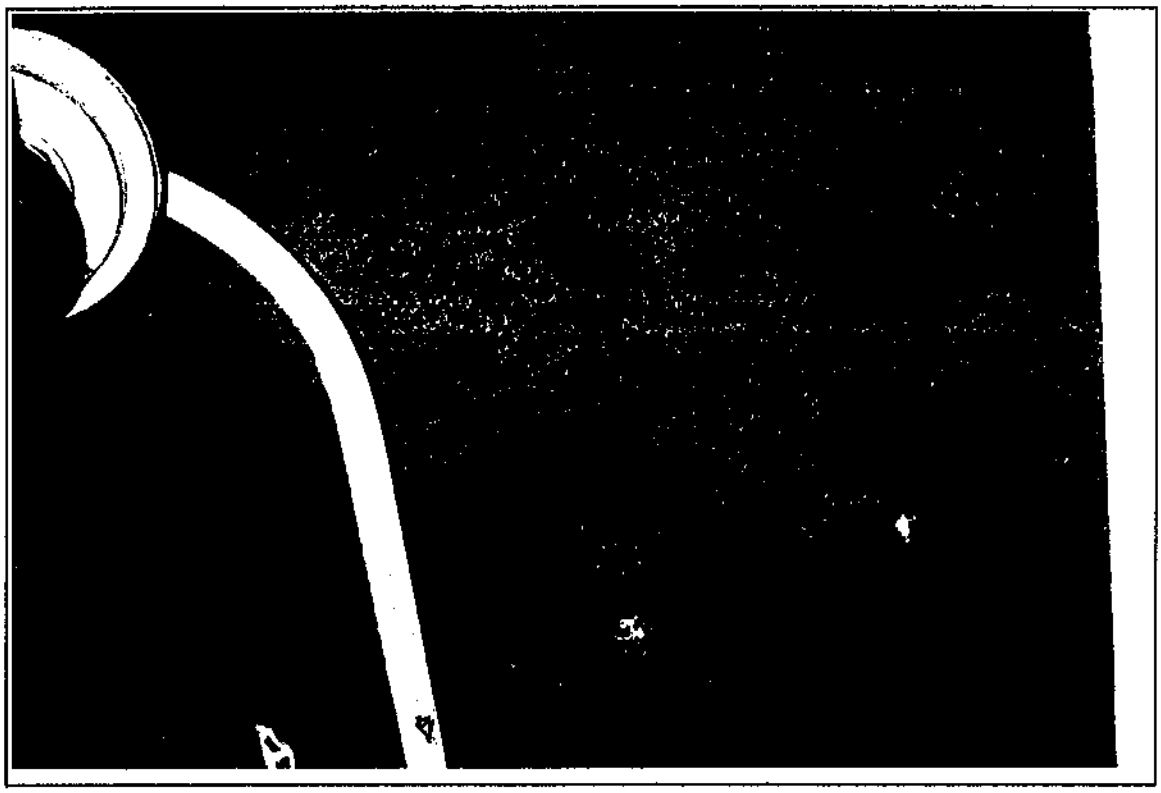
2'x4' Ceiling Tile - Fissure Type IV



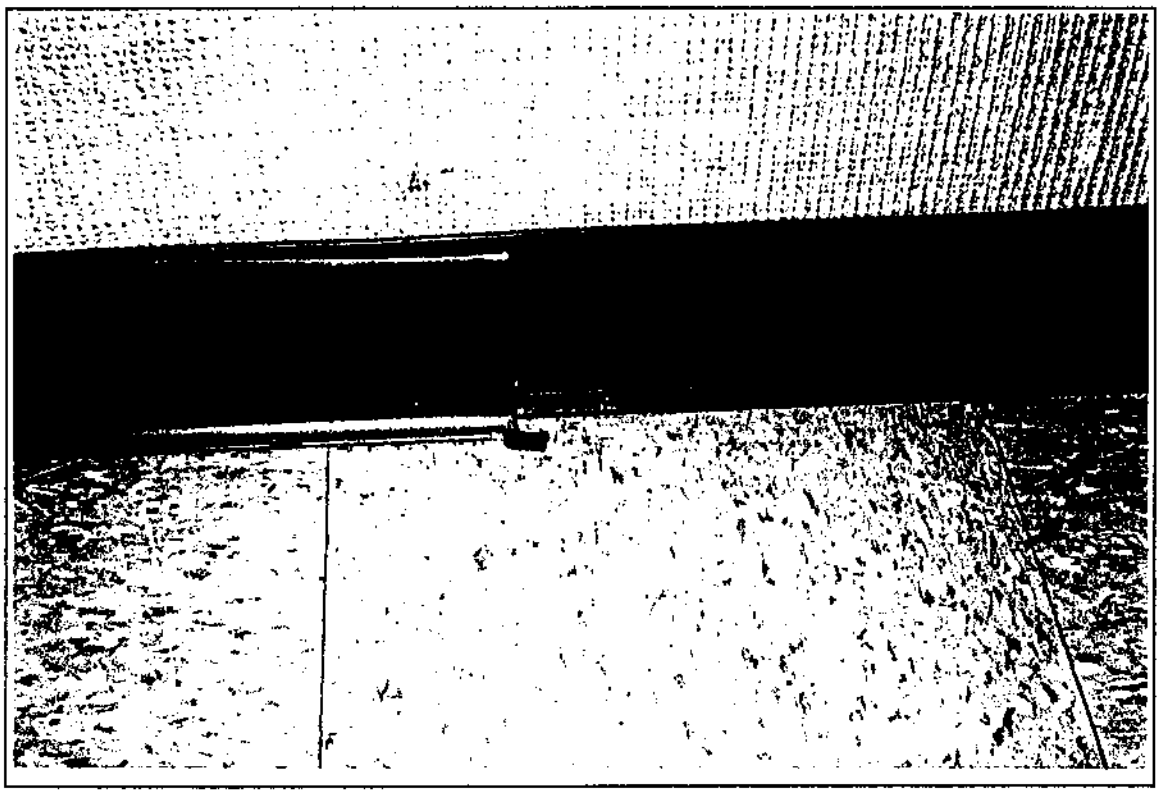
2'x4' Ceiling Tile - Pinhole

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 649 - PHOTO LOG



Ceiling Insulation - Fluffy Material - Brown

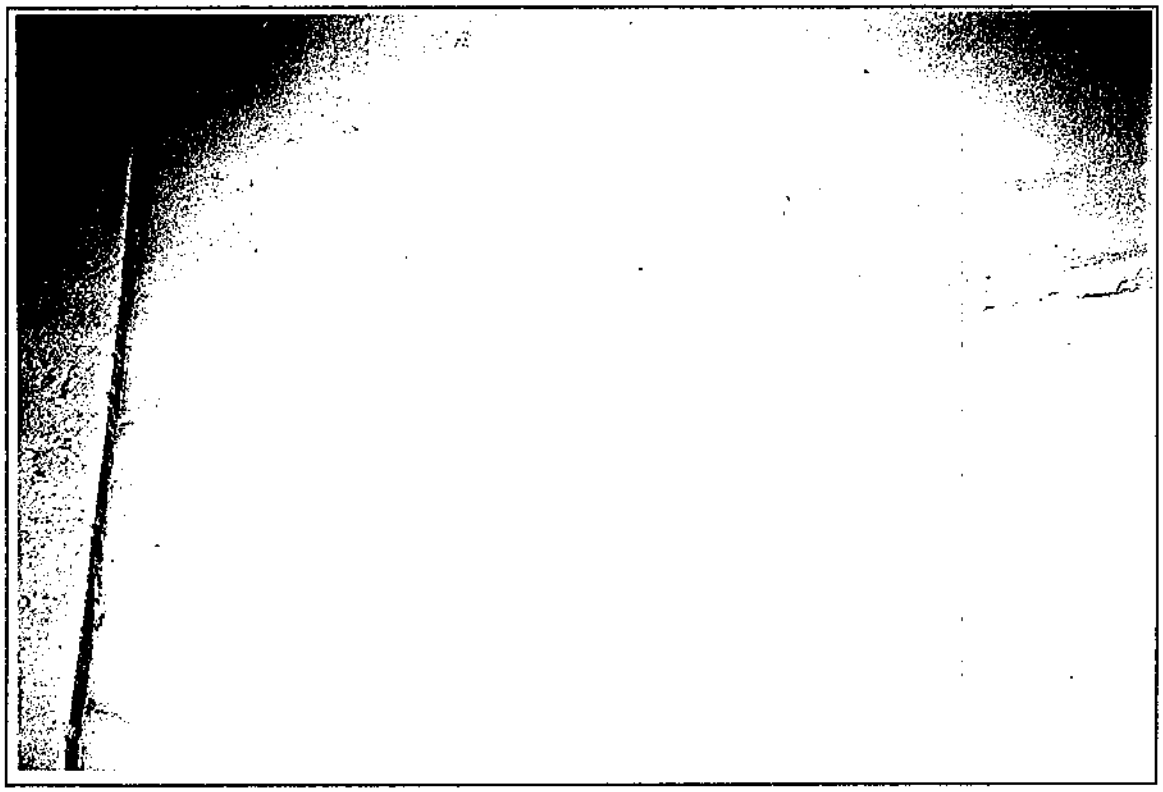


4" Cove Base - Black with Mastic & Brown with Mastic

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 649 - PHOTO LOG

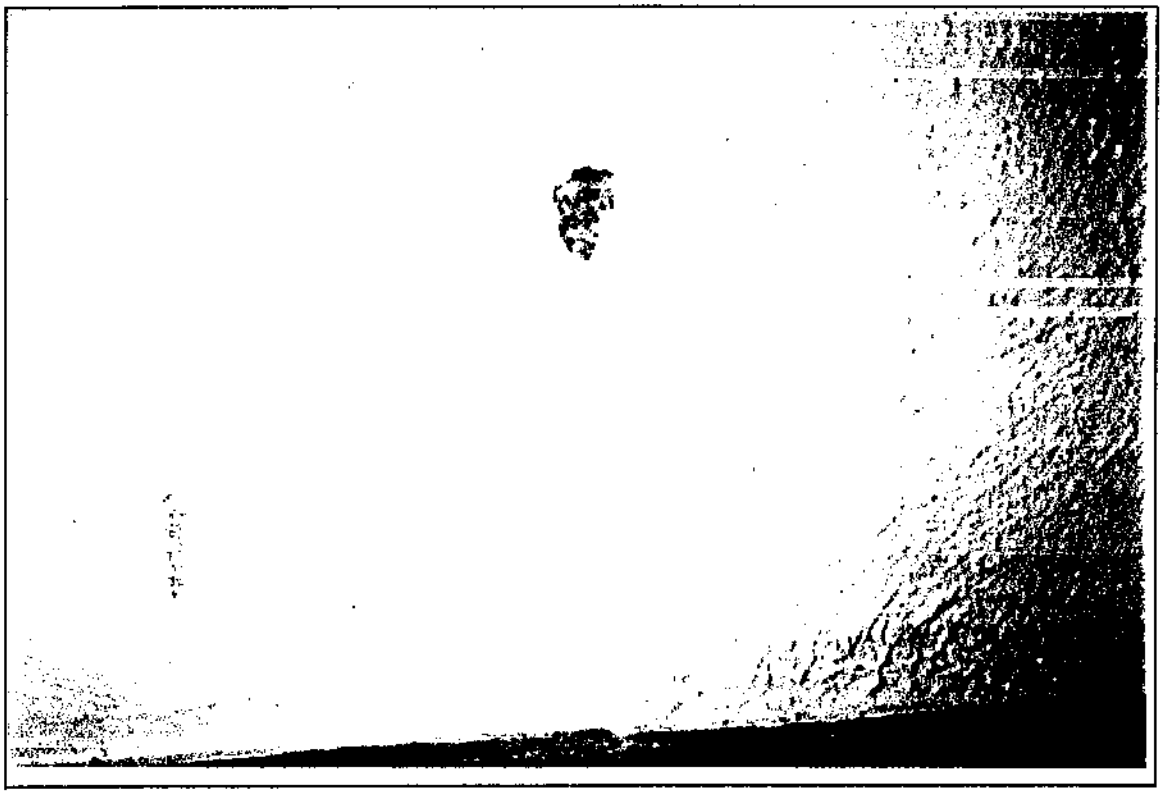
Gypsum Wall Board with Joint Compound & Wall Insulation - Grey Fluffy Material



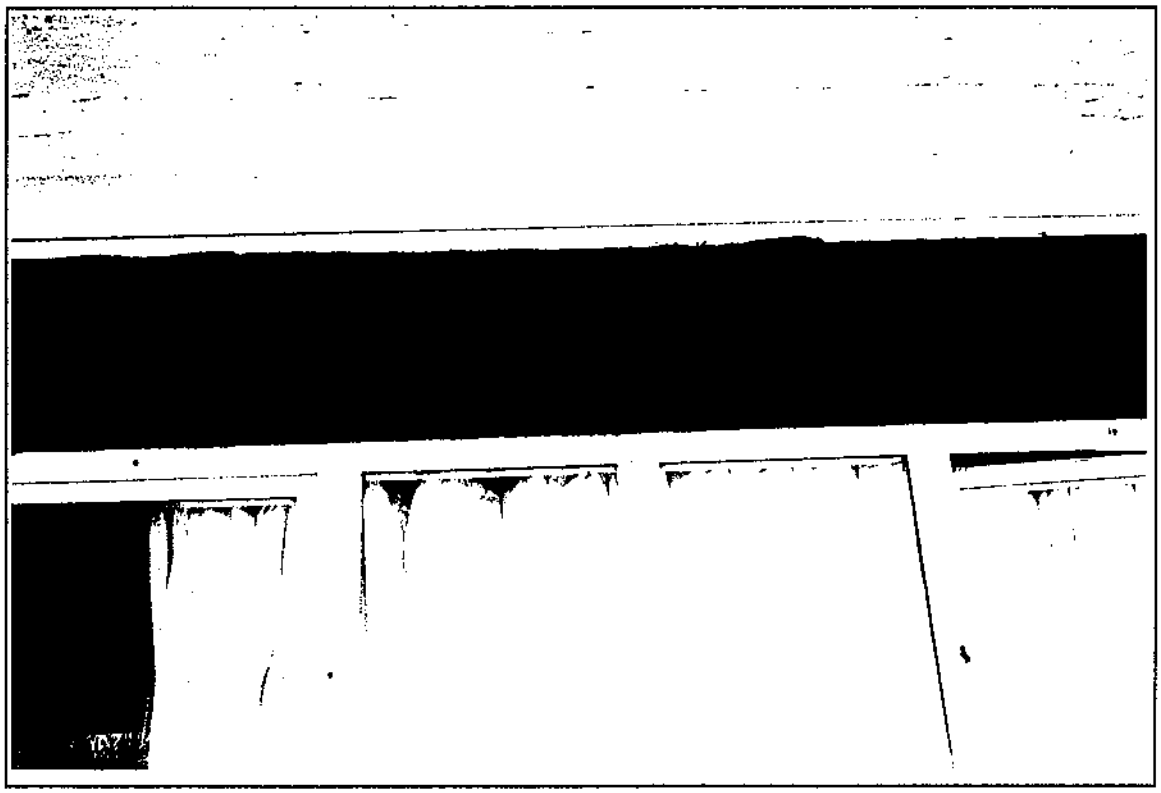
Cementitious Plaster - Troweled on CMU & Concrete Walls

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 649 - PHOTO LOG



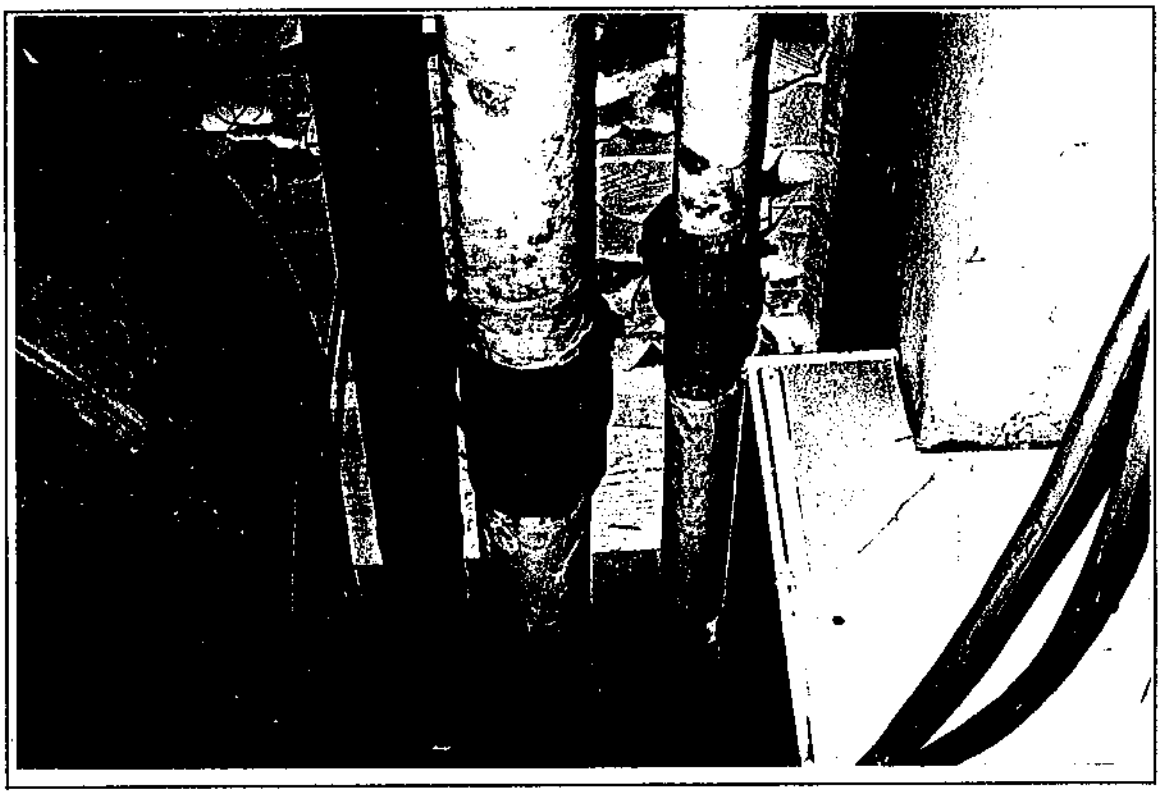
Cementitious Plaster - Hollow Plaster & Lathe Wall System, 1st Floor Restrooms & 2nd Floor Private Bathrooms



Cementitious Panels - Above Doors & Windows

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%). Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

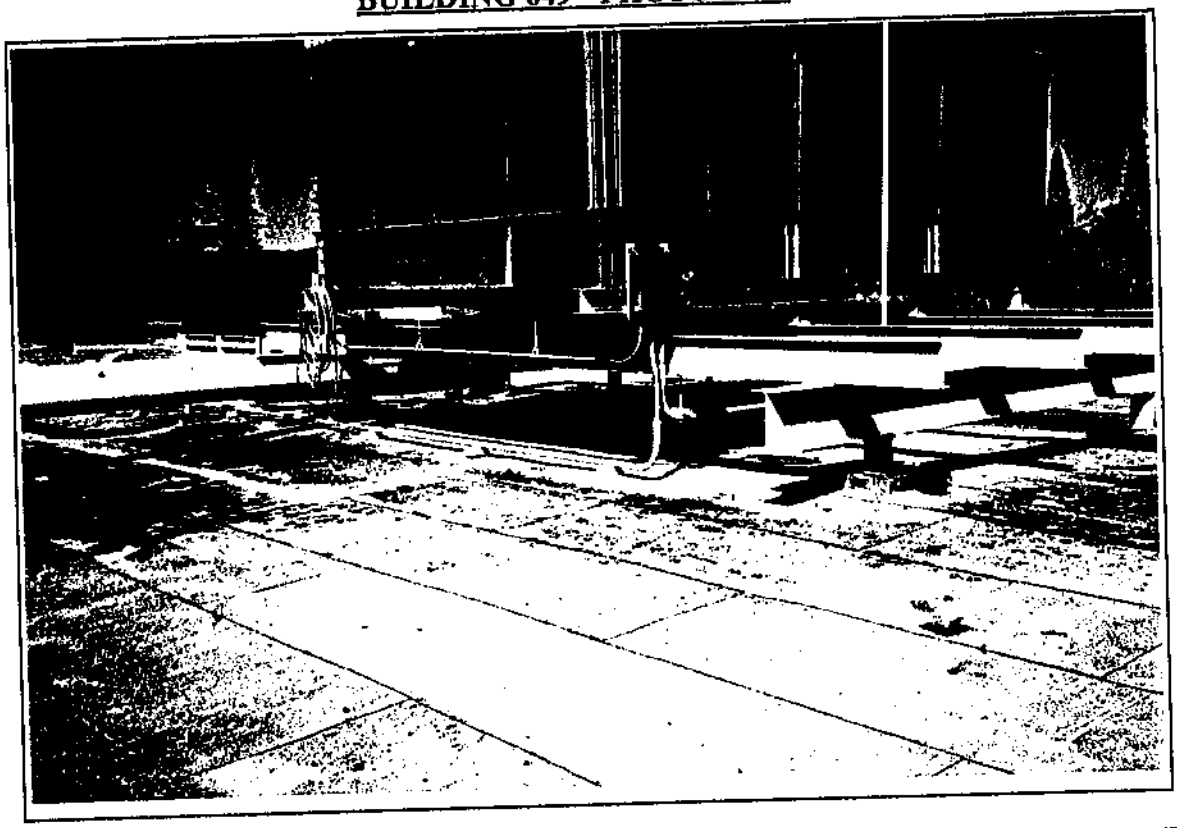
Vibration Cloth - White Woven Fabric



***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Run & Hangers

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 649 - PHOTO LOG

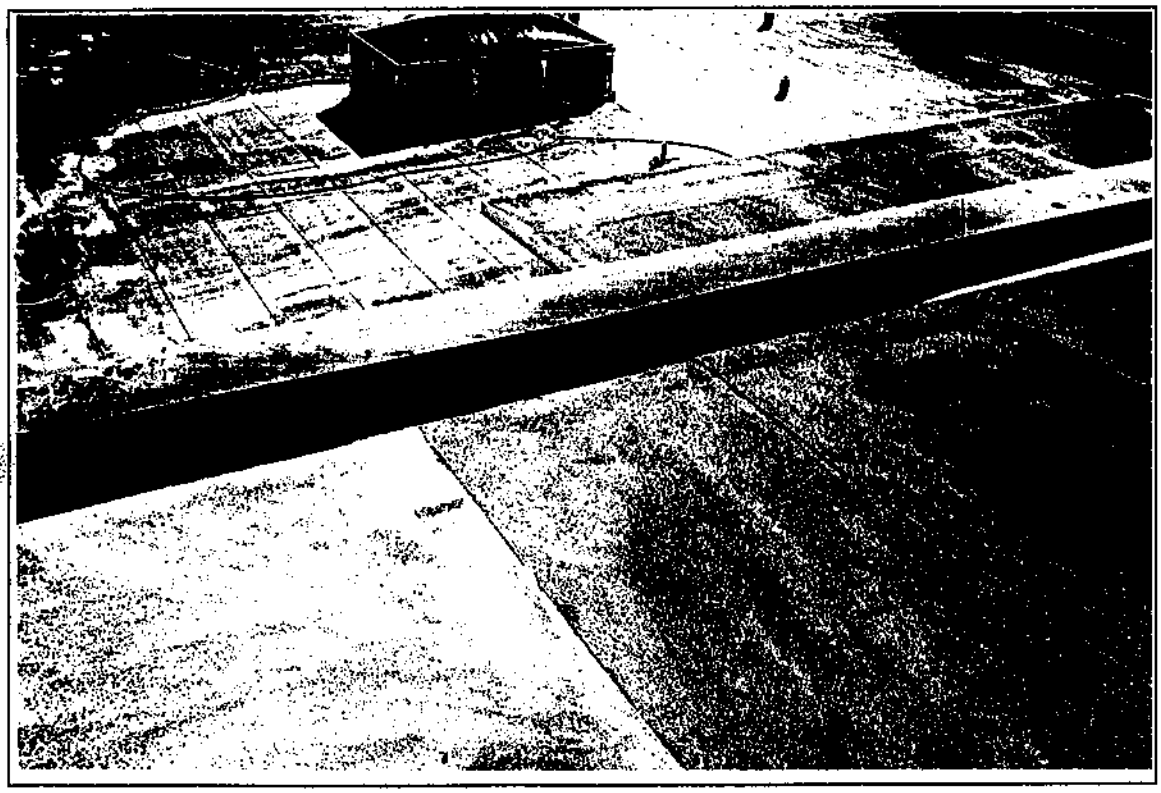


Composition Built-Up Roofing Material - Type I & 18"x18" Cooling Tower Mounts

Beige Paint with **Black Asphaltic Undercoat &**
Composition Built-Up Roofing Material - Flashing Type II

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

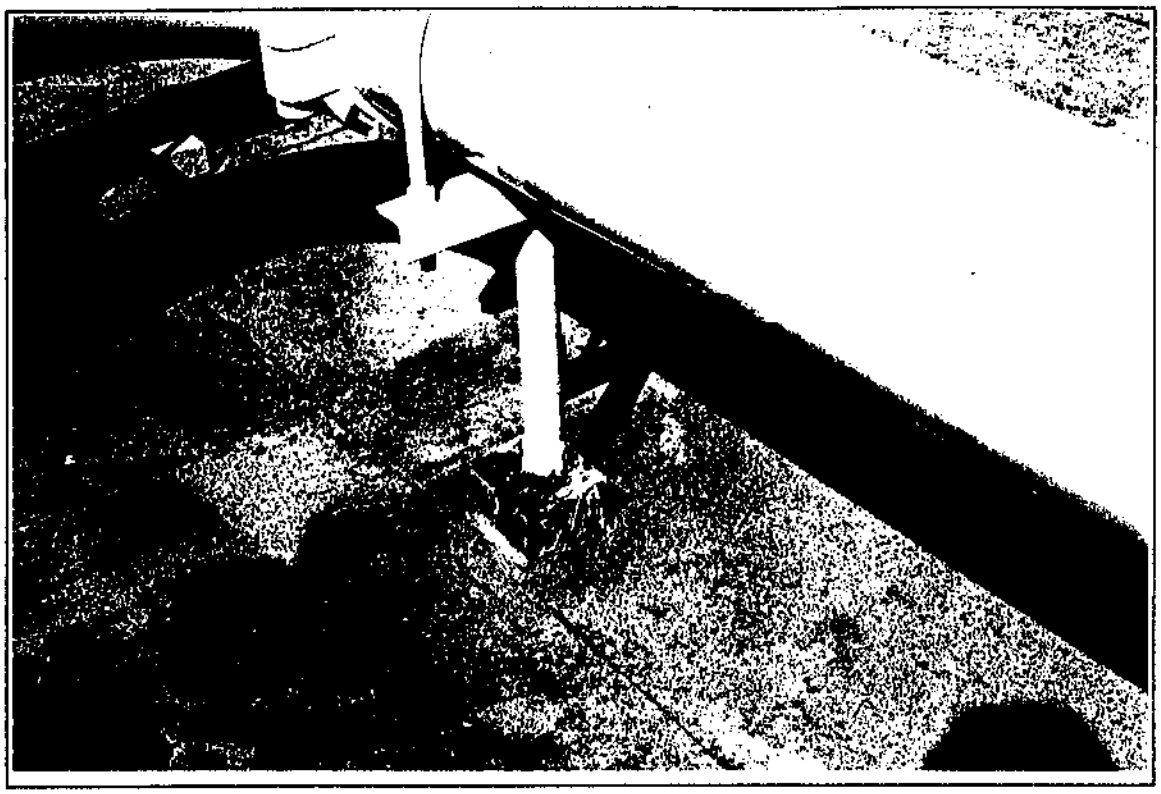
Composition Built-Up Roofing Material - Type I - Flashing, 6"-8" Dia. Gas Vent - Flashing Mastic, 1'x1' Air Vent Flashing.



Composition Built-Up Roofing Materials - Types I, II, III and Roof Patch

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%). Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 649 - PHOTO LOG



3"x3" Metal Service Piping Mounts - Mastic

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

Building 649

Chain of Custody Forms
and
Asbestos Bulk Analysis Forms

(30)

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00450 — SHEET 1 OF 1

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	1	2197 - 649 - 001	B	1		Gypsum Wallboard & Joint Compound - 1st Floor
2	1	2197 - 649 - 002	B	1		
3	1	2197 - 649 - 003	B	1		
4	1	2197 - 649 - 004	B	1		
5	1	2197 - 649 - 005	B	1		
6	2	2197 - 649 - 006	B	2		Gypsum Wallboard & Joint Compound - 2nd Floor
7	2	2197 - 649 - 007	B	2		
8	2	2197 - 649 - 008	B	2		
9	2	2197 - 649 - 009	B	2		
10	2	2197 - 649 - 010	B	2		

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012847							
2	2849							
3	2849							
4	2850							
5	2851							
6	2852							
7	2853							
8	2854							
9	2855							
10	2856							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5-10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FEDEX DHL DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01-17-01 TIME: 1:45 pm INITIALS: JP
ANALYZED BY: [signature] NVL
LAB Q.C. APPROVAL: NVL
DATE: 1/24/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00450 — SHEET 2 OF 19

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
2	1	2	2197 - 649 - 011	B	2		Gypsum Wallboard + Joint Compound - 2nd Floor -
	2	2	2197 - 649 - 012	B	2		↓ ↓ ↓ ↓ ↓ ↓ ↓
	3	3	2197 - 649 - 013	B	3		Gypsum Wallboard & Joint Compound - 3rd Floor
	4	3	2197 - 649 - 014	B	3		-
3	5	3	2197 - 649 - 015	B	3		-
	6	3	2197 - 649 - 016	B	3		-
	7	3	2197 - 649 - 017	B	3		-
	8	3	2197 - 649 - 018	B	3		-
	9	3	2197 - 649 - 019	B	3		-
4	10	4	2197 - 649 - 020	B	1		Wall Insulation - Grey Fluffy Material - 1st Fl.

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012857							
2	2858							
3	2859							
4	2860							
5	2861							
6	2862							
7	2863							
8	2864							
9	2865							
10	2866							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: ~~FED-EX~~ DHL DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 01/17/01 TIME: 4:15 pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 1/24/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

SHEET 3 OF 19

21-00450

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	5	2197 - 649 - 021	B	2		Wall Insulation - Grey Fluffy Material - 2nd Fl.
2	5	2197 - 649 - 022	B	2		↓
3	5	2197 - 649 - 023	B	2		↓
4	6	2197 - 649 - 024	B	3		Wall Insulation - Grey Fluffy Material - 3rd Fl.
5	6	2197 - 649 - 025	B	3		↓
6	6	2197 - 649 - 026	B	3		↓
7	7	2197 - 649 - 027	B	1		Cementitious Plaster - Hollow Plaster & Lathe Wall System - 1st Fl.
8	8	2197 - 649 - 028	B	2	W SIDE BATHROOM	Cementitious Plaster - Hollow Plaster & Lathe Wall System - 2nd Fl.
9	8	2197 - 649 - 029	B	2	CENTER BATHROOM	↓
10	8	2197 - 649 - 030	B	2	E SIDE BATHROOM	↓

5.

6

7

8

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012867							
2	2868							
3	2869							
4	2870							
5	2871							
6	2872							
7	2873							
8	2874							
9	2875							
10	2876							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature] TIME: 7:15pm INITIALS: JP
DATE: 01-17-01
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 1/24/01

APPROVAL SIGNATURE (PROJECT MANAGER):

(30)

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00451 — SHEET 4 OF 19

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	9	2197 - 649 - 031	B	3	R.R.	Cementitious Plaster - Hollow Plaster & Lathe Wall System - 3rd Fl.
2	9	2197 - 649 - 032	B	3	R.R.	↓
3	9	2197 - 649 - 033	B	3	R.R.	↓
4	10	2197 - 649 - 034	B	1	OFFICE	Cementitious Plaster - Trowelled on CMU & Concrete Walls - 1st Fl.
5	10	2197 - 649 - 035	B	1	Post office	↓
6	10	2197 - 649 - 036	B	1	OFFICE	↓
7	10	2197 - 649 - 037	B	1	OFFICE	↓
8	10	2197 - 649 - 038	B	1	OFFICE	↓
9	11	2197 - 649 - 039	B	1	OFFICE	12 x 12 VFT - Med. Grey Marbled - Mat. #1
10	11	2197 - 649 - 040	B	1	OFFICE	↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012901							
2	29678							
3	29679							
4	29680							
5	29681							
6	29682							
7	29683							
8	29684							
9	29685							
10	29686							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1-17-01 TIME: 1:45 pm INITIALS: JC
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 1/24/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

SHEET 5 OF 10

21-00451

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
11 1	11	2197 - 649 - 041	B	1	OFFICE	12x12 VFT - Med. Grey Marbleld - Mat. #1
2	12	2197 - 649 - 042	B	1	OFFICE	12x12 VFT - Beige w/ Olive specks - Mat. #2
3	12	2197 - 649 - 043	B	2	N/W SIDE OFFICE	↓
12 4	12	2197 - 649 - 044	B	2	W SIDE OFFICE	↓
5	12	2197 - 649 - 045	B	3	343	↓
6	12	2197 - 649 - 046	B	3	348	↓
7	13	2197 - 649 - 047	B	1		12x12 VFT - Tan w/ Brown specks - Mat. #3
8	13	2197 - 649 - 048	B	1		↓
13 9	13	2197 - 649 - 049	B	2	N/W SIDE OFFICE	↓
10	13	2197 - 649 - 050	B	2	N SIDE OFFICE	↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	210129687							
2	29688							
3	29689							
4	29690							
5	29691							
6	29692							
7	29693							
8	29694							
9	29695							
10	29696							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Aroub
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: Becca Rogers
DATE: 01-10-01 TIME: 1:45pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 1/24/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00451 — SHEET 6 OF 19

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	13	2197 - 649 - 051	B	2	E SIDE OFFICE	12x12 VFT - Tan w/Brown Specks - Mat. #3
2	14	2197 - 649 - 052	B	1	OFFICE	12x12 VFT - off white w/Brown Streaks - Mat. #4
3	14	2197 - 649 - 053	B	2	S SIDE OFFICE	↓ ↓ ↓ - ↓ ↓ ↓ ↓ ↓ - ↓ ↓
4	15	2197 - 649 - 054	B	2	W SIDE HALLWAY	12x12 VFT - Olive Marbled - Mat. #5
5	15	2197 - 649 - 055	B	2	E SIDE HALLWAY	↓ ↓ ↓ - ↓ ↓ ↓ ↓
6	15	2197 - 649 - 056	B	3	E SIDE HALLWAY	-
7	15	2197 - 649 - 057	B	3	HALLWAY	-
8	15	2197 - 649 - 058	B	3	HALLWAY	↓ ↓ ↓ - ↓ ↓ ↓ ↓
9	16	2197 - 649 - 059	B	2	W SIDE OFFICE	12x12 VFT - Off White Marbled - Mat. #6
10	17	2197 - 649 - 060	B	2	E SIDE OFFICE	12x12 VFT - Tan w/Black + Brown Streaks - Mat #7

14 15 16 17

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012997							
2	2999							
3	2999							
4	2900							
5	2901							
6	2902							
7	2903							
8	2904							
9	2905							
10	2906							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: Jeanne Parker
DATE: 01/10/01 TIME: 1:40pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NC
DATE: 1/24/01

APPROVAL SIGNATURE (PROJECT MANAGER):

(35)

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00450 — SHEET 7 OF 10

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
18	1	18	2197 - 649 - 061	B	2	E SIDE OFFICE	12x12 VFT - Lt. Green w/ Specks - Mat. #8
	2	18	2197 - 649 - 062	B	2	E SIDE OFFICE	↓ ↓ ↓ - ↓ ↓ ↓ ↓ - ↓ ↓
	3	18	2197 - 649 - 063	B	3	324	
	4	18	2197 - 649 - 064	B	3	303	
19	5	19	2197 - 649 - 065	B	1	OFFICE	12x12 VFT - Lt. Brown w/Specks - Mat. #9
	6	19	2197 - 649 - 066	B	1	OFFICE	↓ ↓ ↓ - ↓ ↓ ↓ ↓ - ↓ ↓
20	7	20	2197 - 649 - 067	B	2	W SIDE HALLWAY	12x12 VFT - Baby Blue w/Light Specks - Mat. #13
	8	20	2197 - 649 - 068	B	2	W SIDE HALLWAY	↓ ↓ ↓ - ↓ ↓ ↓ ↓ ↓ - ↓ ↓
21	9	21	2197 - 649 - 069	B	1	OFFICE	Floor Tile Mastic Only - Black
	10	21	2197 - 649 - 070	B	1	HALLWAY	↓ ↓ ↓ ↓ - ↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012907							
2	2908							
3	2909							
4	2910							
5	2911							
6	2912							
7	2913							
8	2914							
9	2915							
10	2916							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: ~~FED EX~~ D.C.H DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: Arlen Pals
DATE: 01-11-01 TIME: 1:45 pm INITIALS: JK
ANALYZED BY: SK 01/23/01 4:00 pm
LAB Q.C. APPROVAL: NL
DATE: 1/24/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00452 — SHEET 8 OF 10

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	22	2197 - 649 - 071	B	1		Cove Base, 4" - Black
2	22	2197 - 649 - 072	B	2		↓ ↓ ↓ - ↓
3	22	2197 - 649 - 073	B	2		↓ ↓ ↓ - ↓
4	22	2197 - 649 - 074	B	3		↓ ↓ ↓ - ↓
5	22	2197 - 649 - 075	B	3		↓ ↓ ↓ - ↓
6	23	2197 - 649 - 076	B	1		Cove Base, 4" - Brown
7	23	2197 - 649 - 077	B	1		↓ ↓ ↓ - ↓
8	23	2197 - 649 - 078	B	1		↓ ↓ ↓ - ↓
9	23	2197 - 649 - 079	B	2		↓ ↓ ↓ - ↓
10	23	2197 - 649 - 080	B	2		↓ ↓ ↓ - ↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012917							
2	2918							
3	2919							
4	2920							
5	2921							
6	2922							
7	2923							
8	2924							
9	2925							
10	2926							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdelt, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01-17-01 TIME: 1:45pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: [signature]
DATE: 1/24/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00452 — SHEET 9 OF 10

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	23	2197 - 649 - 081	B	3		Cove Base, 4" - Brown
2	23	2197 - 649 - 082	B	3		↓ ↓ ↓ - ↓
3	24	2197 - 649 - 083	B	1	OFFICE	2'x4' Ceiling Tile - Fissure w/Holes - Type 1 - 1st Fl
4	24	2197 - 649 - 084	B	1	OFFICE	-
5	24	2197 - 649 - 085	B	1	~~[illegible]~~ OFFICE	-
6	24	2197 - 649 - 086	B	1	OFFICE	- - 2nd Fl
7	24	2197 - 649 - 087	B	2	OFFICE	-
8	24	2197 - 649 - 088	B	2	OFFICE	-
9	24	2197 - 649 - 089	B	2	OFFICE	- - 3rd Fl.
10	24	2197 - 649 - 090	B	3	304	-

23

24

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012927							
2	2926							
3	2929							
4	2920							
5	2921							
6	2922							
7	2923							
8	2924							
9	2925							
10	2926							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: ~~FED-EX~~ DLH DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01/17/01 TIME: 1:23 pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 1/24/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

19

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00452 — SHEET 10 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	24	2197 - 649 - 091	B	3	300	1'x4' Ceiling Tile - Fissure w/Holes - Type 1 - 3rd Fl.
2	24	2197 - 649 - 092	B	3	313	↓
3	24	2197 - 649 - 093	B	3	353	↓
4	24	2197 - 649 - 094	B	3	352	↓
5	24	2197 - 649 - 095	B	3	357	↓
~~25A~~	~~25A~~	~~2197 - 649 - 096~~	B	1	EXT	FLUE - FIRE - BRICK - ORANGE
25B	25B	~~2197 - 649 - 097~~	B	1	Roof	METAL DUCT - SEALANT - GRAY
25C	25C	2197 - 649 - 098	B	1		VIBRATION CLOTH WHITE WOVEN FABRIC
26	26	~~2197 - 649 - 099~~	B	2	R.R.	2'x4' Ceiling Tile - Fissure w/Holes - Type 3 - 2nd Fl.
	26	~~2197 - 649 - 100~~	B	2	OFFICE	↓

24

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012937							
2	2938							
3	2939							
4	2940							
5	2941							
6								
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: ~~FED EX~~ DLH DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 01-10-01 TIME: 1:45 INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 1/24/01

APPROVAL SIGNATURE (PROJECT MANAGER):

(35)

EDWARD K. NODA AND ASSOCIATES

19

SHEET 10 OF 10

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

21-00453

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO:	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
	1	24	2197 - 649 - 091	B	3	300	1'x4' Ceiling Tile - Fissure w/Holes - Type 1 - 3rd Fl.
	2	24	2197 - 649 - 092	B	3	313	-
	3	24	2197 - 649 - 093	B	3	353	-
	4	24	2197 - 649 - 094	B	3	352	-
	5	24	2197 - 649 - 095	B	3	357	-
25A	6	25A	2197 - 649 - 096	B	1	Ext	FLUE - FIRE - BRICK - ORANGE
25B	7	25B	2197 - 649 - 097	B	1	Roof	METAL DUCT - SEALANT - GRAY
25C	8.	25C	2197 - 649 - 098	B	1		VIBRATION CLOTH WHITE WOVEN FABRIC.
	9	26	2197 - 649 - 099	B	2	R.R.	2'x4' Ceiling Tile - Fissure w/Holes - Type 3 - 2nd Fl.
26	10	26	2197 - 649 - 100	B	2	OFFICE	-

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 2948							
2	2101 2943							
3	2101 2944							
4	2101 2945							
5	2101 2946							
6	2101 2942							
7	2942							
8	2944							
9	2945							
10	2946							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: ~~FED-EX~~ DLH DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 01-17-01 TIME: 1:43 INITIALS: JP
ANALYZED BY: [illegible] 1/25/01
LAB Q.C. APPROVAL: [illegible]
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00453 — SHEET 11 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
26	1	26	2197 - 649 - 101	B	2	hallway	2'x4' Ceiling Tile - Fissure w/Holes - Type 3 - 2nd Fl.
	2	27	2197 - 649 - 102	B	1	SAFE	2x4 Ceiling Tile - Fissure w/Holes - Type 4 - 1st Fl.
27	3	27	2197 - 649 - 103	B	1	OFFICE	↓ ↓ ↓ ↓ - ↓ ↓ ↓ - ↓ ↓ - ↓ ↓
	4	27	2197 - 649 - 104	B	1	R. R.	
	5	28	2197 - 649 - 105	B	2	OFFICE	2'x4' Ceiling Tile - Pinhole Pattern -
28	6	28	2197 - 649 - 106	B	2	OFFICE	↓ ↓ ↓ ↓ - ↓ ↓
	7	28	2197 - 649 - 107	B	3	R. R.	
	8	28	2197 - 649 - 108	B	3	R. R.	
29	9	29	2197 - 649 - 109	B	2		Cementitious Panel - Above Doors & Windows
30	10	30	2197 - 649 - 110	B			Composition Built-Up Roofing Material Type 1

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012947							
2	2948							
3	2949							
4	2950							
5	2951							
6	2952							
7	2953							
8	2954							
9	2955							
10	2956							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01·17·01 TIME: 1:45p INITIALS: JP
ANALYZED BY: [signature]
LAB Q.C. APPROVAL: [signature]
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00453 — SHEET 13 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	30	2197 - 649 - 111	B			COMPOSITION BUILT-UP ROOFING MATERIAL - MAIN ROOF
2	30	2197 - 649 - 112	B			-
3	30	2197 - 649 - 113	B			-
4	30	2197 - 649 - 114	B			-
5	31	2197 - 649 - 115	B			COMPOSITION BUILT-UP ROOFING MATERIAL - FLASHING
6	31	2197 - 649 - 116	B			-
7	31	2197 - 649 - 117	B			-
8	31	2197 - 649 - 118	B			-
9	31	2197 - 649 - 119	B			-
10	32	2197 - 649 - 120	B			COMPOSITION BUILT-UP ROOFING MATERIAL - TYPE II

30 31 32

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012957							
2	2958							
3	2959							
4	2960							
5	2961							
6	2962							
7	2963							
8	2964							
9	2965							
10	2966							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01-17-01 TIME: 1715 INITIALS: JP
ANALYZED BY: [signature]
LAB Q.C. APPROVAL: [signature]
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00453 — SHEET 12 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
32 1	32	2197 - 649 - 121	B			COMPOSITION BUILT UP ROOFING MATERIAL TYPE II
2	32	2197 - 649 - 122	B			
33 3	33	2197 - 649 - 123	B			- FLASHING
4	33	2197 - 649 - 124	B			- FLASHING
34 5	34	2197 - 649 - 125	B			TYPE III
6	34	2197 - 649 - 126	B			
35 7	35	2197 - 649 - 127	B			- FLASHING
8	35	2197 - 649 - 128	B			- FLASHING
36 9	36	2197 - 649 - 129	B			G - ROOF PATCH
10	36	2197 - 649 - 130	B			- ROOF PATCH

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	210129607							
2	2968							
3	2969							
4	2970							
5	2971							
6	2972							
7	2973							
8	2974							
9	2975							
10	2976							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: ~~FED EX~~ DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01/17/01 TIME: 1:12pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

56

EDWARD K. NODA AND ASSOCIATES

19

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00454 — SHEET 19 OF 19

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
37	1	37	2197 - 649 - 131	B			1'x1' AIR VENT - FLASHING
	2	37	2197 - 649 - 132	B			3"x3" METAL SERVICE PIPING MOUNTS - MASTIC
38	3	38	2197 - 649 - 133	B			
	4	38	2197 - 649 - 134	B			18"x18" COOLING TOWER MOUNTS - MASTIC
39	5	39	2197 - 649 - 135	B			
	6	39	2197 - 649 - 136	B			BEIGE PAINT W/BLACK ASPHALTIC UNDERCOAT
40	7	40	2197 - 649 - 137	B			
	8	40	2197 - 649 - 138	B			2' DIA. LG. AIR VENT - FLASHING (MAIN ROOF)
41	9	41	2197 - 649 - 139	B			3' (UPPER ROOF)
	10	41	2197 - 649 - 140	B			

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	210129977							
2	2978							
3	2979							
4	2980							
5	2981							
6	2982							
7	2983							
8	2984							
9	2985							
10	2986							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01-17-01 TIME: 1:45pm INITIALS: JP
ANALYZED BY: [signature]
LAB Q.C. APPROVAL: [signature]
DATE: 1/19/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00454 — SHEET 15 OF 78

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	42	2197 - 649 - 141	B	3		6"-8" - GAS VENT - FLASHING / MASTIC
2	42	2197 - 649 - 142	B			
3	42	2197 - 649 - 143	B			
4	43	2197 - 649 - 144	B	3	Southwest St	~~Fiberglass~~ Fiberglass / Joint ~~Sealant~~ Adhesive
5		2197 - 649 - 145	B	3	Northwest	Fiberglass / Joint ~~Sealant~~ Adhesive
6		2197 - 649 - 146	B	3	Center Room 325	Fiberglass / Joint ~~Sealant~~ "
7		2197 - 649 - 147	B	3	in front of Gym Center	Fiberglass / Joint ~~Sealant~~ "
8		2197 - 649 - 148	B	3	Center East	Fiberglass / Joint ~~Sealant~~ "
9		2197 - 649 - 149	B	3	East Room 353	Fiberglass / Joint - ~~Sealant~~ "
10	43	2197 - 649 - 150	B	3	East Room 352	Fiberglass / joint ~~Sealant~~ adhesive

42

43

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 2997							
2	2998							
3	2999							
4	2990							
5	2991							
6	2992							
7	2993							
8	2994							
9	2995							
10	2996							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01-17-01 TIME: INITIALS: JF
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00454 — SHEET 16 OF 19

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	44	2197 - 649 - 151	B	3	southwest	Hanger - Fiberglass
2		2197 - 649 - 152	B	3	northwest	Fiberglass - Hanger
3		2197 - 649 - 153	B	3	center Room 325	Fiberglass - Hanger
4		2197 - 649 - 154	B	3	center Gym	Fiberglass - Hanger
5		2197 - 649 - 155	B	3	east Room 353	Fiberglass - Hanger
6	44	2197 - 649 - 156	B	3	east Room 352	Fiberglass - Hanger
7	45	2197 - 649 - 157	B	2	North east Room 266	Fiberglass - Joint ~~[illegible]~~ adhesive
8		2197 - 649 - 158	B	2	South east Room 256	" "
9		2197 - 649 - 159	B	2	North east Room 244	" "
10	45	2197 - 649 - 160	B	2	North west Room 235	" "

44

45

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21012997							
2	2998							
3	2999							
4	3000							
5	3001							
6	3002							
7	3003							
8	3004							
9	3005							
10	3006							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

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B = BULK MATERIAL
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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 01-17-01 TIME: 11:45 INITIALS: JP
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: NL
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00454 — SHEET 17 OF 19

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	45	2197 - 649 - 161	B	2	South west Room 224	Fiberglass / Joint Adhesive
45 2	45	2197 - 649 - 162	B	2	North west	" " "
3	45	2197 - 649 - 163	B	2	Far west center	" " "
4	44	2197 - 649 - 164	B	2	east Room 266	Hanger - Fiberglass
5	|	2197 - 649 - 165	B	2	South east Room 256	Hanger - Fiberglass
44 6	|	2197 - 649 - 166	B	2	North east Room 244	" "
7	V	2197 - 649 - 167	B	2	Southwest Room 224	" "
8	46	2197 - 649 - 168	B	2	Far west center	" "
47 9	47	2197 - 649 - 169	B	2	Northeast Room 244	Fiberglass / Joint Adhesive/mastic
48 10	48	2197 - 649 - 170	B	1	South east corner	Fiberglass / Joint Adhesive

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013007							
2	3008							
3	3009							
4	3010							
5	3011							
6	3012							
7	3013							
8	3014							
9	3015							
10	3016							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01-11-01 TIME: 1:45 p.m. INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00454 — SHEET 18 OF 19

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	48	2197 - 649 - 171	B	1	North wall of Hallway	Fiberglass / Joint Adhesive
2		2197 - 649 - 172	B	1	South West	" " "
3		2197 - 649 - 173	B	1	Center wall through	" " "
4		2197 - 649 - 174	B	1	North West	" " "
5		2197 - 649 - 175	B	1	South West	" " "
6	48	2197 - 649 - 176	B	1	North West	" " "
7	49	2197 - 649 - 177	B	1	South east of Hallway	Hangers / Fiberglass
8		2197 - 649 - 178	B	1	South East of Hallway	" "
9		2197 - 649 - 179	B	1	South East	" "
10	49	2197 - 649 - 180	B	1	Center wall through	" "

48

49

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013017							
2	3018							
3	3019							
4	3020							
5	3021							
6	3022							
7	3023							
8	3024							
9	3025							
10	3026							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 1/17/01 TIME: 1:45pm INITIALS: JP
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: NL
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00454 — SHEET 19 OF 19

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
49	1	49	2197 - 649 - 181	B	1	SW	~~Pipe~~ Fiber Glass Pipe Insulation - Hangers
	2	50	2197 - 649 - 182	B		~~1st~~	Fiberglass Duct Insulation - Adhesive
50	3		2197 - 649 - 183	B			
	4	51	2197 - 649 - 184	B		NR	Ceiling Insulation - Fluffy Material Brown
51	5	51	2197 - 649 - 185	B			
	6	51	2197 - 649 - 186	B	1	NR	
	7		2197 - 649 -	B			Nothing Follows
	8		2197 - 649 -	B			
	9		2197 - 649 -	B			
	10		2197 - 649 -	B			

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013027							
2	3028							
3	3029							
4	3030							
5	3031							
6	3032							
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01/10/01 TIME: 1400 INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

(23) 21-01140

EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF 3

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	1	2197 - 649 - 187	B	1	Restroom	Cementitious Wall Plaster - Restrooms 1st Fl.
2	1	2197 - 649 - 188	B	1	Restroom	↓ ↓ ↓ ↓ ↓
3	2	2197 - 649 - 189	B	1	Walkway	Exterior Cementitious Wall Plaster - 1st Fl.
4	2	2197 - 649 - 190	B	1	↓	↓ ↓ ↓ ↓ ↓ ↓
5	2	2197 - 649 - 191	B	1	↓	Cementitious Wall Plaster - Community R.R. - 2nd Floor
6	3	2197 - 649 - 192	B	2	Comm. R.R.	↓ ↓ ↓ ↓ ↓ ↓
7	3	2197 - 649 - 193	B	2	" "	Cementitious Wall Plaster - Exterior Walkway - 2nd Fl.
8	4	2197 - 649 - 194	B	2	Walkway	↓ ↓ ↓ ↓ ↓ ↓ ↓
9	4	2197 - 649 - 195	B	2	↓	↓ ↓ ↓ ↓ ↓ ↓ ↓
10	4	2197 - 649 - 196	B	2	↓	↓ ↓ ↓ ↓ ↓ ↓ ↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2102 2032							
2	2033							
3	2034							
4	2035							
5	2036							
6	2037							
7	2038							
8	2039							
9	2040							
10	2041							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

(per email) 48HR

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

REQUESTED COMPLETION DATE: ~~5-10 day turn around~~ RUSH
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

ACCOUNTABILITY RECORD

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 2/8/01 TIME: 1:15 INITIALS: TC
ANALYZED BY:
LAB Q.C. APPROVAL: NC
DATE: 2/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-01140

EDWARD K. NODA AND ASSOCIATES

SHEET 2 OF 2

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	5	2197 - 649 - 197	B	2	Rest Room	Cementitious Wall Plaster - Restroom 2nd Fl.
2	6	2197 - 649 - 198	B	3	Restroom	Cementitious Wall Plaster - Community Restroom - 3rd Fl.
3	7	2197 - 649 - 199	B	3	Restroom	Cementitious Wall Plaster - Private Restrooms - 3rd Fl.
4	7	2197 - 649 - 200	B	3	Restroom	↓ ↓ ↓ ↓ ↓ ↓
5	8	2197 - 649 - 201	B	3	WalKWAY	Cementitious Wall Plaster - Exterior WalKWAY - 3rd Fl.
6	8	2197 - 649 - 202	B	3	↓	↓ ↓ ↓ ↓ ↓ ↓
7	8	2197 - 649 - 203	B	3	↓	↓ ↓ ↓ ↓ ↓ ↓
8	9	2197 - 649 - 204	B	1	STORAGE ROOM	HVAC Vent Sealant - Black
9	9	2197 - 649 - 205	B	1	STORAGE ROOM	↓ ↓ ↓ ↓
10		2197 - 649	B			Nothing Follows

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2102 2042							
2	2043							
3	2044							
4	2045							
5	2046							
6	2047							
7	2048							
8	2049							
9	2050							
10								

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

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D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: Rush ~~< 5 ,10 day turn around~~
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 2/8/01 TIME: 1:15PM INITIALS: TG
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 2/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-0140

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 649, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1		2197 - 649 -	B			
2		2197 - 649 -	B			
3		2197 - 649 -	B			
4		2197 - 649 -	B			
5		2197 - 649 -	B			
6		2197 - 649 -	B			
7	52	2197 - 649 - 206	B	1	EAST SIDE OFFICE	12"x12" VFT - GRAY W/BLACK STREAK - MAT #16
8	↓	2197 - 649 - 207	B	1	↓	↓ VFT - BROWN W/BROWN STREAKS
9	53	2197 - 649 - 208	B	1	↓	"
10	↓	2197 - 649 - 209	B	1	↓	↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1								
2								
3								
4								
5								
6								
7	2102 2051							
8	2052							
9	2053							
10	2102 2054							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: ~~5-10 day turn around~~ RUSH
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/8/01 TIME: 1:15PM INITIALS: TG
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 1/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

Tel: 206.547.0100
Fax: 206.634.1936

NVL Laboratories, Inc.

4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: **Edward K. Noda and Associates**
Address: **615 Piikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F - Bldg - 649, Schofield Barracks, Hawaii**

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012847 **Client Sample #: 2197-649-001**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: White paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 15%, Glass fibers 10%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012848 **Client Sample #: 2197-649-002**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 15%, Glass fibers 10%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012849 Client Sample #: 2197-649-003

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: White compacted powdery material LAYER 2: Blue paint LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 25%, Glass fibers 15%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Paint
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012850 Client Sample #: 2197-649-004

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 15%, Glass fibers 10%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012851 **Client Sample #: 2197-649-005**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: White soft material LAYER 2: White paint LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 15%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Paint
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012852 **Client Sample #: 2197-649-006**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/green paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012853 **Client Sample #: 2197-649-007**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: White paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012854 **Client Sample #: 2197-649-008**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012855 **Client Sample #: 2197-649-009**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material with white woven fiber LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Glass fiber 10%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012856 **Client Sample #: 2197-649-010**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012857 **Client Sample #: 2197-649-011**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012858 **Client Sample #: 2197-649-012**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012859 **Client Sample #: 2197-649-013**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue/tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012860 **Client Sample #: 2197-649-014**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue/tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012861 **Client Sample #: 2197-649-015**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material with white woven fiber LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Glass fiber 10%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012862 **Client Sample #: 2197-649-016**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material with white woven fiber LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012863 **Client Sample #: 2197-649-017**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Blue paint LAYER 2: White compacted powdery material with white woven fiber LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012864 **Client Sample #: 2197-649-018**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material with white woven fiber LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012865 **Client Sample #: 2197-649-019**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material with white woven fiber LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012866 **Client Sample #: 2197-649-020**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012867 **Client Sample #: 2197-649-021**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012868 **Client Sample #: 2197-649-022**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012869 **Client Sample #: 2197-649-023**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012870 **Client Sample #: 2197-649-024**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012871 **Client Sample #: 2197-649-025**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012872 **Client Sample #: 2197-649-026**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012873 **Client Sample #: 2197-649-027**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Yellow paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	2%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

Lab ID #: 21012874 **Client Sample #: 2197-649-028**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/yellow paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	2%

Lab ID #: 21012875 **Client Sample #: 2197-649-029**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: White paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21012876 **Client Sample #: 2197-649-030**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00450.00
Client Project #: 2197-01F
Number of samples: 30

LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	2%

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Blgd-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00451.00
Client Project #: 2197-01F
Number of samples: 21

Lab ID #: 21012877 **Client Sample #: 2197-649-031**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012878 **Client Sample #: 2197-649-032**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012879 **Client Sample #: 2197-649-033**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

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Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F-Blgd-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00451.00
Client Project #: 2197-01F
Number of samples: 21

Lab ID #: 21012880 **Client Sample #: 2197-649-034**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: White brittle material with mastic, LAYER 2: Tan sandy brittle material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21012881 **Client Sample #: 2197-649-035**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: White brittle material with mastic, LAYER 2: Tan sandy brittle material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21012882 **Client Sample #: 2197-649-036**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: White brittle material, LAYER 2: Tan sandy brittle material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001 Nick Ly, Technical Director

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Blgd-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00451.00
Client Project #: 2197-01F
Number of samples: 21

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21012883 **Client Sample #: 2197-649-037**
Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: Tan sandy brittle material

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012884 **Client Sample #: 2197-649-038**
Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: White sandy brittle material

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012885 **Client Sample #: 2197-649-039**
Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Gray vinyl tile, LAYER 2: Black/yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Blgd-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00451.00
Client Project #: 2197-01F
Number of samples: 21

(Lab ID#: 21012885 Client Sample #: 2197-649-039 results continued from previous page)

LAYER 2: *None Detected ND

Lab ID #: 21012886 Client Sample #: 2197-649-040

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Gray vinyl tile, LAYER 2: Black/yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21012887 Client Sample #: 2197-649-041

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Gray vinyl tile, LAYER 2: Black/yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

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Client Project #: 2197-01F
Number of samples: 21

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Blgd-649, Schofield Barracks, Hawaii

Lab ID #: 21012888 **Client Sample #: 2197-649-042**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige vinyl tile with white/olive streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	5%

Lab ID #: 21012893 **Client Sample #: 2197-649-047**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21012894 **Client Sample #: 2197-649-048**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Project: Quad F-Blgd-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00451.00
Client Project #: 2197-01F
Number of samples: 21

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21012895 **Client Sample #: 2197-649-049**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white/brown patterned vinyl tile, LAYER 2: Yellow/black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21012896 **Client Sample #: 2197-649-050**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile with olive streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	5%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

NVL Batch Number: 21-00451.00
Client Project #: 2197-01F
Number of samples: 21

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Blgd-649, Schofield Barracks, Hawaii

Lab ID #: 21012898 **Client Sample #: 2197-649-052**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white vinyl tile with brown streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	3%

Lab ID #: 21012899 **Client Sample #: 2197-649-053**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile with brown streaks, LAYER 2: Black/yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	4%

Lab ID #: 21012900 **Client Sample #: 2197-649-054**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Olive vinyl tile, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 7%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

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NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Blgd-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00451.00
Client Project #: 2197-01F
Number of samples: 21

LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	5%

Lab ID #: 21012905 **Client Sample #: 2197-649-059**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white vinyl tile, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 7%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	5%

Lab ID #: 21012906 **Client Sample #: 2197-649-060**

Sample Location: Quad F-Blgd-649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	7%

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

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NVLAP
#102063

Bulk Asbestos Fiber Analysis

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

Client: **Edward K. Noda and Associates**
Address: **615 Piikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F - Bldg - 649, Schofield Barracks, Hawaii**

Lab ID #: 21012907 **Client Sample #: 2197-649-061**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Green tile with specks LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	3%

Lab ID #: 21012911 **Client Sample #: 2197-649-065**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Brown tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21012912 **Client Sample #: 2197-649-066**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Brown tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE: *PERCENT*

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21012913 **Client Sample #: 2197-649-067**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Blue tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21012914 **Client Sample #: 2197-649-068**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Blue tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	2%

Lab ID #: 21012915 **Client Sample #: 2197-649-069**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Asphalt/binder

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001 Nick Ly, Technical Director

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

ASBESTOS TYPE:	PERCENT
Chrysotile	4%

Lab ID #: 21012916 **Client Sample #: 2197-649-070**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	PERCENT
Chrysotile	4%

Lab ID #: 21012917 **Client Sample #: 2197-649-071**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Grey rubbery material LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21012918 **Client Sample #: 2197-649-072**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Grey rubbery material LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001 Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21012919 **Client Sample #: 2197-649-073**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Grey rubbery material LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21012920 **Client Sample #: 2197-649-074**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Grey rubbery material LAYER 2: White mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

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Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21012921 **Client Sample #: 2197-649-075**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Grey rubbery material LAYER 2: Brown mastic with tan paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21012922 **Client Sample #: 2197-649-076**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: Yellow/white mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21012923 **Client Sample #: 2197-649-077**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: Yellow/white mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21012924 **Client Sample #: 2197-649-078**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: White mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21012925 **Client Sample #: 2197-649-079**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue paint LAYER 2: Brown rubbery material LAYER 3: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Talc fibers 4%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Rubber/binder
LAYER 3: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21012926 **Client Sample #: 2197-649-080**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue paint LAYER 2: Brown rubbery material LAYER 3: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Talc fibers 4%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Rubber/binder
LAYER 3: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012927 **Client Sample #: 2197-649-081**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21012928 **Client Sample #: 2197-649-082**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue paint LAYER 2: Brown rubbery material LAYER 3: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Talc fibers 4%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Rubber/binder
LAYER 3: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21012929 **Client Sample #: 2197-649-083**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012930 **Client Sample #: 2197-649-084**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21012931 **Client Sample #: 2197-649-085**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012932 **Client Sample #: 2197-649-086**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012933 **Client Sample #: 2197-649-087**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001 Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21012934 **Client Sample #: 2197-649-088**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012935 **Client Sample #: 2197-649-089**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012936 **Client Sample #: 2197-649-090**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21012937 **Client Sample #: 2197-649-091**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012938 **Client Sample #: 2197-649-092**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012939 **Client Sample #: 2197-649-093**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00452.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21012940 **Client Sample #: 2197-649-094**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012941 **Client Sample #: 2197-649-095**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

Lab ID #: 21012942 **Client Sample #: 2197-649-096**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Tan granular/sandy material

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012943 **Client Sample #: 2197-649-097**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Grey rubbery material LAYER 2: Black asphaltic material

OTHER FIBROUS MATERIALS:
LAYER 1: Synthetic fibers 2%
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21012944 **Client Sample #: 2197-649-098**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: White/brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 35%

NON-FIBROUS MATERIALS:
Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	35%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

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Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

Lab ID #: 21012945 **Client Sample #: 2197-649-099**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012946 **Client Sample #: 2197-649-100**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012947 **Client Sample #: 2197-649-101**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

Lab ID #: 21012948 **Client Sample #: 2197-649-102**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 35%, Glass fibers 15%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012949 **Client Sample #: 2197-649-103**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012950 **Client Sample #: 2197-649-104**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

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Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

Lab ID #: 21012951 **Client Sample #: 2197-649-105**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012952 **Client Sample #: 2197-649-106**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012953 **Client Sample #: 2197-649-107**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous brittle material

OTHER FIBROUS MATERIALS:
Glass fibers 45%, Cellulose 4%

NON-FIBROUS MATERIALS:
Calcareous matrix, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

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NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

Lab ID #: 21012954 **Client Sample #: 2197-649-108**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Grey fibrous brittle material

OTHER FIBROUS MATERIALS:
Glass fibers 45%, Cellulose 4%

NON-FIBROUS MATERIALS:
Calcareous matrix, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012955 **Client Sample #: 2197-649-109**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Brown paint LAYER 2: Grey brittle material with white fibers

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	25%

Lab ID #: 21012956 **Client Sample #: 2197-649-110**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Glass fibers 25%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

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Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

Lab ID #: 21012957 **Client Sample #: 2197-649-111**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Glass fibers 25%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012958 **Client Sample #: 2197-649-112**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Glass fibers 25%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012959 **Client Sample #: 2197-649-113**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Glass fibers 25%, Cellulose 5%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

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NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

Lab ID #: 21012960 **Client Sample #: 2197-649-114**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Glass fibers 25%, Cellulose 5%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012961 **Client Sample #: 2197-649-115**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Glass fibers 25%, Cellulose 5%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012962 **Client Sample #: 2197-649-116**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains and trace silver paint

OTHER FIBROUS MATERIALS:
Glass fibers 25%, Cellulose 5%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Sample comments: Asbestos found in vicinity of silver paint

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

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NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

Lab ID #: 21012963 **Client Sample #: 2197-649-117**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains and trace silver paint

OTHER FIBROUS MATERIALS:
Glass fibers 25%, Cellulose 5%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012964 **Client Sample #: 2197-649-118**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains and white woven fiber

OTHER FIBROUS MATERIALS:
Glass fibers 25%, Cellulose 5%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

Sample comments: Asbestos is associated with white woven fiber

Lab ID #: 21012965 **Client Sample #: 2197-649-119**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains and brown fibrous material

OTHER FIBROUS MATERIALS:
Glass fibers 25%, Cellulose 10%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

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Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

Lab ID #: 21012966 **Client Sample #: 2197-649-120**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Glass fibers 25%, Cellulose 10%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012967 **Client Sample #: 2197-649-121**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Glass fibers 25%, Cellulose 10%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012968 **Client Sample #: 2197-649-122**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Glass fibers 25%, Cellulose 10%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

Lab ID #: 21012969 **Client Sample #: 2197-649-123**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material with surface mineral grains LAYER 2: Grey fibrous and porous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 15%
LAYER 2: Cellulose 65%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder, Mineral/binder
LAYER 2: Fine particles, Perlite

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21012970 **Client Sample #: 2197-649-124**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material with surface mineral grains and trace grey surfaced black asphaltic material
LAYER 2: Grey fibrous and porous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 15%
LAYER 2: Cellulose 65%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder, Mineral/binder
LAYER 2: Fine particles, Perlite

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND

Sample comments: Asbestos found in grey surfaced area.

Lab ID #: 21012971 **Client Sample #: 2197-649-125**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

*None Detected	ND

Lab ID #: 21012972 **Client Sample #: 2197-649-126**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012973 **Client Sample #: 2197-649-127**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 65%
LAYER 2: Cellulose 5%, Glass fibers 35%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Perlite
LAYER 2: Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21012974 **Client Sample #: 2197-649-128**

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 65%
LAYER 2: Cellulose 5%, Glass fibers 35%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Perlite
LAYER 2: Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00453.00
Client Project #: 2197-01F
Number of samples: 35

(Lab ID#: 21012974 Client Sample #: 2197-649-128 results continued from previous page)

LAYER 2: *None Detected ND

Lab ID #: 21012975 Client Sample #: 2197-649-129

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012976 Client Sample #: 2197-649-130

Sample Location: Quad F - Bldg - 649, Schofield Barracks, Hawaii
Description: Black asphaltic material with mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/24/2001
Reviewed by: Nick Ly Date: 01/24/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21012977 **Client Sample #: 2197-649-131**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Black asphaltic built-up material

OTHER FIBROUS MATERIALS:
Cellulose 7%

NON-FIBROUS MATERIALS:
Binder & filler, Sand/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012978 **Client Sample #: 2197-649-132**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Black asphaltic built-up material

OTHER FIBROUS MATERIALS:
Cellulose 7%

NON-FIBROUS MATERIALS:
Binder & filler, Sand/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012979 **Client Sample #: 2197-649-133**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 4%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21012980 **Client Sample #: 2197-649-134**
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 4%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012981 **Client Sample #: 2197-649-135**
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 5%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21012982 **Client Sample #: 2197-649-136**
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 5%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21012983 **Client Sample #: 2197-649-137**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Black asphaltic material with paint

OTHER FIBROUS MATERIALS:
Cellulose 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	25%

Lab ID #: 21012985 **Client Sample #: 2197-649-139**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Black asphaltic built-up material

OTHER FIBROUS MATERIALS:
Cellulose 10%, Glass fibers 13%

NON-FIBROUS MATERIALS:
Asphalt/binder, Sand/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	4%

Lab ID #: 21012987 **Client Sample #: 2197-649-141**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Black asphaltic built-up material

OTHER FIBROUS MATERIALS:
Cellulose 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Sand/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	3%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21012990 **Client Sample #: 2197-649-144**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 45%, Glass fibers 10%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21012991 **Client Sample #: 2197-649-145**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 45%, Glass fibers 10%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

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Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21012992 **Client Sample #: 2197-649-146**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 45%, Glass fibers 10%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21012993 **Client Sample #: 2197-649-147**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Orange coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 45%, Glass fibers 10%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21012994 **Client Sample #: 2197-649-148**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Yellow coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 45%, Glass fibers 10%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21012995 **Client Sample #: 2197-649-149**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Yellow coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 45%, Glass fibers 10%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21012996 Client Sample #: 2197-649-150

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Yellow coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 45%, Glass fibers 10%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21012997 Client Sample #: 2197-649-151

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Tel: 206.547.0100
Fax: 206.634.1936

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21012998 Client Sample #: 2197-649-152

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21012999 Client Sample #: 2197-649-153

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013000 **Client Sample #: 2197-649-154**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013001 **Client Sample #: 2197-649-155**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013002 **Client Sample #: 2197-649-156**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013003 **Client Sample #: 2197-649-157**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

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Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013004 **Client Sample #: 2197-649-158**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013005 **Client Sample #: 2197-649-159**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Gray mastic, LAYER 2: Off-white coating, LAYER 3: Silver with tan/white fibrous material and mastic, LAYER 4: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 7%
LAYER 3: Cellulose 40%, Glass fibers 13%
LAYER 4: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Mastic/binder
LAYER 2: Binder & filler
LAYER 3: Binder & filler, Mastic/binder
LAYER 4: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	2%
LAYER 3:	*None Detected	ND
LAYER 4:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013006 **Client Sample #: 2197-649-160**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013007 **Client Sample #: 2197-649-161**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013008 **Client Sample #: 2197-649-162**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013009 **Client Sample #: 2197-649-163**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013010 **Client Sample #: 2197-649-164**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Silver with tan/white fibrous material and mastic, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013011 **Client Sample #: 2197-649-165**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Silver with tan/white fibrous material and mastic, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013012 **Client Sample #: 2197-649-166**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Silver with tan/white fibrous material and mastic, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013013 **Client Sample #: 2197-649-167**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Silver with tan/white fibrous material and mastic, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013014 **Client Sample #: 2197-649-168**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Yellow fibrous material

OTHER FIBROUS MATERIALS:
Glass fibers 65%, Cellulose 15%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013015 **Client Sample #: 2197-649-169**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Green soft material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 1%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Synthetic foam

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND

Lab ID #: 21013016 **Client Sample #: 2197-649-170**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: White plastic material, LAYER 2: Off-white coating with paint, LAYER 3: Silver paper with tan/white fibrous material and mastic, LAYER 4: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 7%
LAYER 3: Cellulose 40%, Glass fibers 13%
LAYER 4: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Paint
LAYER 3: Binder & filler, Mastic/binder
LAYER 4: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	2%
LAYER 3:	*None Detected	ND
LAYER 4:	*None Detected	ND

Lab ID #: 21013017 **Client Sample #: 2197-649-171**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013018 **Client Sample #: 2197-649-172**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating with paint, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 7%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013019 **Client Sample #: 2197-649-173**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Orange paint, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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4708 Aurora Ave. N., Seattle, WA 98103
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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013020 **Client Sample #: 2197-649-174**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013021 **Client Sample #: 2197-649-175**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating with paint, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

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Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013022 **Client Sample #: 2197-649-176**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating with paint, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material, LAYER 4: Gray plastic material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%
LAYER 4: Cellulose 1%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler
LAYER 4: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND
LAYER 4:	*None Detected	ND

Lab ID #: 21013023 **Client Sample #: 2197-649-177**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white paint, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013024 **Client Sample #: 2197-649-178**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with tan/white fibrous material and mastic, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013025 **Client Sample #: 2197-649-179**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013026 Client Sample #: 2197-649-180

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013027 Client Sample #: 2197-649-181

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: White paint, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013028 **Client Sample #: 2197-649-182**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with tan/white fibrous material and mastic, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013029 **Client Sample #: 2197-649-183**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with tan/white fibrous material and mastic, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013030 **Client Sample #: 2197-649-184**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 80%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-00454.00
Client Project #: 2197-01F
Number of samples: 52

Lab ID #: 21013031 **Client Sample #: 2197-649-185**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 80%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013032 **Client Sample #: 2197-649-186**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 80%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/23/2001
Reviewed by: Nick Ly Date: 01/23/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

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Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Lab ID #: 21022032 **Client Sample #: 2197-649-187**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022033 **Client Sample #: 2197-649-188**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022034 **Client Sample #: 2197-649-189**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Lab ID #: 21022035 **Client Sample #: 2197-649-190**
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022036 **Client Sample #: 2197-649-191**
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022037 **Client Sample #: 2197-649-192**
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Lab ID #: 21022038 **Client Sample #: 2197-649-193**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022039 **Client Sample #: 2197-649-194**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022040 **Client Sample #: 2197-649-195**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Lab ID #: 21022041 **Client Sample #: 2197-649-196**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022042 **Client Sample #: 2197-649-197**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022043 **Client Sample #: 2197-649-198**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Lab ID #: 21022044 **Client Sample #: 2197-649-199**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022045 **Client Sample #: 2197-649-200**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022046 **Client Sample #: 2197-649-201**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Fax: 206.634.1936

Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Lab ID #: 21022047 **Client Sample #: 2197-649-202**
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022048 **Client Sample #: 2197-649-203**
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022049 **Client Sample #: 2197-649-204**
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 13%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	17%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Fax: 206.634.1936

Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: **Edward K. Noda & Associates**
Address: **615 Pikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F-Bldg-649, Schofield Barracks, Hawaii**

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Lab ID #: 21022051 **Client Sample #: 2197-649-206**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Gray vinyl tile, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21022052 **Client Sample #: 2197-649-207**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Gray vinyl tile, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21022053 **Client Sample #: 2197-649-208**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Brown vinyl tile, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21022054 **Client Sample #: 2197-649-209**

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii
Description: LAYER 1: Brown vinyl tile, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Building 649

NESHAP
Point Count Method Result Forms

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii

Client Sample #: 2197-649-189

Lab ID #: 21022034

Sample Description: Gray sandy brittle material with paint

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

COMMENTS: Percent determined by NESHAPS Point Count Method = 0.3% Asbestos. Analyzed by WL 02/23/2001.

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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4708 Aurora Ave. N., Seattle, WA 98103
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Fax: 206.634.1936

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Client Sample #: 2197-649-190

Lab ID #: 21022035

Sample Description: Gray sandy brittle material with paint

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

COMMENTS: Percent determined by NESHAPS Point Count Method = 0.5% Asbestos. Analyzed by WL 02/23/2001.

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Client Sample #: 2197-649-199

Lab ID #: 21022044

Sample Description: Gray sandy brittle material with paint

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

COMMENTS: Percent determined by NESHAPS Point Count Method = 0.3% Asbestos. Analyzed by WL 02/23/2001.

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-649, Schofield Barracks, Hawaii
Sample Location: Quad F-Bldg-649, Schofield Barracks, Hawaii

NVL Batch Number: 21-01140.00
Client Project #: 2197-01F
Number of samples: 22

Client Sample #: 2197-649-200

Lab ID #: 21022045

Sample Description: Gray sandy brittle material with paint

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

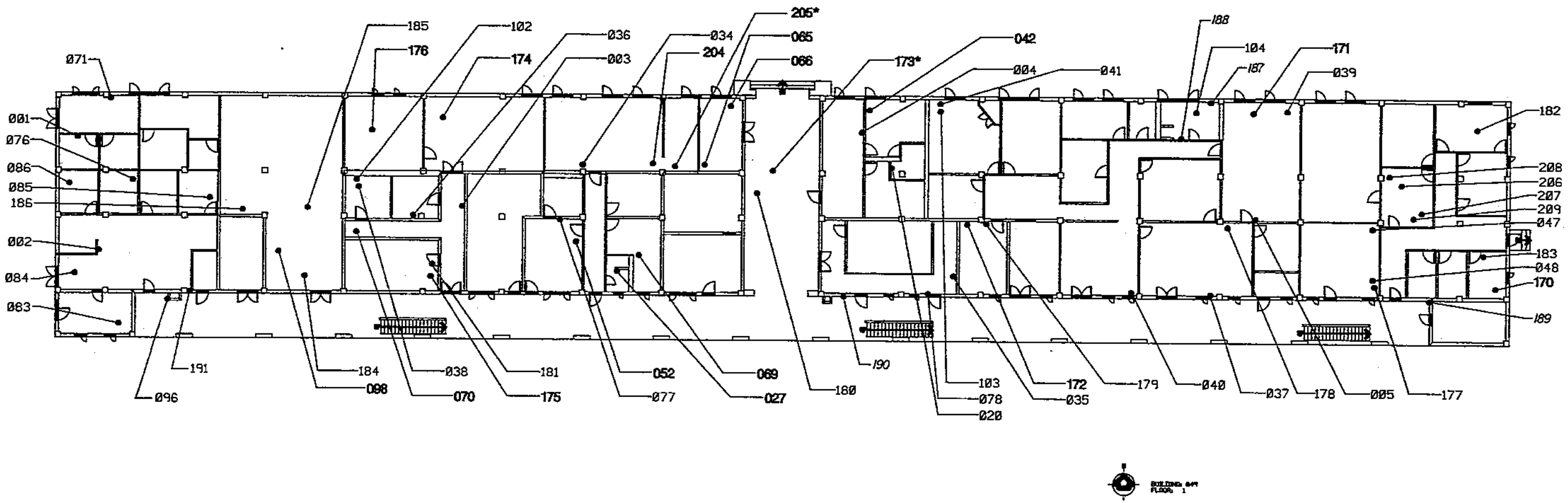
ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

COMMENTS: Percent determined by NESHAPS Point Count Method = 0.3% Asbestos. Analyzed by WL 02/23/2001.

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.



Sample * Prefix: 2179-649-XXX

LEGEND

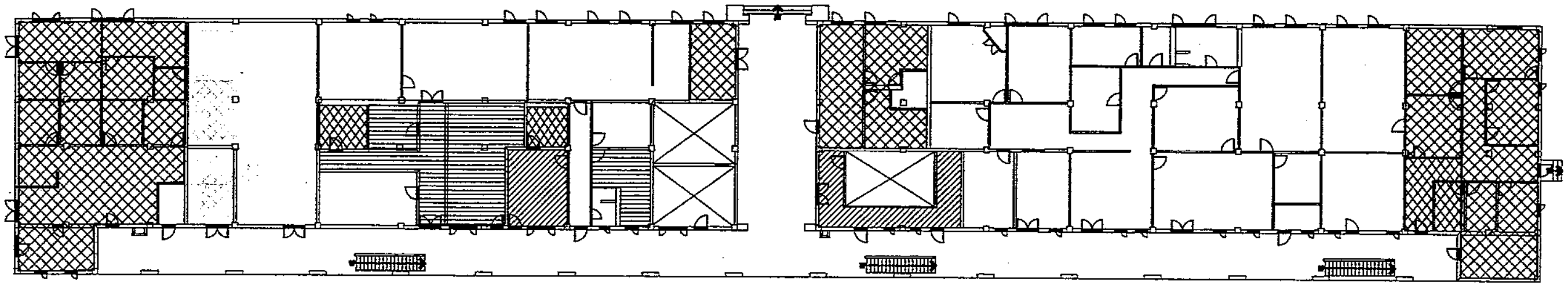
XXX Non-Asbestos-Containing Sample Location

XXX Asbestos-Containing Sample Location

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

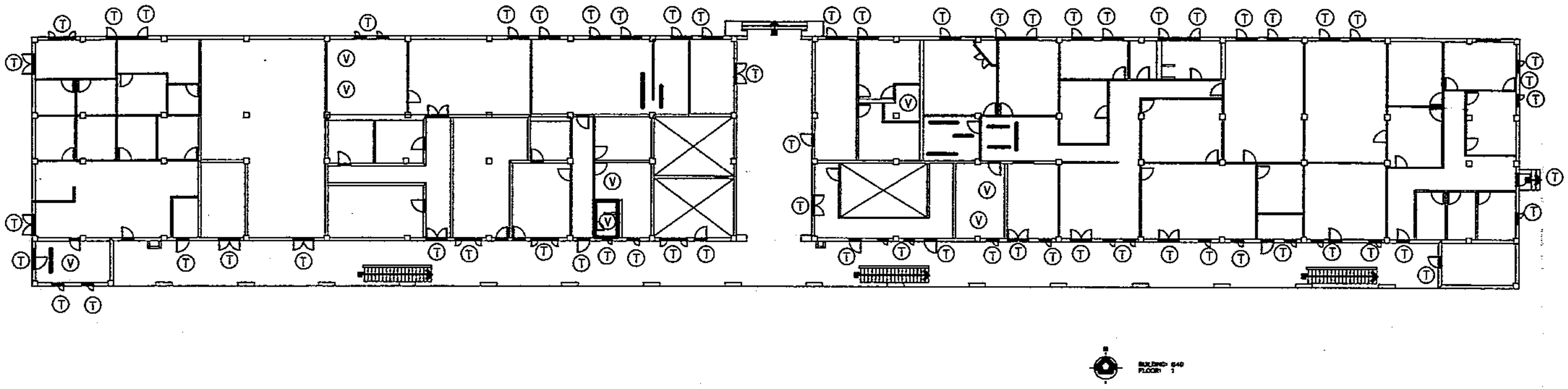
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Sample Locations First Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Extent of Identified ACBM First Floor	Figure 2



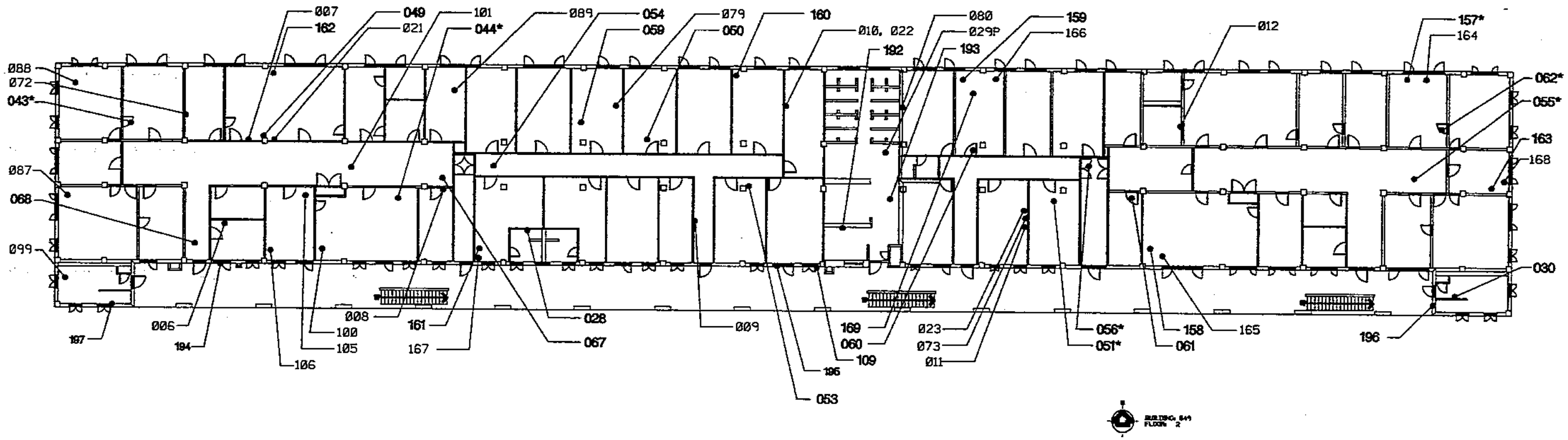
Note:

Asbestos-Containing Joint Adhesive/Sealant-(Off White/Yellow/Orange/Tan) On
Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Extent of Identified ACBM First Floor	Figure 3



Sample * Prefix: 2179-649-XXX

LEGEND

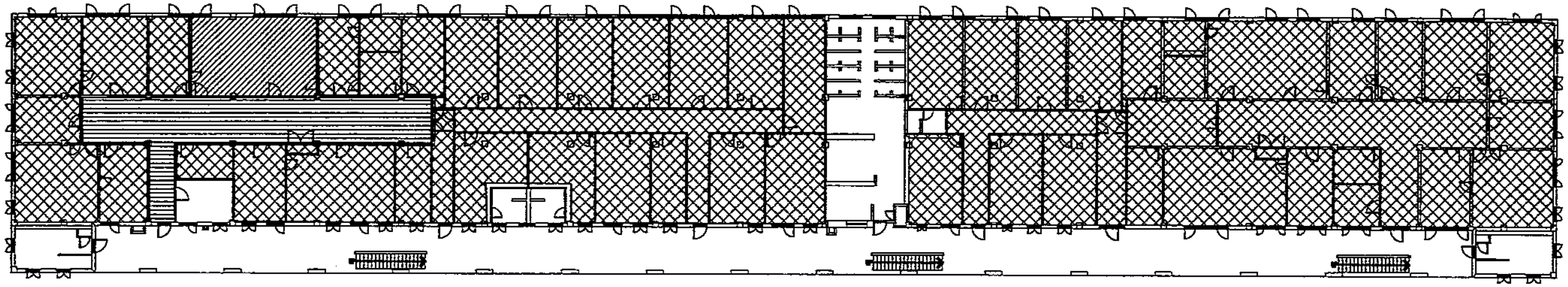
XXX Non-Asbestos-Containing Sample Location

XXX Asbestos-Containing Sample Location

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

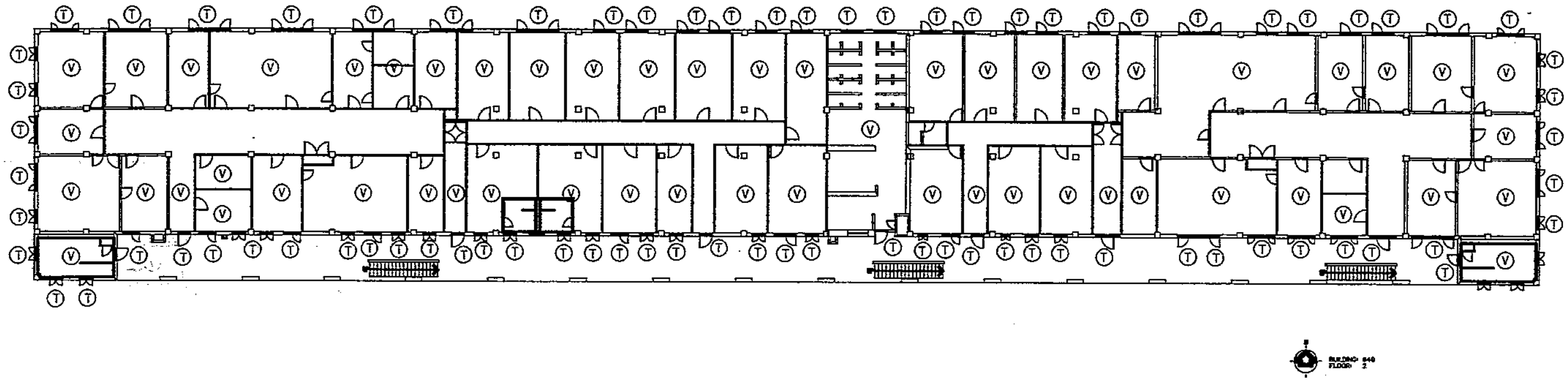
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Sample Locations Second Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Extent of Identified ACBM Second Floor	Figure 2



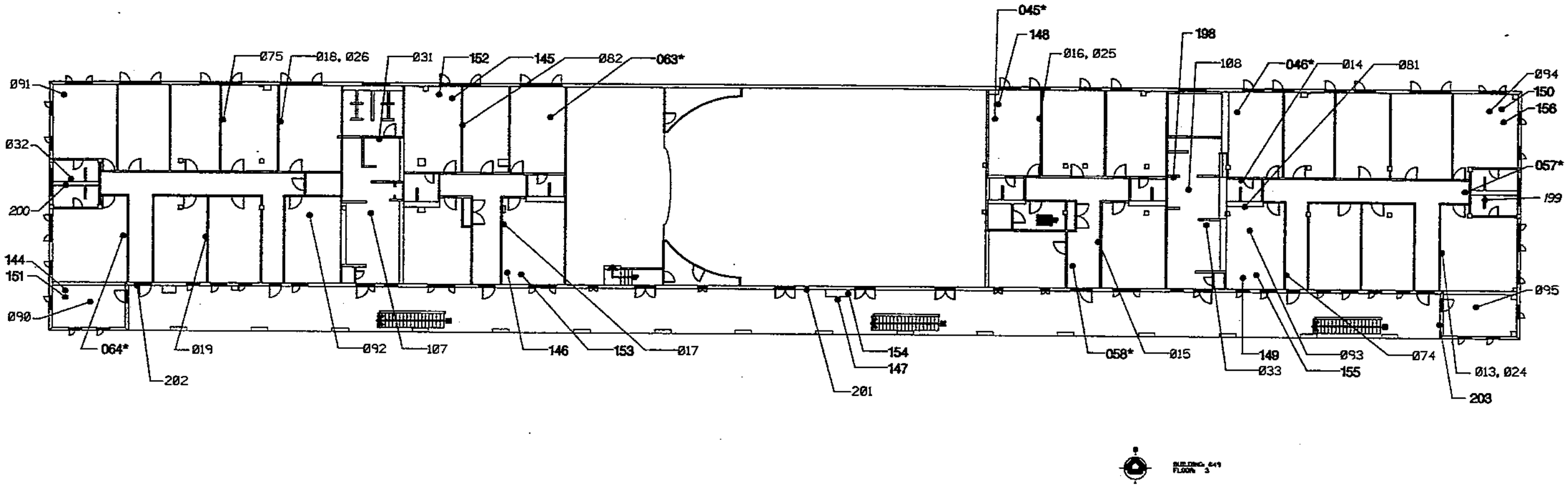
Note:

Asbestos-Containing Joint Adhesive/Sealant-(Off White/Yellow/Orange/Tan) On
Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Extent of Identified ACBM Second Floor	Figure 3

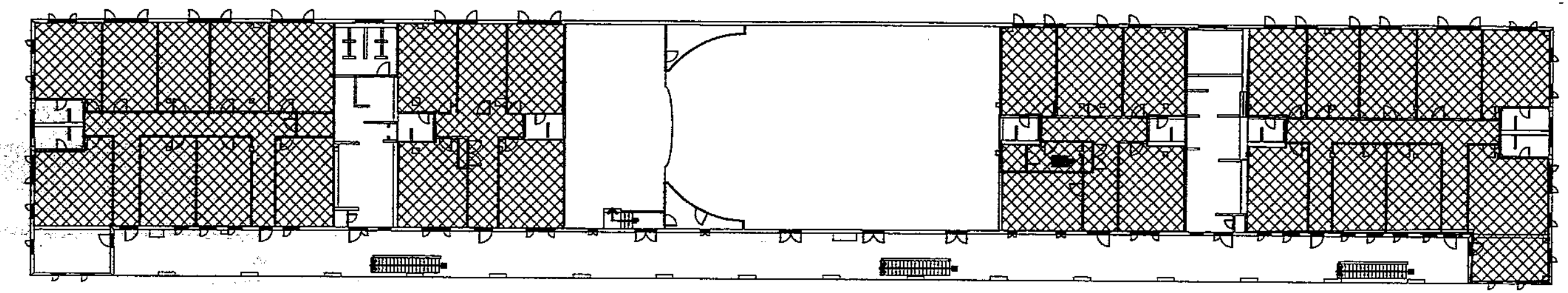


Sample * Prefix: 2179-649-XXX

LEGEND

XXX Non-Asbestos-Containing Sample Locations
XXX Asbestos-Containing Sample Location
XXX* Homogeneous Asbestos-Containing Sample Locations
XXX Asbestos-Containing Sample Location Less Than 1%

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Sample Locations Third Floor	Figure 1

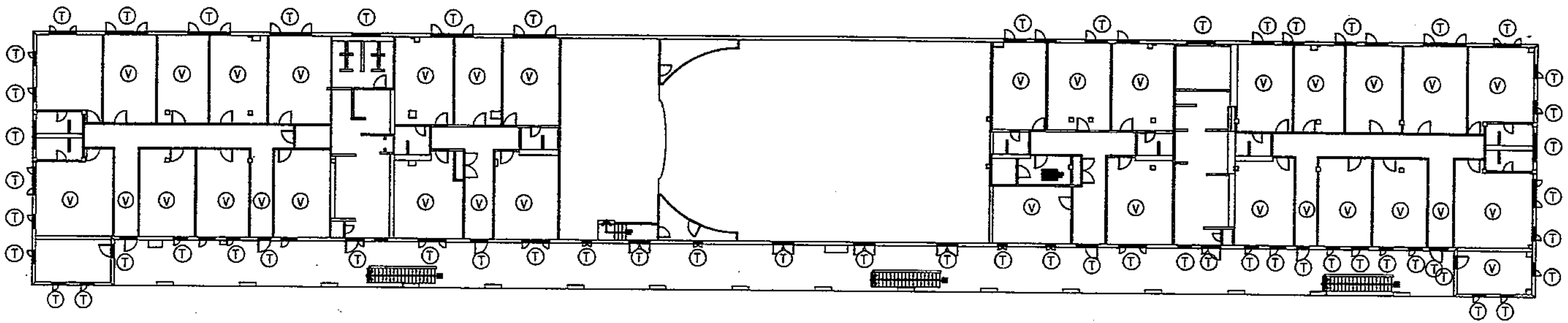


BUILDING: 649
FLOOR: 3

LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Extent of Identified ACBM Third Floor	Figure 2



BUILDING: 649
FLOOR: 3

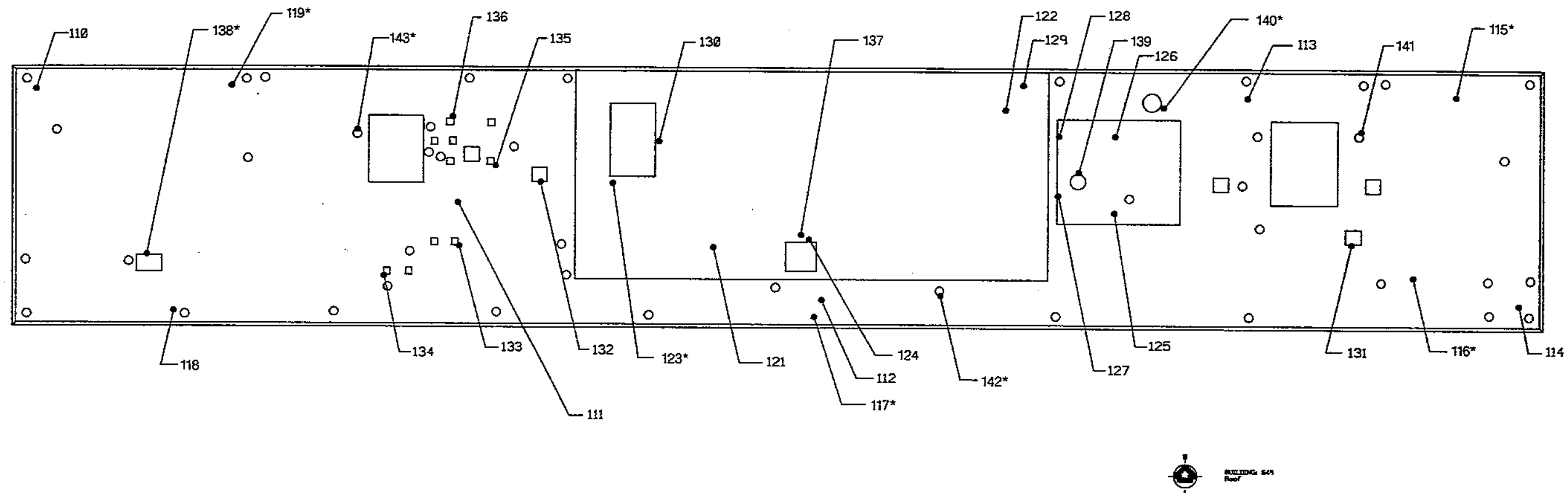
Note:

Asbestos-Containing Joint Adhesive/Sealant-(Off White/Yellow/Orange/Tan) On
Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Extent of Identified ACBM Third Floor	Figure 3



Sample * Prefix: 2179-649-XXX

LEGEND

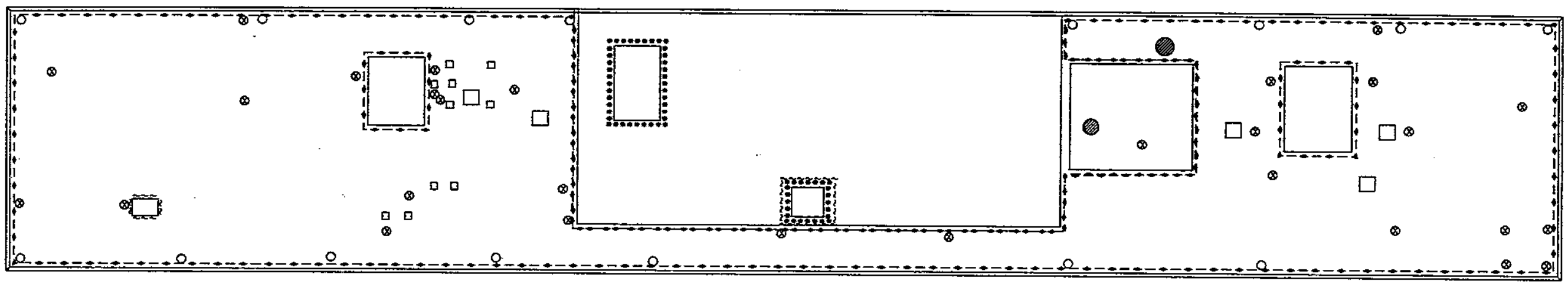
XXX Non-Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Locations

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Sample Locations Roof	Figure 1



LEGEND

- ⊗ Asbestos-Containing Flashing/Sealant, Gas Vents and Mount Points
- —•—•— Asbestos-Containing Flashing/Sealant Type I
- ● Asbestos-Containing Flashing/Sealant Large Air Vents
- ~~~ Asbestos-Containing Asphaltic Undercoat
- ••• Asbestos-Containing Flashing/Sealant Type II

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 649	Extent of Identified ACBM Roof	Figure 2

APPENDIX B

BUILDING 650

I Introduction

Building 650 is a 3-story concrete structure which consist of a dining facility currently occupied and utilized as a "brigade headquarters" and unoccupied office space on the first floor, the second and third floor consist of vacant living quarters. Two (2) hot water heater systems and two (2) associated storage tanks are located on the first floor of the building.

II Summary of Identified ACBM

Materials found to contain >1% asbestos by laboratory analysis is listed below. An asterisk preceding the material description indicates the material is considered friable or potentially friable. Revision/additional identified materials types are indicated by a (☛).

12"x12" Vinyl Floor Tile (VFT) - Beige w/Olive Streaks and Mastic
12"x12" VFT - Olive Green w/Grey Streaks and Mastic
12"x12" VFT - Brown w/Light Brown Streaks and **Mastic**
12"x12" VFT - Beige w/Grey Streaks and **Mastic**
12"x12" VFT - Blue w/White Streaks and **Mastic**
12"x12" VFT - Grey w/ Blue & White Streaks and **Mastic**
12"x12" VFT - Blue w/ Grey Marbling and **Mastic**
12"x12" VFT - Dark Brown w/Brown Streaks and **Mastic**
9"x9" VFT - Green and **Mastic**
9"x9" VFT - Black and **Mastic**
VFT - Green - 2nd Layer and **Mastic**
Floor Tile Mastic Only
☛ **Wall Patch Compound - Cementitious/Asphaltic**
☛ **Wall Patch Compound - Cementitious - 10 Ft. High Patch**
☛ **Wall Plaster - Cementitious Exterior - Type II**
Cementitious Panel - Above Doors & Windows
Composition Roof Flashing - Type I - Main Roof
Beige Paint W/Asphaltic Undercoating (Silver Paint) - Main Roof
Mastic/Sealant at Gas Vents and Air Ducts - Main Roof
Mastic/Sealant at Mounting Points - Main Roof
***Vibration Cloth - White Woven Material**
***Fiberglass Pipe Insulation - Hangar** (Northwest Heater Room)
***Pipe Insulation - <6 Linear Feet**
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 3rd Floor
HVAC Vent Sealant - Black

III Survey Findings

EKNAs inspectors, Christine Arouh, Steven Chun, William Harris, Prudy Stoudt-McRea, Kennyson Thomas and Doug Tisdell (see Appendix E for Inspector Certificates) identified sixty nine (69) distinct material types and submitted two hundred twenty three (223) suspect samples for laboratory analysis. Material types sampled are listed below. Materials found to contain >1% asbestos are indicated in **bold** print, an asterisk indicates a friable or potentially friable material. Materials found to contain <1% asbestos are indicated in *italic* print. Revision/additional identified materials types are indicated by a (☛).

12"x12" Vinyl Floor Tile (VFT) - Beige w/Olive Streaks and Mastic
12"x12" VFT - Olive Green w/Grey Streaks and Mastic
12"x12" VFT - Brown w/Light Brown Streaks and **Mastic**
12"x12" VFT - Beige w/Grey Streaks and **Mastic**
12"x12" VFT - Blue w/White Streaks and **Mastic**
12"x12" VFT - Grey w/ Blue & White Streaks and **Mastic**
12"x12" VFT - Blue w/ Grey Marbling and **Mastic**
12"x12" VFT - Dark Brown w/Brown Streaks and **Mastic**
12"x12' VFT - Medium Brown w/Brown Streaks and Mastic
12"x12" VFT - Brown w/Black & Grey Streaks and Mastic
9"x9" VFT - Green and **Mastic**
9"x9" VFT - Black and **Mastic**
VFT - Green - 2nd Layer and **Mastic**
VFT - Grey w/White Streaks - 2nd Layer and Mastic
Floor Tile Mastic Only
Gypsum Wall Board and Joint Compound, 1st Floor
Gypsum Wall Board and Joint Compound, 2nd Floor
Gypsum Wall Board and Joint Compound, 3rd Floor
Wall Insulation-Grey Fluffy Material, 1st Floor
Wall Insulation-Grey Fluffy Material, 2nd Floor
Wall Insulation-Grey Fluffy Material, 3rd Floor
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 1st Flr (Restrooms)
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 2nd Flr (Private Bathrooms)
Cementitious Plaster-Hollow Plaster and Lathe Wall Sys. 3rd Flr (Private Bathrooms)
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 2nd Flr (Exterior Restrooms)
Cementitious Plaster-Hollow Plaster & Lathe Wall Sys. 3rd Flr (Exterior Restrooms)
Cementitious Plaster-Troweled on CMU and Concrete Walls 1st Floor
Cementitious Panel - Above Doors & Windows
☛ Exterior Cementitious Wall Plaster 1st Floor, see "Remarks and Comments" below.
Exterior Cementitious Wall Plaster 2nd Floor
Exterior Cementitious Wall Plaster 3rd Floor
☛ **Wall Patch Compound - Cementitious/Asphaltic**
☛ **Wall Patch Compound - Cementitious - 10 Ft. High Patch**

☛ Wall Patch Compound - Cementitious - Pipe Hole Patch
☛ **Wall Plaster - Cementitious Exterior - Type II**
4" Cove Base and Adhesive - Black
4" Cove Base and Adhesive - Dark Brown / Brown
2'x4' Ceiling Tile - Fissure w/Holes Pattern - Type III
2'x4' Ceiling Tile - Plain Pattern
2'x4' Ceiling Tile - Fissure w/Holes Pattern - Type II
2'x4' Ceiling Tile - Fissure w/Holes Pattern - Type I
2'x4' Ceiling Tile - Hole Pattern - Type I
2'x4' Ceiling Tile - Hole Pattern - Type II
2'x4' Ceiling Tile - Hole Pattern - Type III
Composition Roof Flashing - Type I - Main Roof
Composition Roofing Material - Type I - Main Roof
Beige Paint W/Asphaltic Undercoating (Silver Paint) - Main Roof
Mastic/Sealant at Gas Vents and Air Ducts - Main Roof
Mastic/Sealant at Mounting Points - Main Roof
Patching Material at Roof Drains - Main Roof
HVAC Vibration Cloth - Black - Main Roof
Flashing Material at Roof Hatches - Main Roof
Composition Roof Flashing - Type II - Lower Roof
Composition Roofing Material - Type II - Lower Roof
Asphaltic Roof Flashing - Lower Roof - East Side
Asphaltic Roofing Material - Lower Roof - East Side
***Vibration Cloth - White Woven Material**
***Pipe Insulation - <6 Linear Feet**
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 1st Floor
Joint Adhesive/Sealant on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, Hangers, 3rd Floor
HVAC Vent Sealant - Black
Metal Duct Sealant - Gray
Metal Duct Sealant - Black
Fibrous Gasket at Stove/Grill Vent
Joint Adhesive/Sealant on Fiberglass Pipe Insulation, Northeast Heater Room
Joint Adhesive/Sealant on Fiberglass Pipe Insulation, Hangar, Northeast Heater Room
Hot Water Tank Insulation - Type I, Northeast Heater Room
Joint Adhesive/Sealant on Fiberglass Pipe Insulation, Northwest Heater Rm
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, Hangers, Northwest Heater Rm
12" O.D. Fiberglass Pipe Insulation - Joint Adhesive / Mastic (Northwest Heater Room)
Hot Water Tank Insulation - Type II (Northwest Heater Room)

IV Remarks and Comments

Review "Volume I, Asbestos Survey, Analytical and Report for: Quad F - Buildings 649, 650, 651 and 652 - Schofield Barracks, Oahu, Hawaii", "Discussion" and "Recommendations". See "Survey Methodology" for survey protocol.

Concerning the "Exterior Cementitious Wall Plaster 1st Floor", EKNA collected and submitted for analysis nine (9) suspect samples of the "Exterior Cementitious Wall Plaster" system during its initial investigative survey. Of the nine samples submitted, laboratory results indicate one (1) sample (sample number 2197-650-213) contains asbestos at a concentration >1%.

EKNA further investigated the "Exterior Cementitious Wall Plaster" system to determine if the positive sample was a patch or is in fact the entire wall system. EKNA collected seven (7) additional samples and identified four (4) more material types as indicated by a (☛). Analytical results indicate that the following material types contains asbestos at a concentration >1%.

- ☛ **Wall Patch Compound - Cementitious/Asphaltic**
- ☛ **Wall Patch Compound - Cementitious - 10 Ft. High Patch**
- ☛ **Wall Plaster - Cementitious Exterior - Type II**

Analytical results indicates that the following material types are "non-detected" and is considered non-asbestos, see "Chain of Custody Forms and Asbestos Bulk Analysis Forms".

- ☛ Wall Patch Compound - Cementitious - Pipe Hole Patch
- Wall Plaster - Cementitious Exterior - Type I

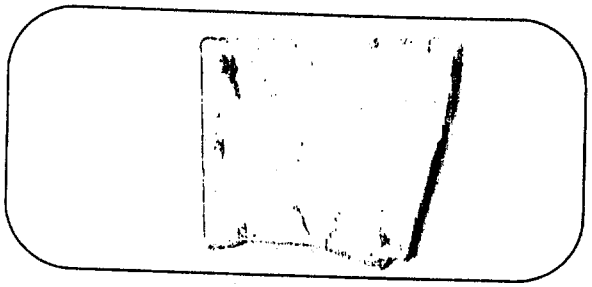
EKNA concludes that the "Exterior Cementitious Wall Plaster 1st Floor" is non-asbestos. Caution should be exercised and work practices evaluated if/when disturbing the exterior plaster walls, identifying the extent of asbestos-containing "Wall Patch Compounds" and "Wall Plaster - Cementitious Exterior - Type II" cannot be completely identified due to the exterior surface paint, that restricts identification.

Building 650

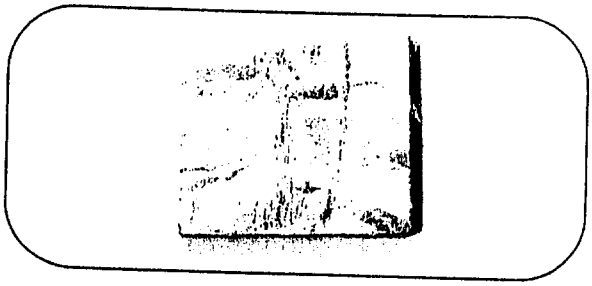
Floor Tile Log

Vinyl Floor Tile Log
Quad F - Building 650

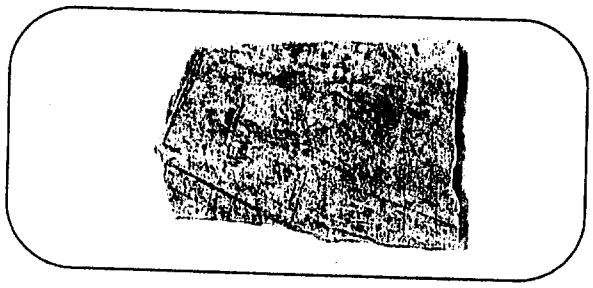
Bold indicates asbestos-containing vinyl floor tile and/or mastic.



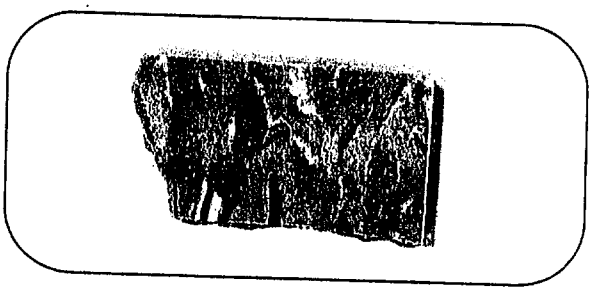
12"X12" Vinyl Floor Tile
Beige w/Olive Streaks and Mastic



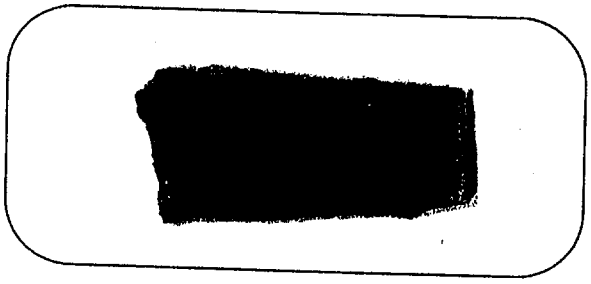
12"X12" Vinyl Floor Tile
Beige w/Grey Streaks and **Mastic**



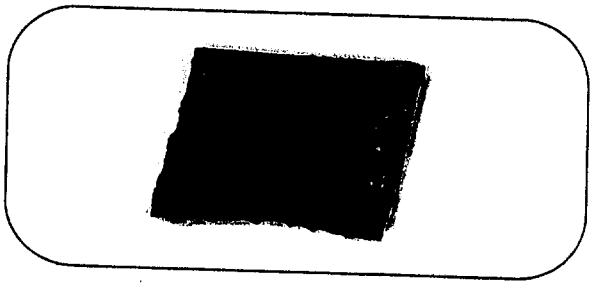
12"X12" Vinyl Floor Tile
Brown W/Black & Grey Streaks



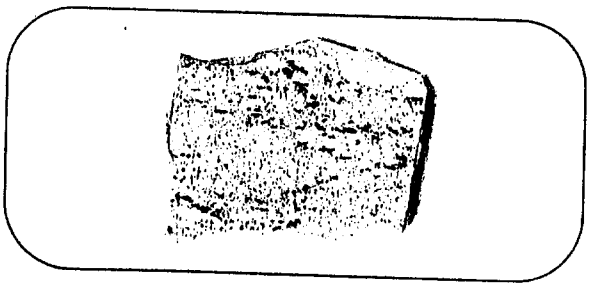
12"X12" Vinyl Floor Tile
Blue w/Grey Marbling and Mastic



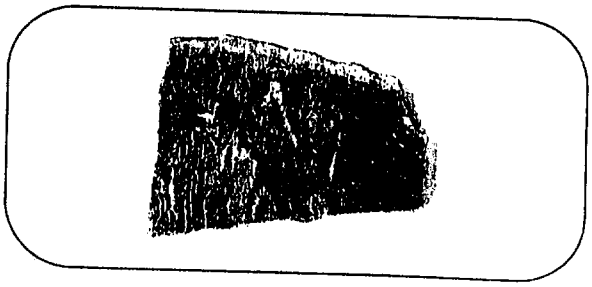
9"x9" Vinyl Floor Tile
Green and **Mastic**



9"x9" Vinyl Floor Tile
Black and **Mastic**



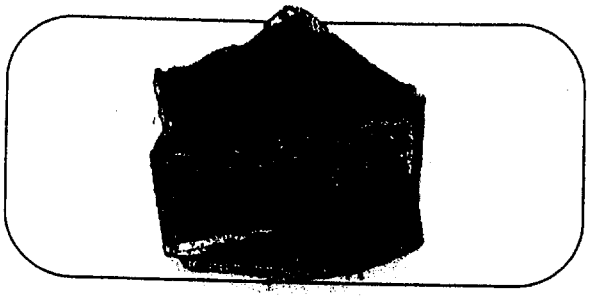
12"X12" Vinyl Floor Tile
Brown w/Light Brown Streaks and **Mastic**



12"X12" Vinyl Floor Tile
Dark Brown w/Brown Streaks

Vinyl Floor Tile Log
Quad F - Building 650

Bold indicates asbestos-containing vinyl floor tile and/or mastic.



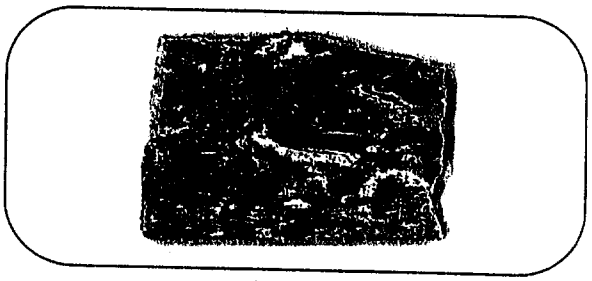
Vinyl Floor Tile
Green 2nd Layer and **Mastic**

12"X12" Vinyl Floor Tile
Med. Brown w/Brown Streaks and Mastic

Vinyl Floor Tile
Grey w/White Streaks 2nd Layer

12"X12" Vinyl Floor Tile
Olive Green w/Grey Streaks & Mastic

12"X12" Vinyl Floor Tile
Blue w/White Streak & **Mastic**



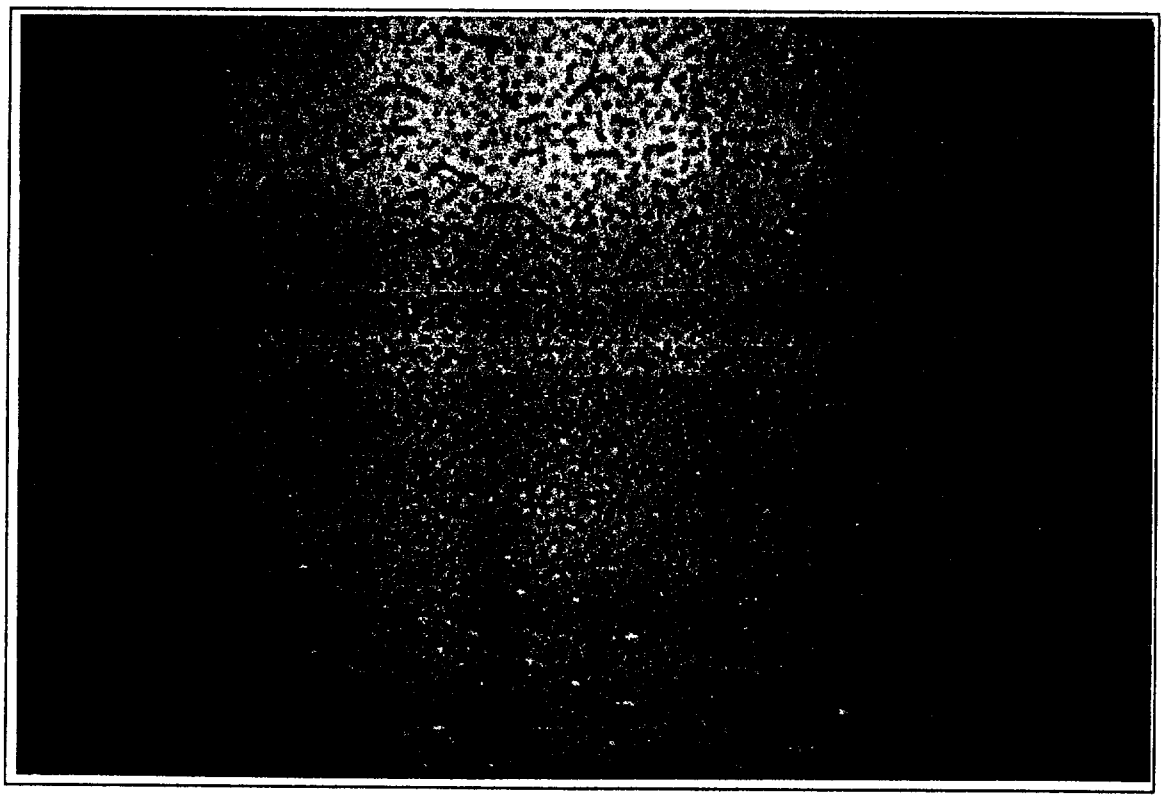
12"X12" Vinyl Floor Tile
Grey w/Blue & White Streaks & **Mastic**

Building 650

Photo Log

BUILDING 650 - PHOTO LOG

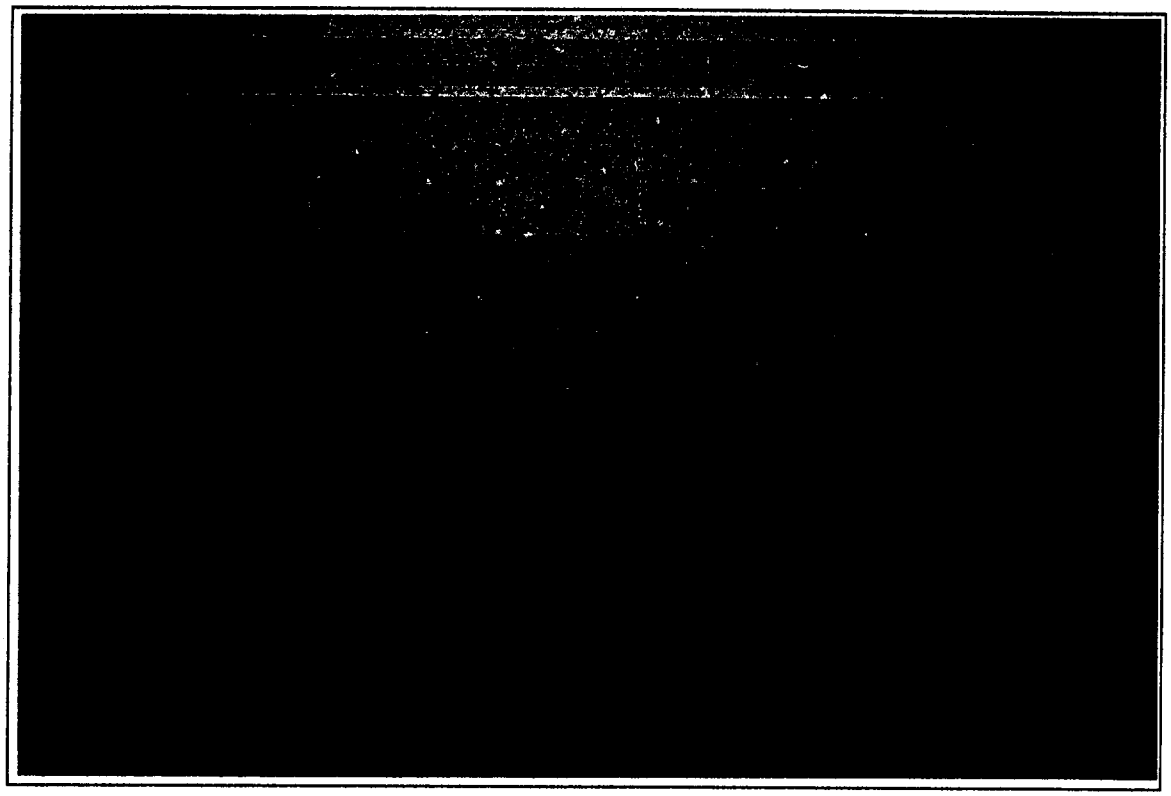
Building 650 - Exterior



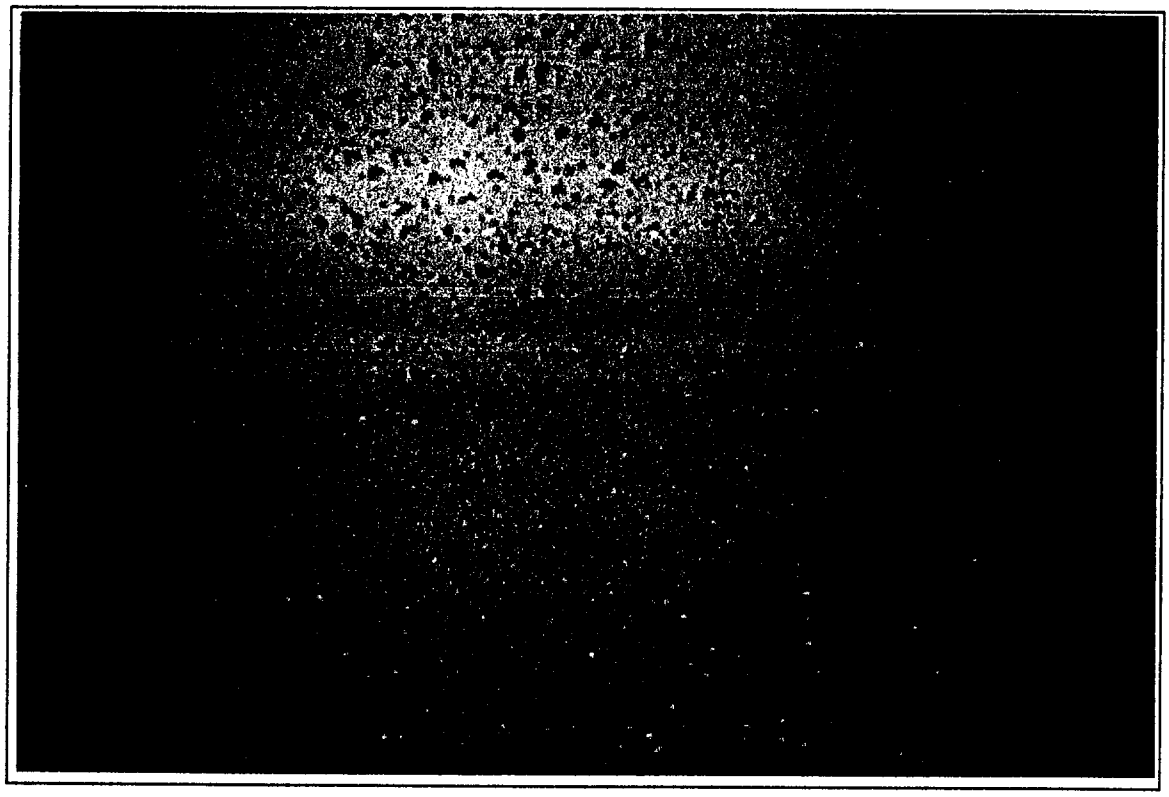
2'x4' Ceiling Tile - Fissure w/Holes - Type I

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 650 - PHOTO LOG



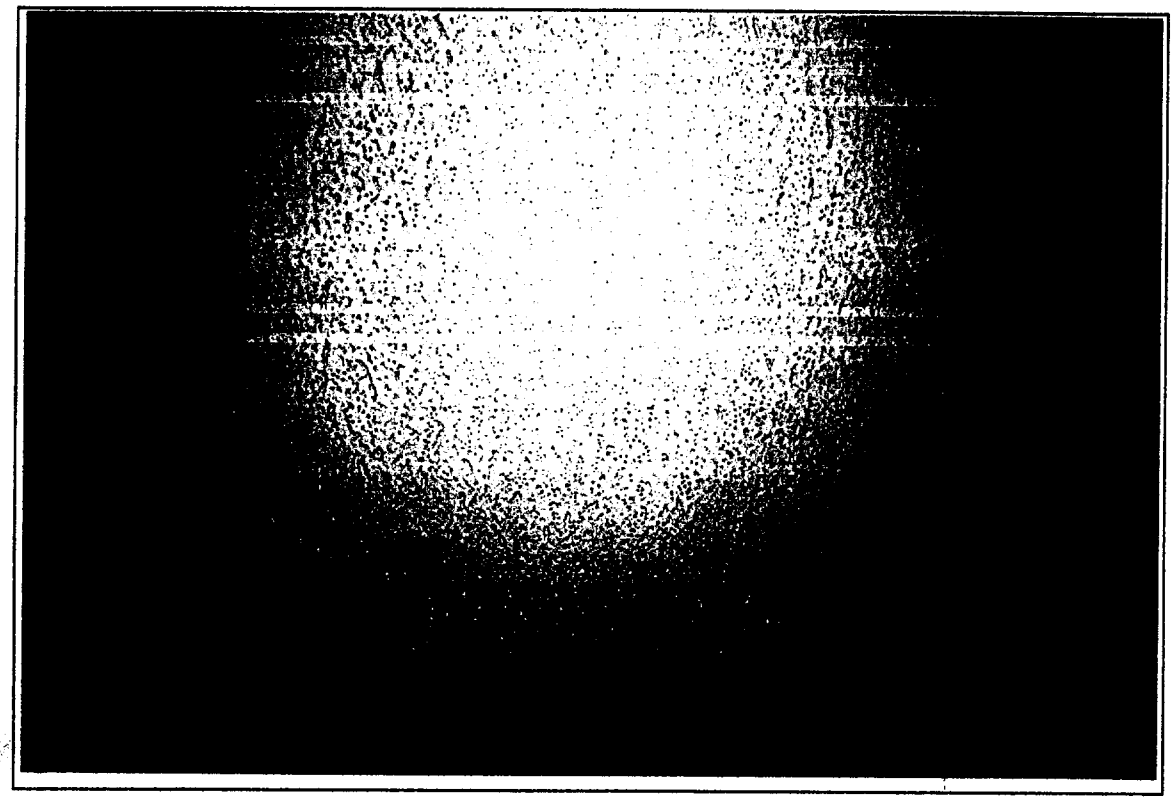
2'x4' Ceiling Tile - Fissure w/Holes - Type II



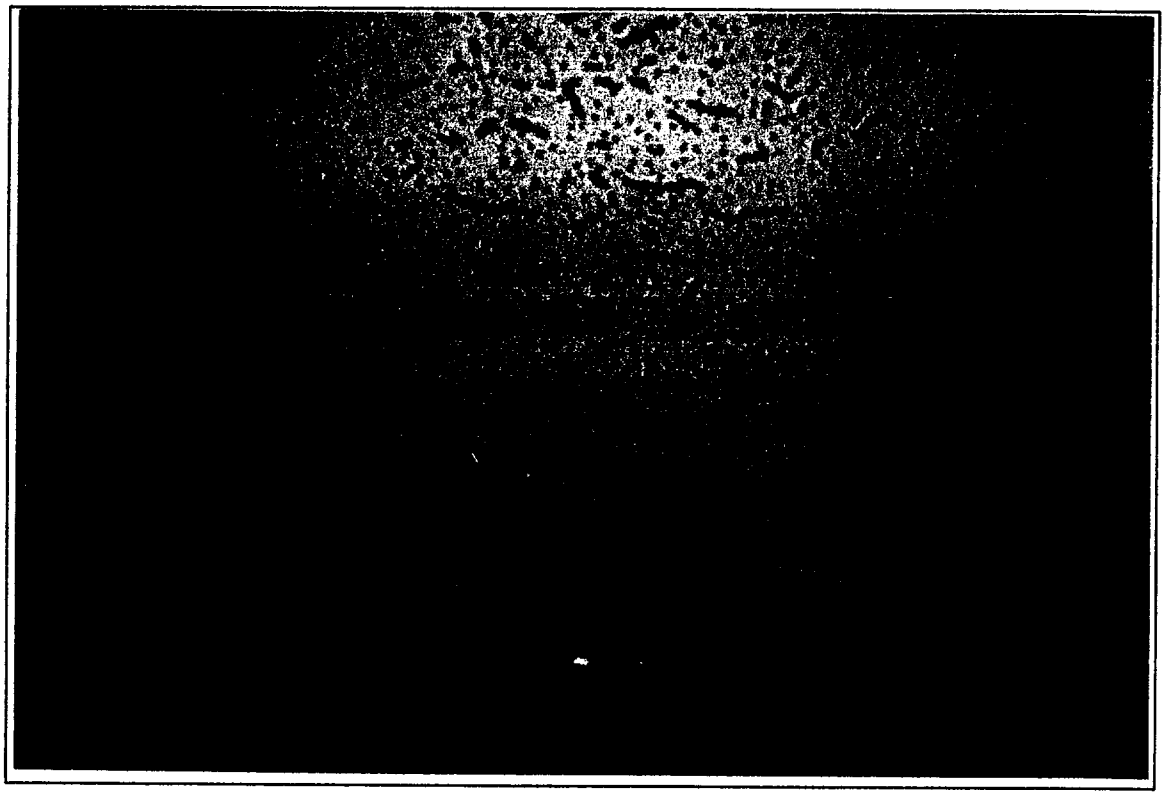
2'x4' Ceiling Tile - Fissure w/Holes - Type III

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 650 - PHOTO LOG



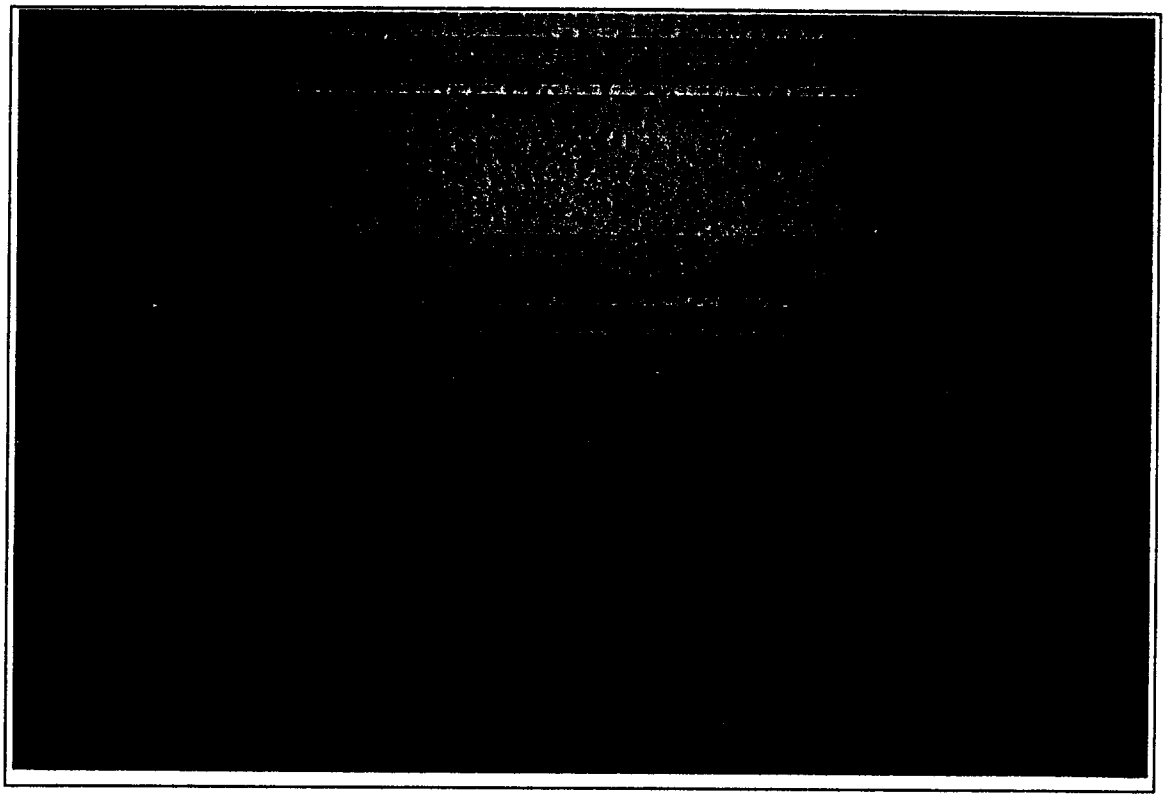
2'x4' Ceiling Tile - Hole Pattern - Type I



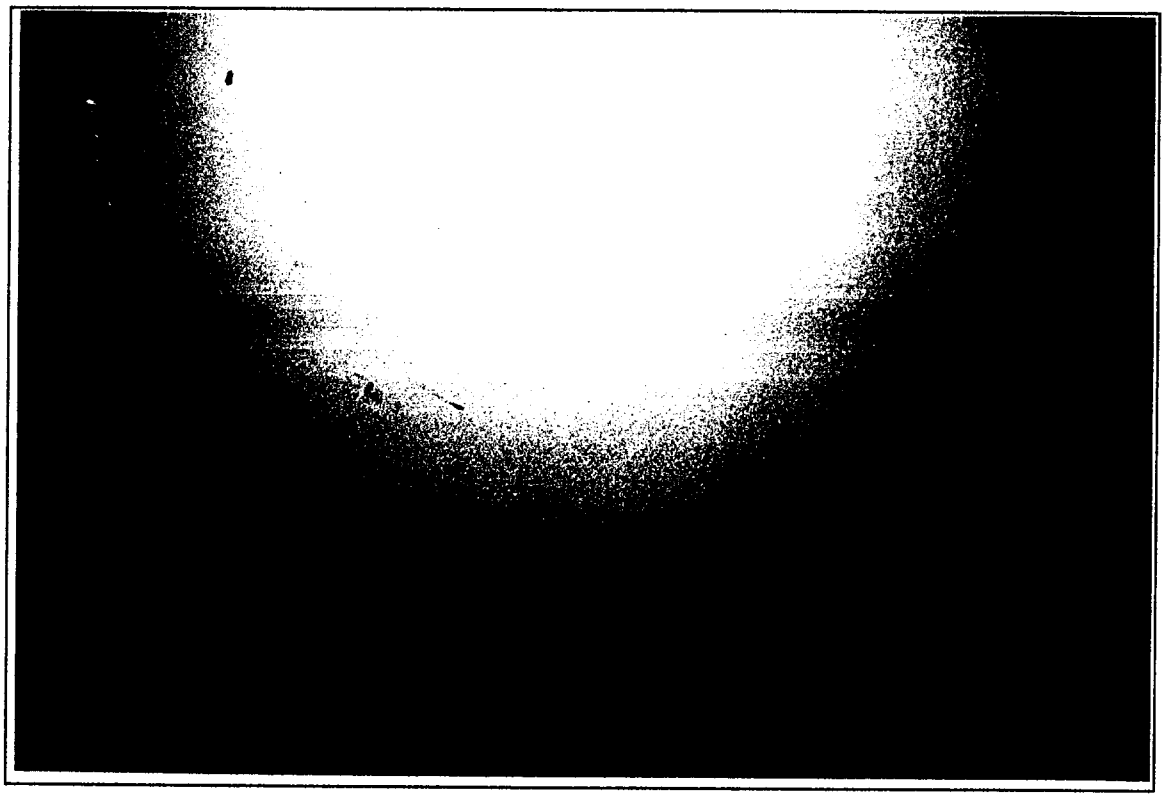
2'x4' Ceiling Tile - Hole Pattern - Type II

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 650 - PHOTO LOG



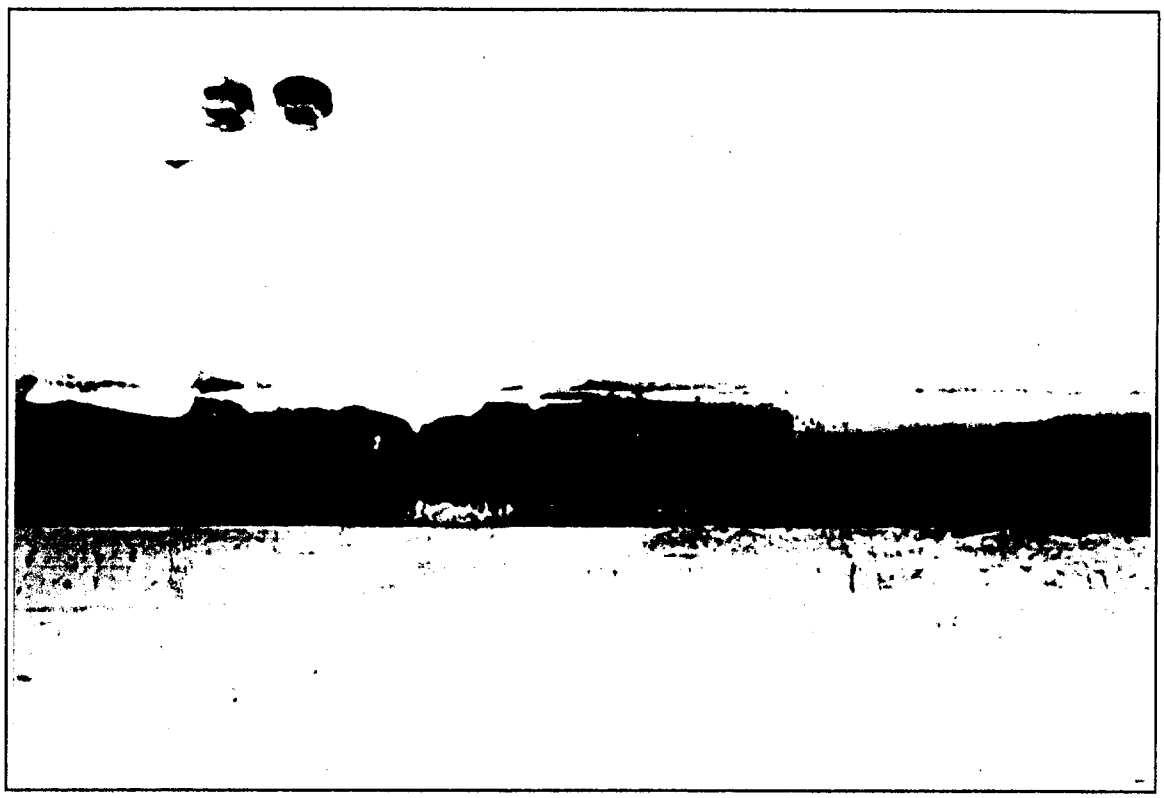
2'x4' Ceiling Tile - Hole Pattern - Type III



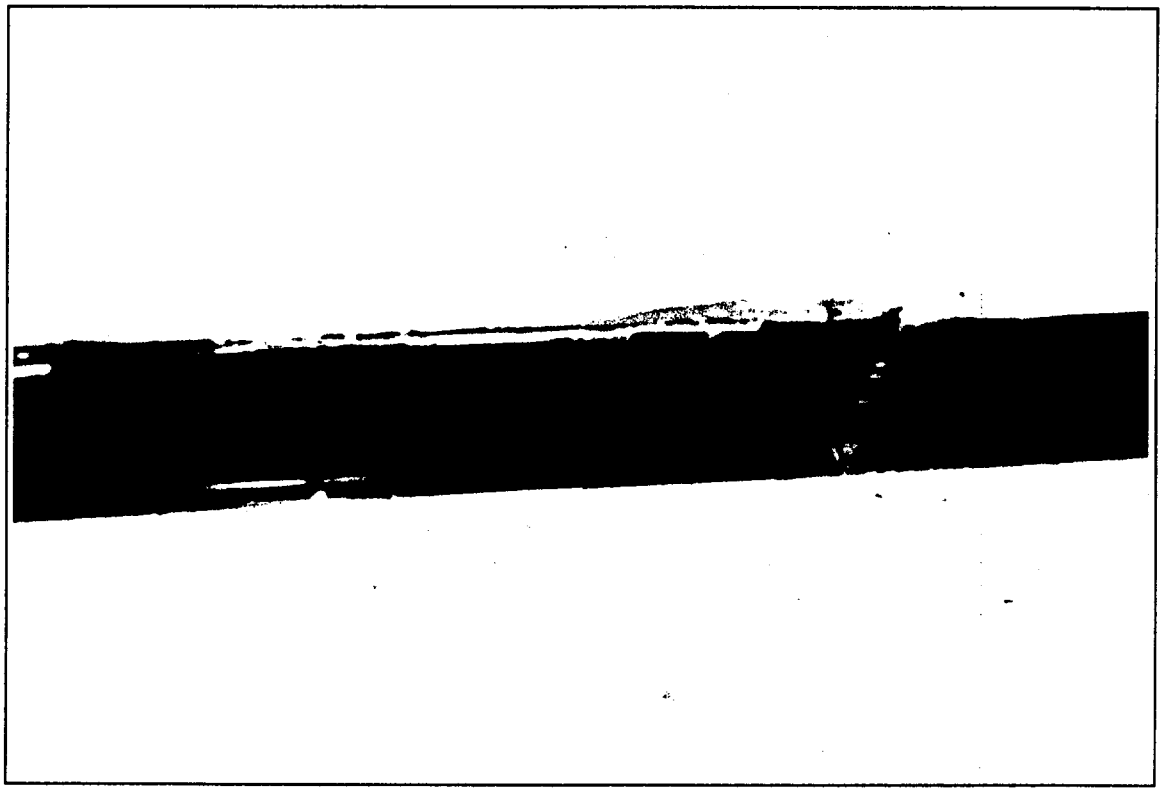
2'x4' Ceiling Tile - Plain Pattern

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 650 - PHOTO LOG



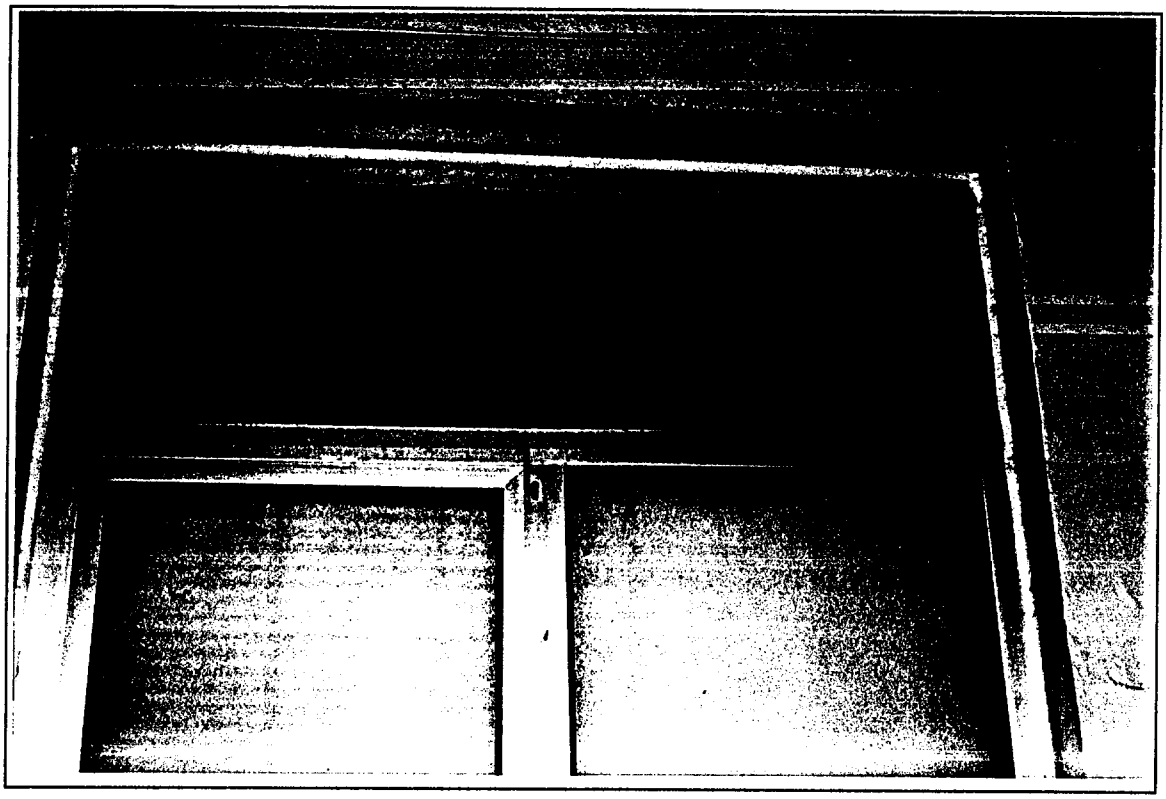
4" Cove Base and Adhesive - Black



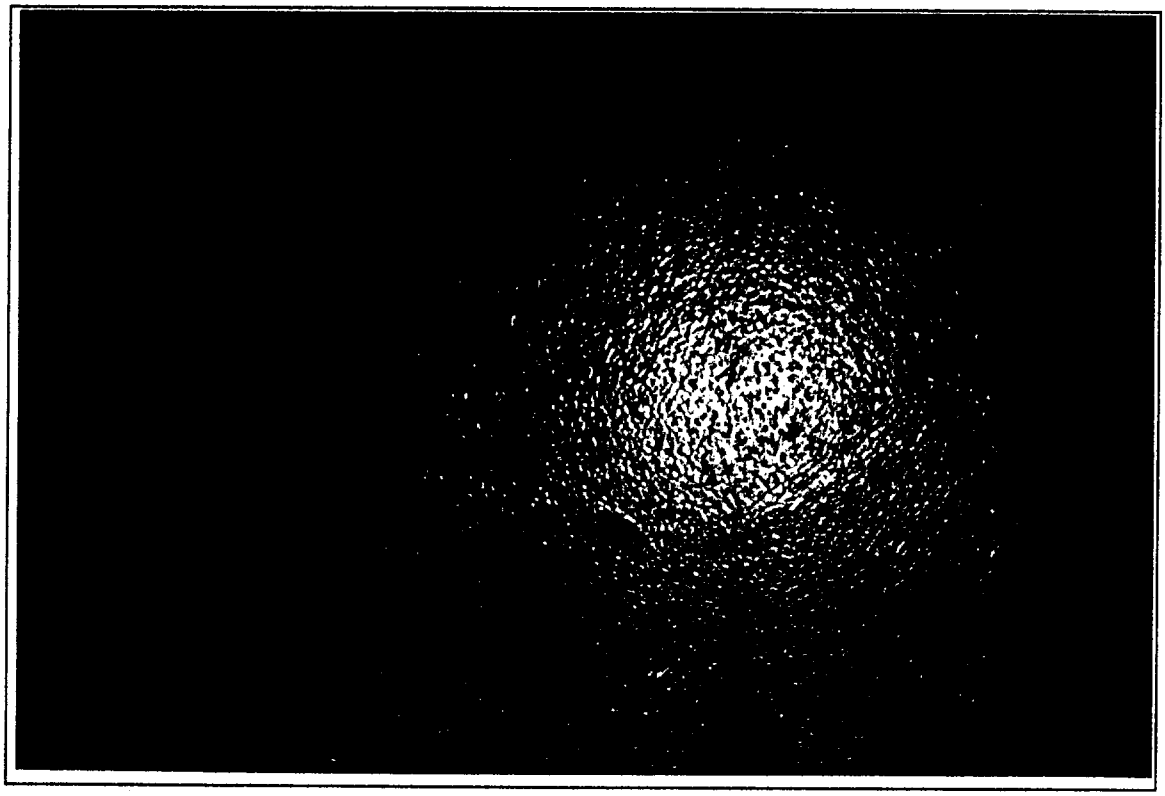
4" Cove Base and Adhesive - Dark Brown / Brown

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 650 - PHOTO LOG



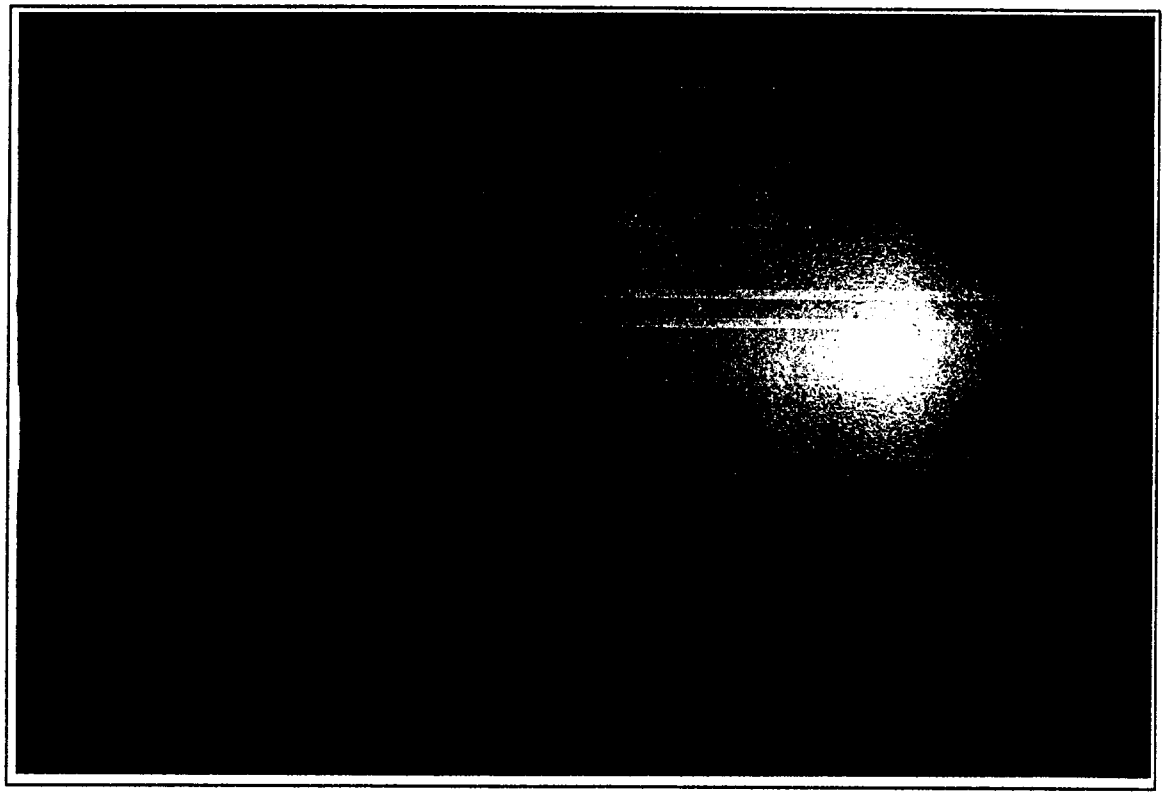
Cementitious Panels - Above Doors & Windows



Cementitious Plaster - Hollow Plaster and Lathe System

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 650 - PHOTO LOG



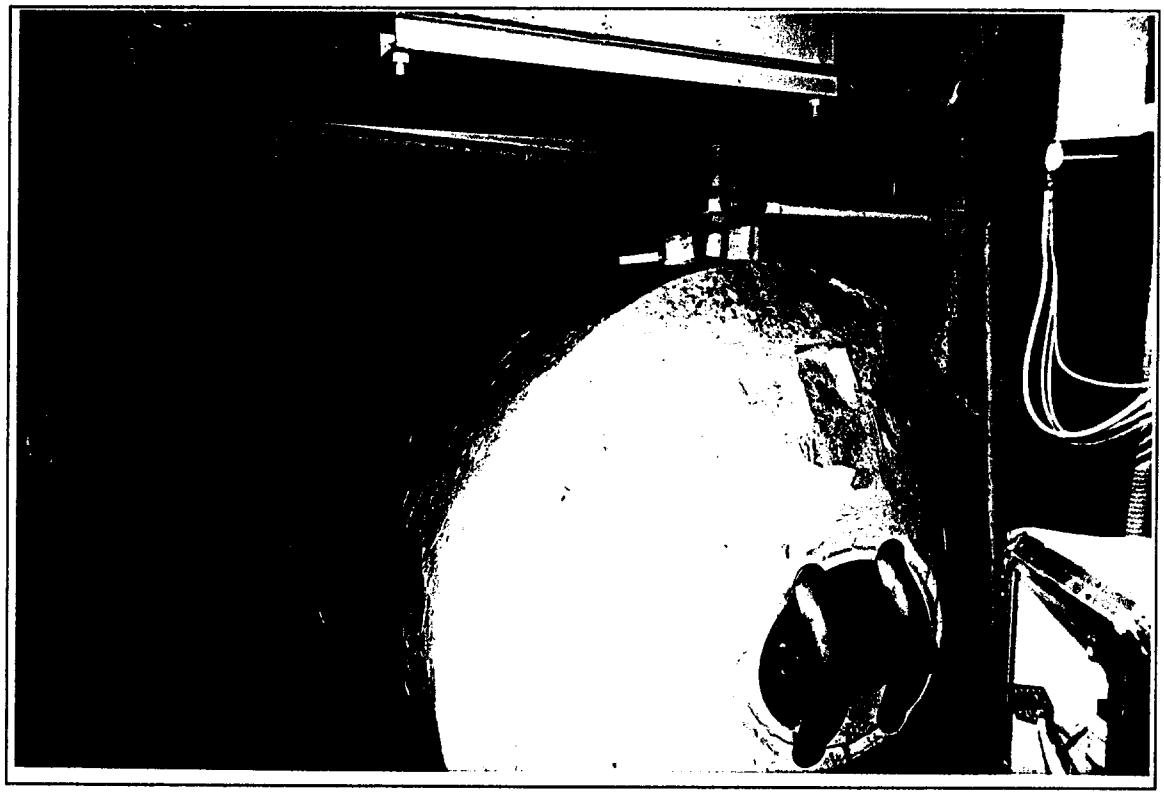
Cementitious Plaster - Troweled on CMU & Concrete Walls

Gypsum Wall Board with Joint Compound & Wall Insulation - Grey Fluffy Material

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 650 - PHOTO LOG

Hot Water Tank Insulation - Type I, Northeast Heater Room

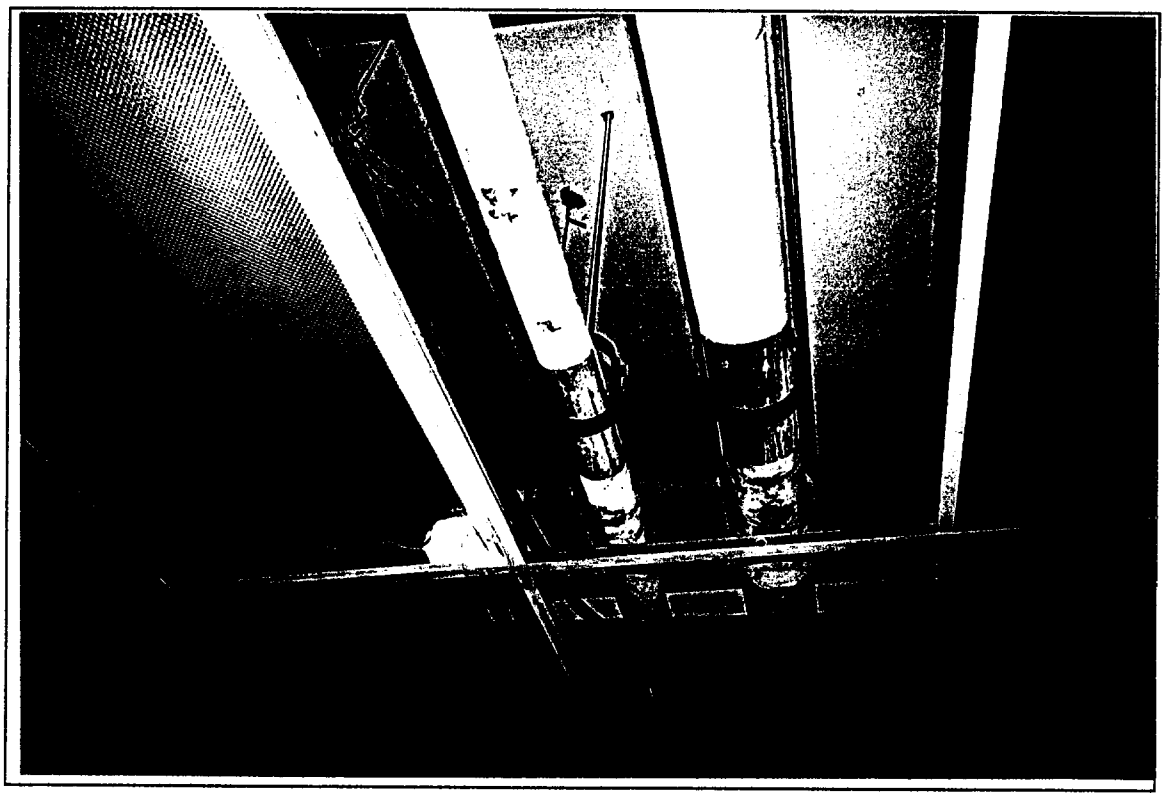


Hot Water Tank Insulation - Type II, Northwest Heater Room

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 650 - PHOTO LOG

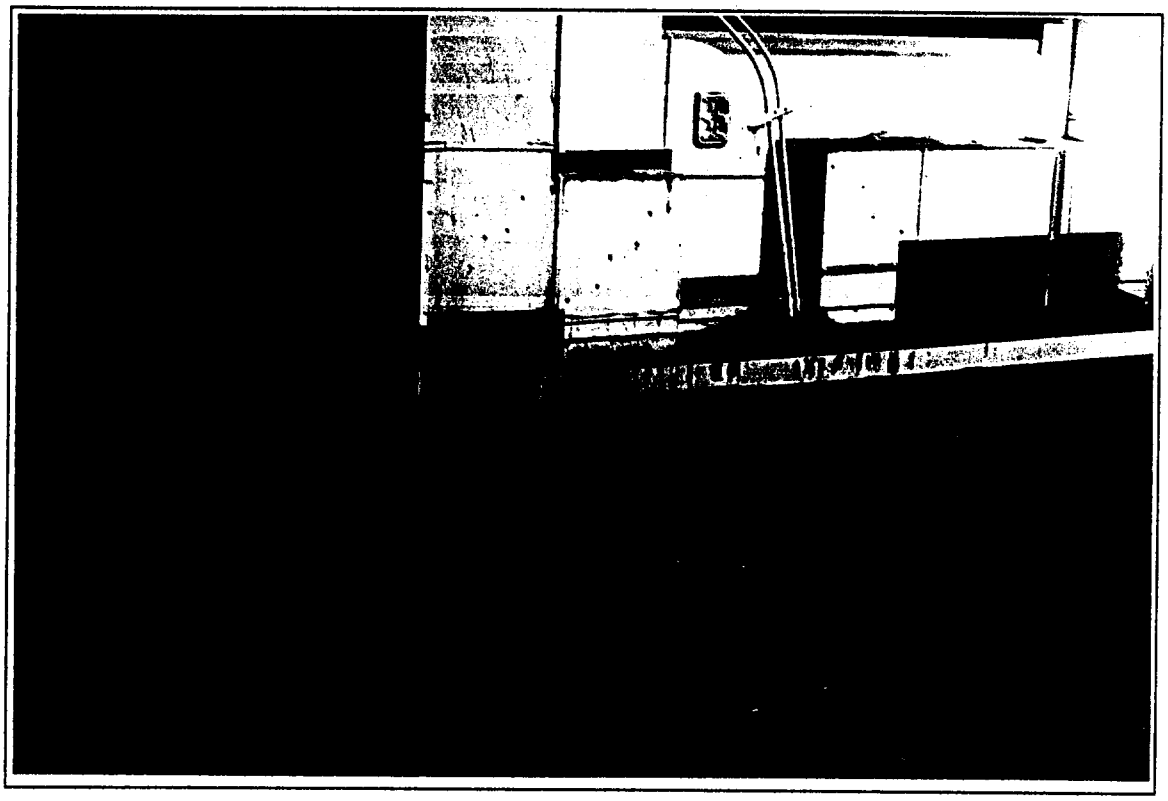
***Pipe Insulation - Residue <6 Linear Feet**



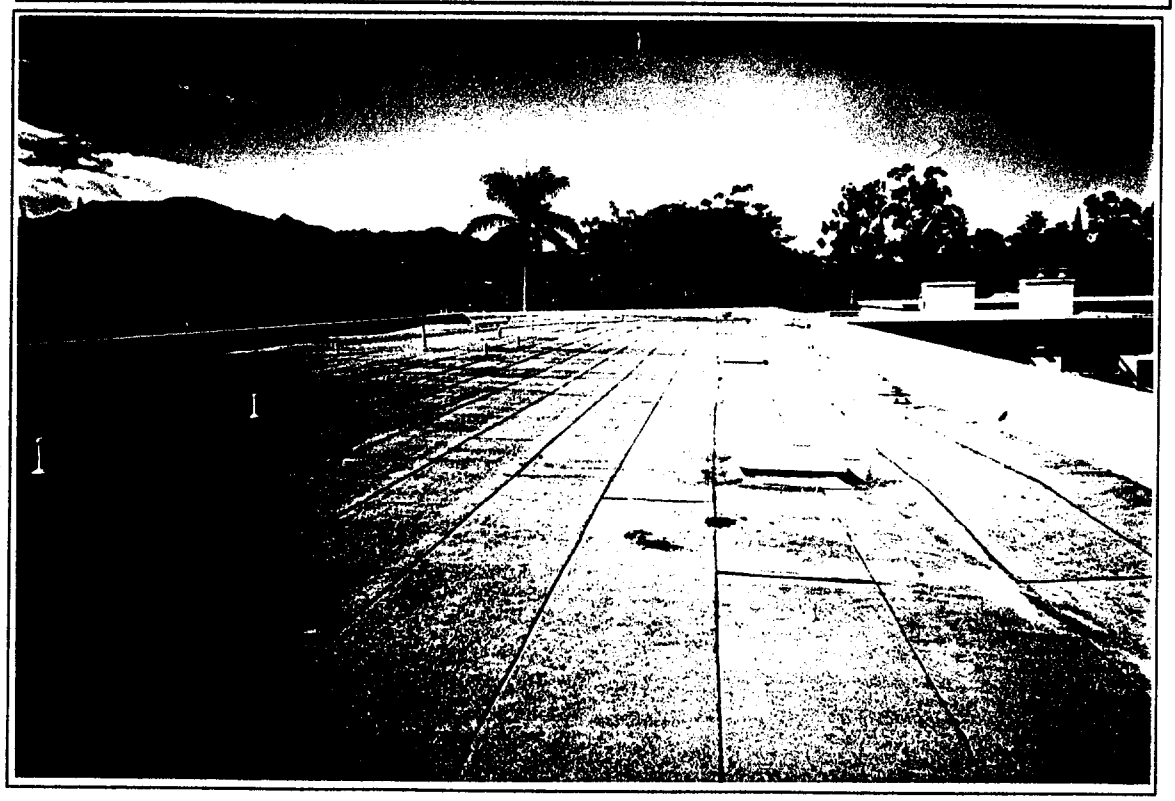
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 650 - PHOTO LOG



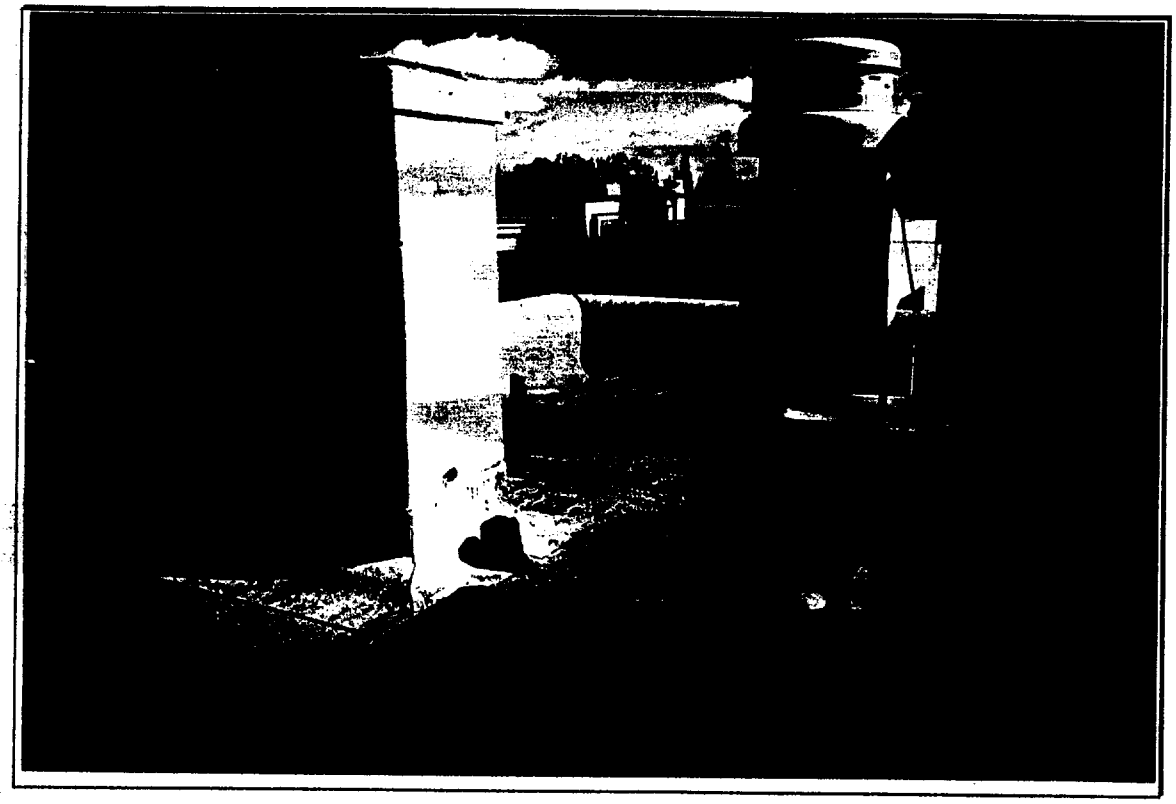
Composition Roofing Material and Flashing - Type II
Metal Duct Sealant - Grey / Black



Composition Roofing Material - Type I, **Composition Roof Flashing - Type I,** Flashing Material @ Roof Hatches, **Mastic/Sealant @Mounting Points**

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* prin

BUILDING 650 - PHOTO LOG



Beige Paint w/Asphaltic Undercoating (Silver Paint) - Main Roof
Mastic / Sealant @ Gas Vents and Air Ducts - Main Roof.

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* prin

Building 650

Chain of Custody Forms
and
Asbestos Bulk Analysis Forms

21-00-536

EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	1	2197 - 650 - 001	B	3	360	Gypsum Wall Board & Joint Compound - 3rd Floor
2	1	2197 - 650 - 002	B	3	333	" " " " " " - " "
3	1	2197 - 650 - 003	B	3	Hallway	" " " " " " - " "
4	1	2197 - 650 - 004	B	3	353	" " " " " " - " "
5	1	2197 - 650 - 005	B	3	301	" " " " " " - " "
6	1	2197 - 650 - 006	B	3	318	" " " " " " - " "
7	1	2197 - 650 - 007	B	3	Electrical Room by Rm 3216	" " " " " " - " "
8	2	2197 - 650 - 008	B	2	WEST HALLWAY	Gypsum Wall Board & Joint Compound - 2nd Floor
9	2	2197 - 650 - 009	B	2	250	" " " " " " - " "
10	2	2197 - 650 - 010	B	2	240	" " " " " " - " "

set 1

set 2

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3707							
2	3708							
3	3709							
4	3710							
5	3711							
6	3712							
7	3713							
8	3714							
9	3715							
10	3716							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

ACCOUNTABILITY RECORD

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 1-10-01 TIME: 1:35pm INITIALS: JP
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: [illegible]
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00536

EDWARD K. NODA AND ASSOCIATES

SHEET 2 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	2	2197 - 650 - 011	B	2	232	Gypsum Wall Board & Joint Compound - 2nd Floor
2	2	2197 - 650 - 012	B	2	226	" " " " " " - " "
3	2	2197 - 650 - 013	B	2	213	" " " " " " - " "
4	2	2197 - 650 - 014	B	2	205	" " " " " " - " "
5	3	2197 - 650 - 015	B	1	OFFICE	Gypsum Wall Board & Joint Compound - 1st Floor
6	3	2197 - 650 - 016	B	1	OFFICE	" " " " " " - " "
7	3	2197 - 650 - 017	B	1	OFFICE	" " " " " " - " "
8	3	2197 - 650 - 018	B	1	KITCHEN	" " " " " " - " "
9	3	2197 - 650 - 019	B	1	KITCHEN	" " " " " " - " "
10	4	2197 - 650 - 020	B	3	360	Wall Insulation - Grey - 3rd Floor

set 2
set 3
set 4

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-3717							
2	3718							
3	3719							
4	3720							
5	3721							
6	3722							
7	3723							
8	3724							
9	3725							
10	3726							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 1.19.01 TIME: 1:35 pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00536

EDWARD K. NODA AND ASSOCIATES

SHEET 3 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	4	2197 - 650 - 021	B	3	333	Wall Insulation - Grey Fluffy Material - 3rd Floor
2	4	2197 - 650 - 022	B	3	301	" " - " " " - " "
3	5	2197 - 650 - 023	B	2	WEST HALLWAY	Wall Insulation - Grey Fluffy Material - 2nd Floor
4	5	2197 - 650 - 024	B	2	240	" " - " " " - " "
5	5	2197 - 650 - 025	B	2	201	" " - " " " - " "
6	6	2197 - 650 - 026	B	1	OFFICE	Wall Insulation - Grey Fluffy Material - 1st Floor
7	6	2197 - 650 - 027	B	2	222	" " - " " " - " "
8	4	2197 - 650 - 028	B	3	322	" " - " " " - " "
9	7	2197 - 650 - 029	B	3	3rd W SIDE RESTROOM	Cementitious Plaster - Hollow Plaster + Lathe Wall Systems - 3rd Floor
10	7	2197 - 650 - 030	B	3	3rd W SIDE COMM. RESTROOM	" " - " " " " " " - "

set 4 / set 5 / set 6 / set 5 / set 4 / Set 7

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-3727							
2	3728							
3	3729							
4	3730							
5	3731							
6	3732							
7	3733							
8	3734							
9	3735							
10	3736							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 1/19/01 TIME: 1:35pm INITIALS: JP
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: NL
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

21-00536

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

SHEET 4 OF 22

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
set 7	1	7	2197 - 650 - 031	B	3	E. Side Restroom	Cementitious Plaster - Hollow Plaster & Lathe Wall System - 3rd Floor
set 8	2	8	2197 - 650 - 032	B	2	E Side Restroom	Cementitious Plaster - Hollow Plaster & Lathe Wall System - 2nd Floor
	3	8	2197 - 650 - 033	B	2	E. Side Comm. Restroom	" " - " " " " " " - " "
	4	8	2197 - 650 - 034	B	2	W. Side Restroom	" " - " " " " " " - " "
set 9	5	9	2197 - 650 - 035	B	1	W. Side Restroom	Cementitious Plaster - Hollow Plaster & Lathe Wall System - 1st Floor
set 10	6	10	2197 - 650 - 036	B	1	W. Side Storage	Cementitious Plaster - Trowelled over Cmu & Concrete walls
	7	10	2197 - 650 - 037	B	1	W. Side Janitor	" " - " " " " " "
	8	10	2197 - 650 - 038	B	1	Middle Storage	" " - " " " " " "
	9	10	2197 - 650 - 039	B	1	Kitchen W Side	" " - " " " " " "
	10	10	2197 - 650 - 040	B	1	Kitchen E Side	" " - " " " " " "

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3737							
2	3738							
3	3739							
4	3740							
5	3741							
6	3742							
7	3743							
8	3744							
9	3745							
10	3746							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 1/19/01 TIME: 9:35 pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00537

EDWARD K. NODA AND ASSOCIATES

SHEET 5 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
set 11 1	11	2197 - 650 - 041	B	1	Kitchen	Fibrous Gasket at Stove/Grill Vent
2	12	2197 - 650 - 042	B	2	216	12"x12" VFT - Beige w/olive streak - Mat. #1
3	12	2197 - 650 - 043	B	2	232	" " " - " " " " - " "
set 12 4	12	2197 - 650 - 044	B	2	247	" " " - " " " " - " "
5	12	2197 - 650 - 045	B	3	344	" " " - " " " " - " "
6	12	2197 - 650 - 046	B	3	333	" " " - " " " " - " "
7	13	2197 - 650 - 047	B	1	DINING AREA	12x12 VFT - Beige w/Grey Streak - Mat #2
8	13	2197 - 650 - 048	B	1	DINING AREA	" " " - " " " " - " "
set 13 9	13	2197 - 650 - 049	B	2	201	" " " - " " " " - " "
10	13	2197 - 650 - 050	B	2	259	" " " - " " " " - " "

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-3747							
2	3748							
3	3749							
4	3750							
5	3751							
6	3752							
7	3753							
8	3754							
9	3755							
10	3756							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

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D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 1/10/01 TIME: 11:35pm INITIALS: JP
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: [illegible]
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00537

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

SHEET 6 OF 22

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
set 13	1	13	2197 - 650 - 051	B	3	310	12x12 VFT - Beige w/Grey Streak - Mat. #2
	2	13	2197 - 650 - 052	B	3	301	" " " " - " " " " - " "
set 14	3	14	2197 - 650 - 053	B	1	STORAGE Room	12x12 VFT - Brown w/Black & Grey streaks - Mat. #6
	4	14	2197 - 650 - 054	B	1	STORAGE Room	" " " " - " " " " " " - " "
	5	15	2197 - 650 - 055	B	1	OFFICE AREA	Floor Tile Mastic - No VFT
set 15	6	15	2197 - 650 - 056	B	1	RECREATION RM.	" " " - " "
	7	15	2197 - 650 - 057	B	1	OFFICE AREA	" " " - " "
Set 16	8	16	2197 - 650 - 058	B	1	OFFICE AREA	12x12 VFT - Blue w/Grey Marbeling - mat # 8
Set 17	9	17	2197 - 650 - 059	B	1	STORAGE Room	9 x 9 VFT - GREEN - mat. #9
Set 18	10	18	2197 - 650 - 060	B	1	STORAGE Room	9x9 VFT - Black - mat. #10

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3757							
2	3758							
3	3759							
4	3760							
5	3761							
6	3762							
7	3763							
8	3764							
9	3765							
10	3766							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5-10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01-Feb-01 TIME: 1:34 pm INITIALS: JJ
ANALYZED BY: SE
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00537

EDWARD K. NODA AND ASSOCIATES

SHEET 7 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
set 19	1	19	2197 - 650 - 061	B	1	OFFICE AREA	12x12 VFT - Brown w/Light Brown Streak - Mat. # 11
	2	19	2197 - 650 - 062	B	1	STORAGE AREA	" " " " - " " " " " " "
set 20	3	20	2197 - 650 - 063	B	1	DINING AREA	12x12 VFT - Dark Brown w/Brown Streaks - Mat # 12
	4	20	2197 - 650 - 064	B	1	CLOSET	" " " " - " " " " " - " "
	5	20	2197 - 650 - 065	B	1	DINING AREA	" " " " - " " " " " - " "
set 21	6	21	2197 - 650 - 066	B	1	DINING AREA	VFT - Green - 2nd Layer - Mat # 13
	7	21	2197 - 650 - 067	B	1	DINING AREA	" - " - " " - " " "
set 22	8	22	2197 - 650 - 068	B	1	DINING AREA	12x12 VFT - Med. Brown w/Brown Streaks - Mat. # 14
	9	22	2197 - 650 - 069	B	1	DINING AREA	" " " " - " " " " " - " "
set 23	10	23	2197 - 650 - 070	B	2	205	VFT - Grey w/White streak - 2nd Layer - Mat. # 15

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-3767							
2	3768							
3	3769							
4	3770							
5	3771							
6	3772							
7	3773							
8	3774							
9	3775							
10	3776							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
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SD/T = SURFACE DUST - TAPE SAMPLE
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SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01/19/01 TIME: 1:35pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00537

EDWARD K. NODA AND ASSOCIATES

SHEET 8 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	24	2197 - 650 - 071	B	1	HALLWAY, BACK DAYROOM	~~Black~~ Cove Base & Adhesive - Black - 4"
2	24	2197 - 650 - 072	B	2	256	" " " " - " "
3	24	2197 - 650 - 073	B	2	HALLWAY, EAST SIDE	" " " " - " "
4	24	2197 - 650 - 074	B	3	HALLWAY, WEST SIDE	" " " " - " "
5	24	2197 - 650 - 075	B	3	311	" " " " - " "
6	25	2197 - 650 - 076	B	1	STORAGE	Cove Base & Adhesive - Dark Brown/Brown - 4"
7	25	2197 - 650 - 077	B	2	236	" " " " - " " " " - "
8	25	2197 - 650 - 078	B	2	213	" " " " - " " " - "
9	25	2197 - 650 - 079	B	3	337	" " " " - " " " - "
10	25	2197 - 650 - 080	B	3	310	" " " " - " " " - "

set 24

set 25

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3777							
2	3778							
3	3779							
4	3780							
5	3781							
6	3782							
7	3783							
8	3784							
9	3785							
10	3786							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

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SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 1-19-01 TIME: 1:35pm INITIALS: JP
ANALYZED BY: SZ
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00538

EDWARD K. NODA AND ASSOCIATES

SHEET 9 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
set 26	1	26	2197 - 650 - 081	B	1	dining	2'x4' Ceiling Tile - Fissure w/Holes Pattern - Type III
	2	26	2197 - 650 - 082	B	1	dining Area	" " " " - " " " " - " "
	3	26	2197 - 650 - 083	B	1	dining Area	" " " " - " " " " - " "
set 27	4	27	2197 - 650 - 084	B	1	Kitchen	2'x4' Ceiling Tile - Plain Pattern
	5	27	2197 - 650 - 085	B	1	Kitchen	" " " " " - " "
	6	27	2197 - 650 - 086	B	1	Kitchen	" " " " " - " "
set 28	7	28	2197 - 650 - 087	B	1	R.R.	2'x4' Ceiling Tile - Fissure w/Holes Pattern - Type II
	8	28	2197 - 650 - 088	B	2	hallway	" " " " - " " " " - " "
	9	28	2197 - 650 - 089	B	3	338	" " " " - " " " " - " "
set 29	10	29	2197 - 650 - 090	B	1	7	2'x4' Ceiling Tile - Fissure w/Holes Pattern - Type I

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3787							
2	3788							
3	3789							
4	3790							
5	3791							
6	3792							
7	3793							
8	3794							
9	3795							
10	3796							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/10/01 TIME: 11:45 INITIALS: JT
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00538

EDWARD K. NODA AND ASSOCIATES

SHEET 10 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	29	2197 - 650 - 091	B	2	301	2'x4' Ceiling Tile - Fissure w/Holes Pattern - Type I
2	29	2197 - 650 - 092	B	2	212	" " " " - " " " " - " "
3	29	2197 - 650 - 093	B	3	313	" " " " - " " " " - " "
4	29	2197 - 650 - 094	B	3	363	" " " " - " " " " - " "
5	30	2197 - 650 - 095	B	1	7	2'x4' Ceiling Tile - Hole Pattern - Type I
6	30	2197 - 650 - 096	B	2	211	" " " " - " " - " "
7	30	2197 - 650 - 097	B	3	309	" " " " - " " - " "
8	31	2197 - 650 - 098	B	2	R.R.	2'x4' Ceiling Tile - Hole Pattern - Type II
9	31	2197 - 650 - 099	B	3	R.R.	" " " " " - " " " "
10	31	2197 - 650 - 100	B	3	R.R.	" " " " " - " " " "

set 29
set 30
set 31

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3797							
2	3798							
3	3799							
4	3800							
5	3801							
6	3802							
7	3803							
8	3804							
9	3805							
10	3806							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/10/01 TIME: 1:35 INITIALS:
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00538

EDWARD K. NODA AND ASSOCIATES

SHEET 11 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
	1	32	2197 - 650 - 101	B	2	R.R.	2'x4' Ceiling Tile - Hole Pattern - Type III
set 32	2	32	2197 - 650 - 102	B	3	R.R.	" " " " " - " " - " "
	3	33	2197 - 650 - 103	B	2	HALLWAY	12"x12" VFT - Olive Green w/Grey Streak - Mat. #3
set 33	4	33	2197 - 650 - 104	B	2	HALLWAY	" " " - " " " " " - " "
	5	33	2197 - 650 - 105	B	3	HALLWAY	" " " - " " " " " - " "
	6	34	2197 - 650 - 106	B	3	HALLWAY	12"x12" VFT - Blue w/ white Streak - Mat. #4
set 34	7	34	2197 - 650 - 107	B	3	HALLWAY	" " " - " " " " " - " "
	8	35	2197 - 650 - 108	B	2	HALLWAY	12x12 VFT - Grey w/ Blue & White Streaks - Mat #5
set 35	9	35	2197 - 650 - 109	B	2	HALLWAY	" " " - " " " " " - " "
36	10	36	2197 - 650 - 110	B	2	250	Cementitious Panel - Above Doors & Windows

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3807							
2	3808							
3	3809							
4	3810							
5	3811							
6	3812							
7	3813							
8	3814							
9	3815							
10	3816							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

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B = BULK MATERIAL
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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/10/01 TIME: 1:35pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00538

EDWARD K. NODA AND ASSOCIATES

SHEET 12 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	37	2197 - 650 - 111	B	Roof	Main-Upper	Composition Roof Flashing - Type 1 - Main Roof
2	37	2197 - 650 - 112	B	Roof	Main-Upper	
3	37	2197 - 650 - 113	B	Roof	Main-Upper	
4	37	2197 - 650 - 114	B	Roof	Main-Upper	
5	37	2197 - 650 - 115	B	Roof	Main-Upper	
6	38	2197 - 650 - 116	B	Roof	Main-Upper	Composition Roofing Material - Type 1 - Main Roof
7	38	2197 - 650 - 117	B	Roof	Main-Upper	
8	38	2197 - 650 - 118	B	Roof	Main-Upper	
9	38	2197 - 650 - 119	B	Roof	Main-Upper	
10	38	2197 - 650 - 120	B	Roof	Main-Upper	

37

38

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3817							
2	3818							
3	3819							
4	3820							
5	3821							
6	3822							
7	3823							
8	3824							
9	3825							
10	3826							

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ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01-19-01 TIME: 1:45 pm INITIALS: JP
ANALYZED BY: [signature]
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00538

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
38	1 38	2197 - 650 - 121	B	Roof	Main-Upper	Composition Roofing Material - Type I - Main Roof
	2 38	2197 - 650 - 122	B	Roof	Main-Upper	↓ ↓ ↓ - ↓ ↓ - ↓ ↓
39	3 39	2197 - 650 - 123	B	Roof	Main-Upper	Beige Paint w/Asphaltic Under Coating - Main Roof
	4 39	2197 - 650 - 124	B	Roof	Main-Upper	↓ ↓ ↓ ↓ ↓ ↓ - ↓ ↓
40	5 40	2197 - 650 - 125	B	Roof	Main-Upper	Mastic/Sealant at Gas Vents and Air Ducts - Main Roof
	6 40	2197 - 650 - 126	B	Roof	Main-Upper	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ - ↓ ↓
	7 40	2197 - 650 - 127	B	Roof	Main-Upper	
41	8 41	2197 - 650 - 128	B	Roof	Main-Upper	Mastic/Sealant at Mounting Points - Main Roof
	9 41	2197 - 650 - 129	B	Roof	Main-Upper	↓ ↓ ↓ ↓ ↓ - ↓ ↓
	10 41	2197 - 650 - 130	B	Roof	Main-Upper	

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3827							
2	3828							
3	3829							
4	3830							
5	3831							
6	3832							
7	3833							
8	3834							
9	3835							
10	3836							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

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SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 1/10/01 TIME: 1:35pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 1/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00539

EDWARD K. NODA AND ASSOCIATES

SHEET 14 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	42	2197 - 650 - 131	B	Roof	Main-Upper	Patching Material at Roof Drains - Main Roof
2	42	2197 - 650 - 132	B	Roof	Main-Upper	↓ ↓ ↓ ↓ ↓ - ↓ ↓
3	42	2197 - 650 - 133	B	Roof	Main-Upper	↓ ↓ ↓ ↓ ↓ - ↓ ↓
4	43	2197 - 650 - 134	B	Roof	Main-Upper	HVAC Vibration Cloth - Black - Main Roof
5	44	2197 - 650 - 135	B	Roof	Main-Upper	Flashing Material at Roof Hatches - Main Roof
6	44	2197 - 650 - 136	B	Roof	Main-Upper	↓ ↓ ↓ ↓ ↓ - ↓ ↓
7	45	2197 - 650 - 137	B	Roof	Lower	Composition Roof Flashing - Type 2 - Lower Roof
8	45	2197 - 650 - 138	B	Roof	Lower	↓ ↓ ↓ - ↓ ↓ - ↓ ↓
9	46	2197 - 650 - 139	B	Roof	Lower	Composition Roofing Material - Type 2 - Lower Roof
10	46	2197 - 650 - 140	B	Roof	Lower	↓ ↓ ↓ - ↓ ↓ - ↓ ↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3837							
2	3838							
3	3839							
4	3840							
5	3841							
6	3842							
7	3843							
8	3844							
9	3845							
10	3846							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

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ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 2/1/01 TIME: 1:35pm INITIALS: JT
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00539

EDWARD K. NODA AND ASSOCIATES

SHEET 15 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	47	2197 - 650 - 141	B	Roof	Lower - East	Asphaltic Roof Flashing - Lower Roof - East Side
47 2	47	2197 - 650 - 142	B	Roof	Lower - East	↓
3	47	2197 - 650 - 143	B	Roof	Lower - East	↓
4	48	2197 - 650 - 144	B	Roof	Lower - East	Asphaltic Roofing Material - Lower Roof - East Side
48 5	48	2197 - 650 - 145	B	Roof	Lower - East	↓
6	48	2197 - 650 - 146	B	Roof	Lower - East	↓
49 7	49	2197 - 650 - 147	B	1	UPPER MAIN	DUCT SEALANT - GRAY
8	50	2197 - 650 - 148	B	1	NE MR	HOT WATER TANK INSULATION - TYPE I
50 9	50	2197 - 650 - 149	B	1	NE MR	↓
10	50	2197 - 650 - 150	B	1	NE MR	↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3847							
2	3848							
3	3849							
4	3850							
5	3851							
6	3852							
7	3853							
8	3854							
9	3855							
10	3856							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

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ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 1/10/01 TIME: 1:35pm INITIALS: JP
ANALYZED BY: SR
LAB Q.C. APPROVAL: NL
DATE: 1/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00539

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	51	2197 - 650 - 151	B	1	NW MR	HOT WATER TANK INSULATION TYPE II
2	51	2197 - 650 - 152	B	1	NW MR	↓
3	51	2197 - 650 - 153	B	1	NW MR	↓
4	52	2197 - 650 - 154	B	1	NE MR	FIBERGLASS PIPE INSULATION - JOINT ADHESIVE/MASTIC
5	52	2197 - 650 - 155	B	↓	↓	↓
6	52	2197 - 650 - 156	B	↓	↓	↓
7	52	2197 - 650 - 157	B	↓	↓	↓
8	52	2197 - 650 - 158	B	↓	↓	↓
9	52	2197 - 650 - 159	B	↓	↓	↓
10	52	2197 - 650 - 160	B	↓	NE MR	↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-3857							
2	3858							
3	3859							
4	3860							
5	3861							
6	3862							
7	3863							
8	3864							
9	3865							
10	3866							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

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ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01/19/01 TIME: 1:36 INITIALS: JP
ANALYZED BY: SZ
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00539

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	53	2197 - 650 - 161	B	1	NE MR	Fiberglass Pipe Insulation - Hangar
2	53	2197 - 650 - 162	B	1	NE R	↓ ↓ ↓ ↓
3	54	2197 - 650 - 163	B	1	NW MR	12" Fiberglass Pipe Insulation - Hangar
4	55	2197 - 650 - 164	B	1	NW MR	12" O.D Fiberglass Pipe Insulation - Joint Adhesive/Mastic
5	55	2197 - 650 - 165	B	1	NW MR	↓ ↓ ↓ ↓
6	55	2197 - 650 - 166	B	1	NW MR	Fiberglass Pipe Insulation - Hangar
7	56	2197 - 650 - 167	B	1	↓ ↓	↓ ↓ ↓ ↓
8	56	2197 - 650 - 168	B	1	↓ ↓	- Joint Adhesive/Mastic
9	57	2197 - 650 - 169	B	1	↓ ↓	↓ ↓ ↓ ↓ ↓ ↓
10	57	2197 - 650 - 170	B	1	NW MR	

53 54 55 55 56 57

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101- 3867							
2	3868							
3	3869							
4	3870							
5	3871							
6	3872							
7	3873							
8	3874							
9	3875							
10	3876							

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ACCOUNTABILITY RECORD

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REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 01/10/01 TIME: 11:35 am INITIALS: JP
ANALYZED BY: SB
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00539

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	57	2197 - 650 - 171	B	1	NW MR	FIBERGLASS PIPE INSULATION JOINT ADHESIVE/MASTIC
2	↓	2197 - 650 - 172	B	1	NW MR	↓ ↓ ↓ ↓ ↓ ↓
3	57	2197 - 650 - 173	B	1	NW MR	
4	58	2197 - 650 - 174	B	R	Roof	METAL DUCT SEALANT - BLACK
5	59	2197 - 650 - 175	B	1	NE MR	PIPE INSULATION - REDDUE <1%
6	60	2197 - 650 - 176	B	1	Serving Area	SADDLES
7	↓	2197 - 650 - 177	B	1	Entry way	↓
8		2197 - 650 - 178	B	1	hallway	
9		2197 - 650 - 179	B	1	Storage	
10	60	2197 - 650 - 180	B	1	OFFICE	SADDLES

57 58 59 60

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-3877							
2	3878							
3	3879							
4	3880							
5	3881							
6	3882							
7	3883							
8	3884							
9	3885							
10	3886							

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SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
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ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01-11-01 TIME: 11:35pm INITIALS: JP
ANALYZED BY: ST
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00540

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	61	2197 - 650 - 181	B	1	Kitchen	JOINT ADHESIVE/MASTIC
2	↓	2197 - 650 - 182	B	1	OFFICE	↓
3		2197 - 650 - 183	B	1	Entry WAY	↓
4		2197 - 650 - 184	B	1	OFFICE	↓
5		2197 - 650 - 185	B	1	Storage	↓
6	↓	2197 - 650 - 186	B	1	office	↓
7	61	2197 - 650 - 187	B	1	Storage	JOINT ADHESIVE/MASTIC
8	62	2197 - 650 - 188	B	2	R.R.	SADDLE
9	↓	2197 - 650 - 189	B	2	244	↓
10	↓	2197 - 650 - 190	B	2	DORM	SADDLE

61

62

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3887							
2	3888							
3	3889							
4	3890							
5	3891							
6	3892							
7	3893							
8	3894							
9	3895							
10	3896							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01/10/01 TIME: 1:45 INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 1/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00540

EDWARD K. NODA AND ASSOCIATES

SHEET 20 OF 22

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	62	2197 - 650 - 191	B	2	R.R.	SADDLE
2	62	2197 - 650 - 192	B	2	212	SADDLE
3	63	2197 - 650 - 193	B	2	262	JOINT ADHESIVE / MASTIC
4		2197 - 650 - 194	B	2	Dorm Rm	
5		2197 - 650 - 195	B	2	R.R.	
6		2197 - 650 - 196	B	2	235	
7		2197 - 650 - 197	B	2	R.R.	
8		2197 - 650 - 198	B	2	hallway	
9	63	2197 - 650 - 199	B	2	DORM	JOINT ADHESIVE / MASTIC
10	64	2197 - 650 - 200	B	3	Post Room 360	SADDLE

62 63 64

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-3897							
2	3898							
3	3899							
4	3900							
5	3901							
6	3902							
7	3903							
8	3904							
9	3905							
10	3906							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 01-19-01 TIME: 1:14 pm INITIALS: JF
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/1/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00540

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	64	2197 - 650 - 201	B	3	South east Room 342	SADDLE
2		2197 - 650 - 202	B	3	North east Room 333	
3		2197 - 650 - 203	B	3	South east Room 321	
4	64	2197 - 650 - 204	B	3	east 301	SADDLE
5	65	2197 - 650 - 205	B	3	east Room 360	JOINT ADHESIVE/MASTIC
6		2197 - 650 - 206	B	3	North east	
7		2197 - 650 - 207	B	3	South east Room 349	
8		2197 - 650 - 208	B	3	North east Room 333	
9		2197 - 650 - 209	B	3	South east Room 321	
10	65	2197 - 650 - 210	B	3	North east Room 312	JOINT ADHESIVE/MASTIC

64

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-3907							
2	3908							
3	2909							
4	3910							
5	3911							
6	3912							
7	3913							
8	3914							
9	3915							
10	3916							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01/10/01 TIME: 1:45 pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00540

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
65 1	65	2197 - 650 - 211	B	3	east Room 301	Joint Adhesive / mastic
2		2197 - 650 -	B			
3		2197 - 650 -	B			
4		2197 - 650 -	B			
5		2197 - 650 -	B			
6		2197 - 650 -	B			
7		2197 - 650 -	B			
8		2197 - 650 -	B			
9		2197 - 650 -	B			
10		2197 - 650 -	B			

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 3917							
2								
3								
4								
5								
6								
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01.10.01 TIME: 1:15p INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 1/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES (12) 21-01141

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

SHEET 1 OF 2

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1		~~2197 - 650 - 211~~	B			
2	1	2197 - 650 - 212	B	1	Exterior w.w.	Cementitious wall Plaster - Exterior walkway - 1st Fl.
3	↓	2197 - 650 - 213	B	1	↓	↓
4	↓	2197 - 650 - 214	B	1	↓	↓
5	2	2197 - 650 - 215	B	2	↓	Cementitious wall Plaster - Exterior walkway - 2nd Fl.
6	↓	2197 - 650 - 216	B	2	↓	↓
7	↓	2197 - 650 - 217	B	2	↓	↓
8	3	2197 - 650 - 218	B	3	↓	Cementitious wall Plaster - Exterior walkway - 3rd Fl.
9	↓	2197 - 650 - 219	B	3	↓	↓
10	↓	2197 - 650 - 220	B	3	↓	↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	~~2102~~							
2	2102 2055							
3	2056							
4	2057							
5	2058							
6	2059							
7	2060							
8	2061							
9	2062							
10	2063							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: ~~5-10 day turn around~~ Rush 48HR per Murat
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 2/8/01 TIME: 1:15PM INITIALS:
ANALYZED BY: 02/12/01
LAB Q.C. APPROVAL:
DATE: 2/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

21-01141

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

SHEET 2 OF 2

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	4	2197 - 650 - 221	B	1	OFFICE	HVAC Vent Sealant - Black
2	4	2197 - 650 - 222	B	1	OFFICE	↓ ↓ ↓ ↓
3	5	2197 - 650 - 223	B	1	OFFICE	Fiberglass Pipe Insulation - Run
4		2197 - 650 -	B			Nothing Follows
5		2197 - 650 -	B			
6		2197 - 650 -	B			
7		2197 - 650 -	B			
8		2197 - 650 -	B			
9		2197 - 650 -	B			
10		2197 - 650 -	B			

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2102 2064							
2	2065							
3	2066							
4								
5								
6								
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: ~~5-10 day~~ Rush turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 2/8/01 TIME: 1:15pm INITIALS: TG
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

(7) 21-01567

SHEET 1 OF 1

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 650, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1		2197 - 650 -	B			
2		2197 - 650 -	B			
3		2197 - 650 -	B			
4	01	2197 - 650 - 224	B	1	Exterior "B"	Wall Patch Compound - Cementitious / Asphaltic
5	02	2197 - 650 - 225	B	1	Exterior "B"	Wall Patch Compound - Cementitious - 10 Ft High Patch
6	03	2197 - 650 - 226	B	1	Exterior "B"	Wall Patch Compound - Cementitious - Pipe Hole Patch
7	03	2197 - 650 - 227	B	1	Exterior "B"	↓ ↓ ↓ ↓ ↓ ↓
8	04	2197 - 650 - 228	B	1	Exterior	Wall Plaster - Cementitious Exterior - Type I
9	05	2197 - 650 - 229	B	1	Exterior	Wall Plaster - Cementitious Exterior - Type II
10	05	2197 - 650 - 230	B	1	Exterior	↓ ↓ ↓ ↓ ↓ ↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1								
2								
3								
4	2102 5382							
5	5383							
6	5384							
7	5385							
8	5386							
9	5387							
10	5388							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: RUSH
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: David Napoleon & Douglas Tisdell
SIGNATURE: [illegible]
DATE: 2/01/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 2/ 21/01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 2/23/01 TIME: 9am INITIALS: TG
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: [illegible]
DATE: 2/28/01

APPROVAL SIGNATURE (PROJECT MANAGER):

Tel: 206.547.0100
Fax: 206.634.1936

NVL Laboratories, Inc.

4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013707 **Client Sample #: 2197-650-001**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: White chalky material with paper and paint

OTHER FIBROUS MATERIALS:
Cellulose 25%

NON-FIBROUS MATERIALS:
Binder & filler Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013708 **Client Sample #: 2197-650-002**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: White chalky material with paper and paint

OTHER FIBROUS MATERIALS:
Cellulose 25%

NON-FIBROUS MATERIALS:
Binder & filler Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013709 **Client Sample #: 2197-650-003**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: White chalky material with paper and paint

OTHER FIBROUS MATERIALS:
Cellulose 25%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Binder & filler Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013710 **Client Sample #: 2197-650-004**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013711 **Client Sample #: 2197-650-005**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013712 **Client Sample #: 2197-650-006**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Tel: 206.547.0100
Fax: 206.634.1936

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013713 **Client Sample #: 2197-650-007**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013714 **Client Sample #: 2197-650-008**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013715 **Client Sample #: 2197-650-009**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013716 **Client Sample #: 2197-650-010**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013717 **Client Sample #: 2197-650-011**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013718 **Client Sample #: 2197-650-012**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013719 **Client Sample #: 2197-650-013**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013720 **Client Sample #: 2197-650-014**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013721 **Client Sample #: 2197-650-015**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: White chalky material with paper and coating and paint

OTHER FIBROUS MATERIALS:
Cellulose 25%, Glass fibers 13%

NON-FIBROUS MATERIALS:
Binder & filler, Gypsum/binder, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013722 **Client Sample #: 2197-650-016**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013723 **Client Sample #: 2197-650-017**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013724 **Client Sample #: 2197-650-018**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 25%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013725 **Client Sample #: 2197-650-019**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: LAYER 1: White powdery material with paint, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 25%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

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Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013726 **Client Sample #: 2197-650-020**
Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013727 **Client Sample #: 2197-650-021**
Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Blue fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013728 **Client Sample #: 2197-650-022**
Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
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Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013729 **Client Sample #: 2197-650-023**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013730 **Client Sample #: 2197-650-024**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013731 **Client Sample #: 2197-650-025**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

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Address: 615 Pikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013732 **Client Sample #: 2197-650-026**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013733 **Client Sample #: 2197-650-027**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013734 **Client Sample #: 2197-650-028**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013735 **Client Sample #: 2197-650-029**
Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 1%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013736 **Client Sample #: 2197-650-030**
Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013737 **Client Sample #: 2197-650-031**
Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013738 **Client Sample #: 2197-650-032**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013739 **Client Sample #: 2197-650-033**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013740 **Client Sample #: 2197-650-034**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013741 **Client Sample #: 2197-650-035**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013742 **Client Sample #: 2197-650-036**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Tan sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013743 **Client Sample #: 2197-650-037**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Tan sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg.-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00536.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013744 **Client Sample #: 2197-650-038**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Tan sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013745 **Client Sample #: 2197-650-039**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Tan sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013746 **Client Sample #: 2197-650-040**

Sample Location: Quad F-Bldg.-650, Schofield Barracks, Hawaii
Description: Tan sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

Lab ID #: 21013747 **Client Sample #: 2197-650-041**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: White fibrous material with trace black asphaltic material

OTHER FIBROUS MATERIALS:
Glass fibers 75%

NON-FIBROUS MATERIALS:
Fine particles, Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013748 **Client Sample #: 2197-650-042**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: Chrysotile	2%
LAYER 2: Chrysotile	4%

Lab ID #: 21013753 **Client Sample #: 2197-650-047**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

Lab ID #: 21013754 **Client Sample #: 2197-650-048**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013755 **Client Sample #: 2197-650-049**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013756 **Client Sample #: 2197-650-050**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013757 **Client Sample #: 2197-650-051**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21013758 **Client Sample #: 2197-650-052**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Brown brittle mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

Lab ID #: 21013759 **Client Sample #: 2197-650-053**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013760 **Client Sample #: 2197-650-054**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013761 **Client Sample #: 2197-650-055**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	4%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Piikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

Lab ID #: 21013764 **Client Sample #: 2197-650-058**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Grey tile LAYER 2: Brown adhesive mastic and trace black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder, Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	<1%

Lab ID #: 21013765 **Client Sample #: 2197-650-059**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Green tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder, Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21013766 **Client Sample #: 2197-650-060**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Black tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder, Mastic/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21013767 **Client Sample #: 2197-650-061**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21013768 **Client Sample #: 2197-650-062**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Brown mastic with grey paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder, Paint

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

Lab ID #: 21013769 **Client Sample #: 2197-650-063**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Brown tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder, Paint

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	<1%

Lab ID #: 21013770 **Client Sample #: 2197-650-064**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Brown tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder, Paint

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	<1%

Lab ID #: 21013771 **Client Sample #: 2197-650-065**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Brown tile LAYER 2: Black/brown asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder, Paint, Asphalt/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013772 **Client Sample #: 2197-650-066**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Green tile with adhesive LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Adhesive/binder
LAYER 2: Asphalt/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21013773 **Client Sample #: 2197-650-067**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Green tile with adhesive LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Adhesive/binder
LAYER 2: Asphalt/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

Lab ID #: 21013774 **Client Sample #: 2197-650-068**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013775 **Client Sample #: 2197-650-069**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013776 **Client Sample #: 2197-650-070**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Grey tile LAYER 2: Brown fibrous material with lack asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 65%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder, Fine particles

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

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Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013777 **Client Sample #: 2197-650-071**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Black rubbery material LAYER 2: Brown/white mastic LAYER 3: Beige paint with White chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder
LAYER 3: Paint, Calcareous matrix

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013778 **Client Sample #: 2197-650-072**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Black rubbery material LAYER 2: Brown/white mastic LAYER 3: Beige paint with brown paper and trace white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 15%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder
LAYER 3: Paint, Calcareous matrix

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001
Nick Ly, Technical Director

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

Lab ID #: 21013779 Client Sample #: 2197-650-073

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Black rubbery material LAYER 2: White mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013780 Client Sample #: 2197-650-074

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Black rubbery material LAYER 2: Brown mastic LAYER 3: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder
LAYER 3: Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Tel: 206.547.0100
Fax: 206.634.1936

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

Lab ID #: 21013781 **Client Sample #: 2197-650-075**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Black rubbery material with surface paint LAYER 2: Brown mastic LAYER 3: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder, Paint
LAYER 2: Mastic/binder
LAYER 3: Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013782 **Client Sample #: 2197-650-076**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: White mastic LAYER 3:Brown paper with white chalky material and paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 35%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder
LAYER 3: Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

Lab ID #: 21013783 **Client Sample #: 2197-650-077**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material with surface paint LAYER 2: Brown mastic LAYER 3: Beige paint with tan compacted powdery material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 2%
LAYER 3: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder
LAYER 3: Paint, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013784 **Client Sample #: 2197-650-078**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: Brown mastic LAYER 3: Brown fibrous material with paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder
LAYER 3: Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00537.00
Client Project #: 2197-01F
Number of samples: 34

Lab ID #: 21013785 **Client Sample #: 2197-650-079**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: Brown mastic with paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013786 **Client Sample #: 2197-650-080**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: Brown mastic with paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/31/2001
Reviewed by: Nick Ly Date: 01/31/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVL Laboratories, Inc.
11000 Lk City Way NE, Ste. A-100, Seattle, WA 98125
Tel: 206.361.1858 Fax: 206.365.6712

FAX COVER SHEET

To: Mr. William Harris

Company: Edward K. Noda and Associates

Fax number: 808.593.8551

Tel number:

Date: February 01, 2001

From: Steve Zhang

Total Pages: 7

DESCRIPTION OF DOCUMENT (S)

Results for NVL Batch #: 21- 00537.00

COMMENTS

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NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013787 **Client Sample #: 2197-650-081**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with paint

OTHER FIBROUS MATERIALS:
Cellulose 4%, Glass fibers 75%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013788 **Client Sample #: 2197-650-082**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with paint

OTHER FIBROUS MATERIALS:
Cellulose 4%, Glass fibers 75%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013789 **Client Sample #: 2197-650-083**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with paint

OTHER FIBROUS MATERIALS:
Cellulose 4%, Glass fibers 75%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013790 **Client Sample #: 2197-650-084**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: White plastic material, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 25%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013791 **Client Sample #: 2197-650-085**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: White plastic material, LAYER 2: White chalky material with paper

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 25%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013792 **Client Sample #: 2197-650-086**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: White chalky material with paper

OTHER FIBROUS MATERIALS:
Cellulose 25%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Binder & filler, Gypsum/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013793 **Client Sample #: 2197-650-087**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013794 **Client Sample #: 2197-650-088**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013795 **Client Sample #: 2197-650-089**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013796 **Client Sample #: 2197-650-090**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013797 **Client Sample #: 2197-650-091**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013798 **Client Sample #: 2197-650-092**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013799 **Client Sample #: 2197-650-093**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013800 **Client Sample #: 2197-650-094**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013801 **Client Sample #: 2197-650-095**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013802 **Client Sample #: 2197-650-096**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013803 **Client Sample #: 2197-650-097**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 70%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013804 **Client Sample #: 2197-650-098**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 4%, Glass fibers 70%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013805 **Client Sample #: 2197-650-099**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 4%, Glass fibers 70%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013806 **Client Sample #: 2197-650-100**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 4%, Glass fibers 70%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013807 **Client Sample #: 2197-650-101**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 4%, Glass fibers 70%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013808 **Client Sample #: 2197-650-102**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray fibrous material with white coating

OTHER FIBROUS MATERIALS:
Cellulose 4%, Glass fibers 70%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013809 **Client Sample #: 2197-650-103**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Oliver vinyl tile with white/gray streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	4%

Lab ID #: 21013812 **Client Sample #: 2197-650-106**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Blue vinyl tile with white streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	4%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013813 **Client Sample #: 2197-650-107**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Blue vinyl tile with white streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	4%

Lab ID #: 21013814 **Client Sample #: 2197-650-108**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Gray vinyl tile with white streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21013815 **Client Sample #: 2197-650-109**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Gray vinyl tile with white streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21013816 **Client Sample #: 2197-650-110**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Gray cementitious material with paint

OTHER FIBROUS MATERIALS:
Cellulose 7%

NON-FIBROUS MATERIALS:
Cement/binder, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	35%

Lab ID #: 21013817 **Client Sample #: 2197-650-111**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Black asphaltic built-up material

OTHER FIBROUS MATERIALS:
Cellulose 7%, Glass fibers 13%, Synthetic fiber 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Sand/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	5%

Lab ID #: 21013822 **Client Sample #: 2197-650-116**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Multi-layer black asphaltic material, LAYER 2: Tan/brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 20%, Glass fibers 17%
LAYER 2: Glass fibers 20%, Cellulose 60%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

(Lab ID#: 21013822 Client Sample #: 2197-650-116 results continued from previous page)

LAYER 2: *None Detected ND

Lab ID #: 21013823 Client Sample #: 2197-650-117

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Multi-layer black asphaltic material, LAYER 2: Tan/brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 20%, Glass fibers 17%
LAYER 2: Glass fibers 20%, Cellulose 60%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013824 Client Sample #: 2197-650-118

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Multi-layer black asphaltic material, LAYER 2: Tan/brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 20%, Glass fibers 17%
LAYER 2: Glass fibers 20%, Cellulose 60%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013825 **Client Sample #: 2197-650-119**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Multi-layer black asphaltic material, LAYER 2: Tan/brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 20%, Glass fibers 17%
LAYER 2: Glass fibers 20%, Cellulose 60%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013826 **Client Sample #: 2197-650-120**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Multi-layer black asphaltic material, LAYER 2: Tan/brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 20%, Glass fibers 17%
LAYER 2: Glass fibers 20%, Cellulose 60%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013827 **Client Sample #: 2197-650-121**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Multi-layer black asphaltic material, LAYER 2: Tan/brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 20%, Glass fibers 17%
LAYER 2: Glass fibers 20%, Cellulose 60%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013828 **Client Sample #: 2197-650-122**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Multi-layer black asphaltic material, LAYER 2: Tan/brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 20%, Glass fibers 17%
LAYER 2: Glass fibers 20%, Cellulose 60%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013829 **Client Sample #: 2197-650-123**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Silver paint with black asphaltic material and tan coating

OTHER FIBROUS MATERIALS:
Cellulose 5%

NON-FIBROUS MATERIALS:
Asphalt/binder, Paint, Binder & filler

ASBESTOS TYPE:	*PERCENT*
Chrysotile	4%

Sample comments: Asbestos found in silver paint

Lab ID #: 21013830 **Client Sample #: 2197-650-124**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Silver paint with black asphaltic material and tan coating

OTHER FIBROUS MATERIALS:
Cellulose 5%

NON-FIBROUS MATERIALS:
Asphalt/binder, Paint, Binder & filler

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
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Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00538.00
Client Project #: 2197-01F
Number of samples: 40

ASBESTOS TYPE:	*PERCENT*
Chrysotile	4%

Sample comments: Asbestos found in silver paint

Lab ID #: 21013831 **Client Sample #: 2197-650-125**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 7%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	5%

Lab ID #: 21013834 **Client Sample #: 2197-650-128**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 7%

NON-FIBROUS MATERIALS:
Asphalt/binder, Sand

ASBESTOS TYPE:	*PERCENT*
Chrysotile	4%

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013837 **Client Sample #: 2197-650-131**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013838 **Client Sample #: 2197-650-132**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013839 **Client Sample #: 2197-650-133**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013840 **Client Sample #: 2197-650-134**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black rubbery material with white woven fiber

OTHER FIBROUS MATERIALS:
Glass fibers 55%

NON-FIBROUS MATERIALS:
Rubber/binder, Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013841 **Client Sample #: 2197-650-135**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013842 **Client Sample #: 2197-650-136**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Black rubbery material with white woven fiber LAYER 2: Grey fibrous and porous material

OTHER FIBROUS MATERIALS:
LAYER 1: Glass fibers 15%, Cellulose 15%
LAYER 2: Cellulose 55%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder, Fine particles
LAYER 2: Fine particles, Perlite

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013843 **Client Sample #: 2197-650-137**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013844 **Client Sample #: 2197-650-138**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013845 **Client Sample #: 2197-650-139**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013846 **Client Sample #: 2197-650-140**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013847 **Client Sample #: 2197-650-141**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 35%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013848 **Client Sample #: 2197-650-142**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 35%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013849 **Client Sample #: 2197-650-143**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 35%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013850 **Client Sample #: 2197-650-144**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Black asphaltic material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 55%
LAYER 2: Cellulose 5%, Glass fibers 45%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Perlite
LAYER 2: Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013851 **Client Sample #: 2197-650-145**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Black asphaltic material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 55%
LAYER 2: Cellulose 5%, Glass fibers 45%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Perlite
LAYER 2: Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013852 **Client Sample #: 2197-650-146**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Black asphaltic material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 55%
LAYER 2: Cellulose 5%, Glass fibers 45%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Perlite
LAYER 2: Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013853 **Client Sample #: 2197-650-147**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Grey elastic material with paint and metal chips

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Calcareous matrix, Metal, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013854 **Client Sample #: 2197-650-148**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White sofr material with metal foil, mastic and white woven fiber LAYER 2: Yelow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%,
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Metal foil, Mastic, FIne particles
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

(Lab ID#: 21013854 Client Sample #: 2197-650-148 results continued from previous page)

LAYER 2: *None Detected ND

Lab ID #: 21013855 Client Sample #: 2197-650-149

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White sofr material with metal foil, mastic and white woven fiber LAYER 2: Yelow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%,
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Metal foil, Mastic, FIne particles
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013856 Client Sample #: 2197-650-150

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White sofr material with metal foil, mastic and white woven fiber LAYER 2: Yelow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%,
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Metal foil, Mastic, FIne particles
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013857 **Client Sample #: 2197-650-151**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Yellow fibrous material with silver metal foil and mastic LAYER 2: White brittle material with surface paint LAYER 3: Grey powdery fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 15%
LAYER 2: Cellulose 3%
LAYER 3: Cellulose 15%, Glass fibers 45%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Mastic/binder, Metal foil
LAYER 2: Calcareous matrix, Paint
LAYER 3: Fine particles

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013858 **Client Sample #: 2197-650-152**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Yellow fibrous material with silver metal foil and mastic LAYER 2: White brittle material with surface paint LAYER 3: Grey powdery fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 15%
LAYER 2: Cellulose 3%
LAYER 3: Cellulose 15%, Glass fibers 45%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Mastic/binder, Metal foil
LAYER 2: Calcareous matrix, Paint
LAYER 3: Fine particles

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013859 **Client Sample #: 2197-650-153**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Yellow fibrous material with silver metal foil and mastic LAYER 2: White brittle material with surface paint LAYER 3: Grey powdery fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 15%
LAYER 2: Cellulose 3%
LAYER 3: Cellulose 15%, Glass fibers 45%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Mastic/binder, Metal foil
LAYER 2: Calcareous matrix, Paint
LAYER 3: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013860 **Client Sample #: 2197-650-154**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013861 **Client Sample #: 2197-650-155**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013862 **Client Sample #: 2197-650-156**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber, white vinyl and surface paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Vinyl/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013863 **Client Sample #: 2197-650-157**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013864 **Client Sample #: 2197-650-158**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013865 **Client Sample #: 2197-650-159**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013866 **Client Sample #: 2197-650-160**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013867 Client Sample #: 2197-650-161

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013868 Client Sample #: 2197-650-162

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013869 Client Sample #: 2197-650-163

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder
LAYER 2: Fine particles

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013870 **Client Sample #: 2197-650-164**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White soft material with white woven fiber, white fibrous material and silver metal foil LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Calcareous matrix
LAYER 2: Fine particles

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013871 **Client Sample #: 2197-650-165**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver metal foil with mastic, white woven fiber and grey plastic material LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Fine particles, Plastic/binder
LAYER 2: Fine particles

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Tel: 206.547.0100
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NVL Laboratories, Inc.

4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013872 **Client Sample #: 2197-650-166**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver metal foil with mastic, white woven fiber and black foamy material LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Synthetic foam
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013873 **Client Sample #: 2197-650-167**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: White twined fibers

OTHER FIBROUS MATERIALS:
Cellulose 15%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
Chrysotile	65%

Lab ID #: 21013874 **Client Sample #: 2197-650-168**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and mastic LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013875 **Client Sample #: 2197-650-169**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and mastic LAYER 2: Yellow fibrous material LAYER 3: Grey plastic with surface paint and fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 15%
LAYER 2: Glass fibers 75%
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder
LAYER 2: Fine particles
LAYER 3: Plastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013876 **Client Sample #: 2197-650-170**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and mastic and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013877 **Client Sample #: 2197-650-171**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Multi-layered white fibrous material with silver metal foil, mastic, white woven fiber LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013878 **Client Sample #: 2197-650-172**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013879 **Client Sample #: 2197-650-173**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil, mastic, white woven fiber and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 35%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013880 **Client Sample #: 2197-650-174**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Grey soft material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013881 **Client Sample #: 2197-650-175**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: Grey fibrous material with paint

OTHER FIBROUS MATERIALS:
Cellulose 25%, Glass fibers 15%

NON-FIBROUS MATERIALS:
Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	35%

Lab ID #: 21013882 **Client Sample #: 2197-650-176**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil LAYER 2: Grey brittle material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil
LAYER 2: Calcareous matrix

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

(Lab ID#: 21013882 Client Sample #: 2197-650-176 results continued from previous page)

LAYER 2: *None Detected ND

Lab ID #: 21013883 Client Sample #: 2197-650-177

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and mastic and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013884 Client Sample #: 2197-650-178

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and mastic and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00539.00
Client Project #: 2197-01F
Number of samples: 50

Lab ID #: 21013885 **Client Sample #: 2197-650-179**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and mastic and paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013886 **Client Sample #: 2197-650-180**

Sample Location: Quad F Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and mastic and surface soft material LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 25%, Glass fibers 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Mastic/binder, Paint
LAYER 2: Fine particles

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND

Sample comments: Asbestos found in surface soft material

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001
Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013887 **Client Sample #: 2197-650-181**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and white/tan fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013888 **Client Sample #: 2197-650-182**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and white/tan fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013889 **Client Sample #: 2197-650-183**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	*PERCENT*

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013890 **Client Sample #: 2197-650-184**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: White soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013891 **Client Sample #: 2197-650-185**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

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Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013892 **Client Sample #: 2197-650-186**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
AYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013893 **Client Sample #: 2197-650-187**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan coating with paint, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013894 **Client Sample #: 2197-650-188**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013895 **Client Sample #: 2197-650-189**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013896 **Client Sample #: 2197-650-190**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013897 **Client Sample #: 2197-650-191**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: White soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013898 **Client Sample #: 2197-650-192**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 13%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013899 **Client Sample #: 2197-650-193**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013900 **Client Sample #: 2197-650-194**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

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Address: 615 Pikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013901 **Client Sample #: 2197-650-195**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: White coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013902 **Client Sample #: 2197-650-196**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013903 **Client Sample #: 2197-650-197**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: White coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013904 **Client Sample #: 2197-650-198**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Orange paint, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Black brittle material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Cellulose 1%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler, Synthetic foam

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013905 **Client Sample #: 2197-650-199**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013906 **Client Sample #: 2197-650-200**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013907 **Client Sample #: 2197-650-201**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 15%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013908 **Client Sample #: 2197-650-202**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 15%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013909 **Client Sample #: 2197-650-203**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 14%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013910 Client Sample #: 2197-650-204

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 14%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013911 Client Sample #: 2197-650-205

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 14%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013912 Client Sample #: 2197-650-206

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 14%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013913 Client Sample #: 2197-650-207

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 14%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

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Address: 615 Pikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013914 **Client Sample #: 2197-650-208**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 14%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013915 **Client Sample #: 2197-650-209**

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 14%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

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Fax: 206.634.1936

Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-650, Schofield Barracks, Hawaii

NVL Batch Number: 21-00540.00
Client Project #: 2197-01F
Number of samples: 31

Lab ID #: 21013916 Client Sample #: 2197-650-210

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 14%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013917 Client Sample #: 2197-650-211

Sample Location: Quad F-Bldg-650, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 14%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/01/2001
Reviewed by: Nick Ly Date: 02/01/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: **Edward K. Noda and Associates**
Address: **615 Piikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F - Bldg - 650, Schofield Barracks, Hawaii**

NVL Batch Number: 21-01141.00
Client Project #: 2197-01F
Number of samples: 11

Lab ID #: 21022055 **Client Sample #: 2197-650-212**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21022056 **Client Sample #: 2197-650-213**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	2%

Sample comments: Sample has slightly different texture from those in the group

---

Lab ID #: 21022057 **Client Sample #: 2197-650-214**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-01141.00
Client Project #: 2197-01F
Number of samples: 11

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21022058 **Client Sample #: 2197-650-215**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/brown paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21022059 **Client Sample #: 2197-650-216**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/green paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-01141.00
Client Project #: 2197-01F
Number of samples: 11

Lab ID #: 21022060 **Client Sample #: 2197-650-217**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21022061 **Client Sample #: 2197-650-218**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21022062 **Client Sample #: 2197-650-219**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-01141.00
Client Project #: 2197-01F
Number of samples: 11

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21022063 **Client Sample #: 2197-650-220**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21022064 **Client Sample #: 2197-650-221**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	8%

Lab ID #: 21022066 **Client Sample #: 2197-650-223**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and white soft material LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%, Glass fibers 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Fine particles, Metal foil
LAYER 2: Fine particles

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-01141.00
Client Project #: 2197-01F
Number of samples: 11

ASBESTOS TYPE:		PERCENT
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND

Sample comments: Asbestos found in soft material

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-01567.00
Client Project #: 2197-01F
Number of samples: 7

Lab ID #: 21025382 **Client Sample #: 2197-650-224**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: Grey brittle material with paint and sandy material

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

Sample comments: Asbestos found in brittle material

Lab ID #: 21025383 **Client Sample #: 2197-650-225**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint with tan/white powdery material LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint, Calcareous matrix
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: Chrysotile	2%
LAYER 2: *None Detected	ND

Sample comments: Asbestos found in powdery material

Lab ID #: 21025384 **Client Sample #: 2197-650-226**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Sands

ASBESTOS TYPE:	*PERCENT*

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/26/2001
Reviewed by: Nick Ly Date: 02/26/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-01567.00
Client Project #: 2197-01F
Number of samples: 7

*None Detected ND

Lab ID #: 21025385 **Client Sample #: 2197-650-227**
Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Sands

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21025386 **Client Sample #: 2197-650-228**
Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Sands

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21025387 **Client Sample #: 2197-650-229**
Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Sands

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/26/2001
Reviewed by: Nick Ly Date: 02/26/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
#102063

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 650, Schofield Barracks, Hawaii

NVL Batch Number: 21-01567.00
Client Project #: 2197-01F
Number of samples: 7

Lab ID #: 21025388 **Client Sample #: 2197-650-230**

Sample Location: Quad F - Bldg - 650, Schofield Barracks, Hawaii
Description: Sample not analyzed

OTHER FIBROUS MATERIALS:
Sample not analyzed

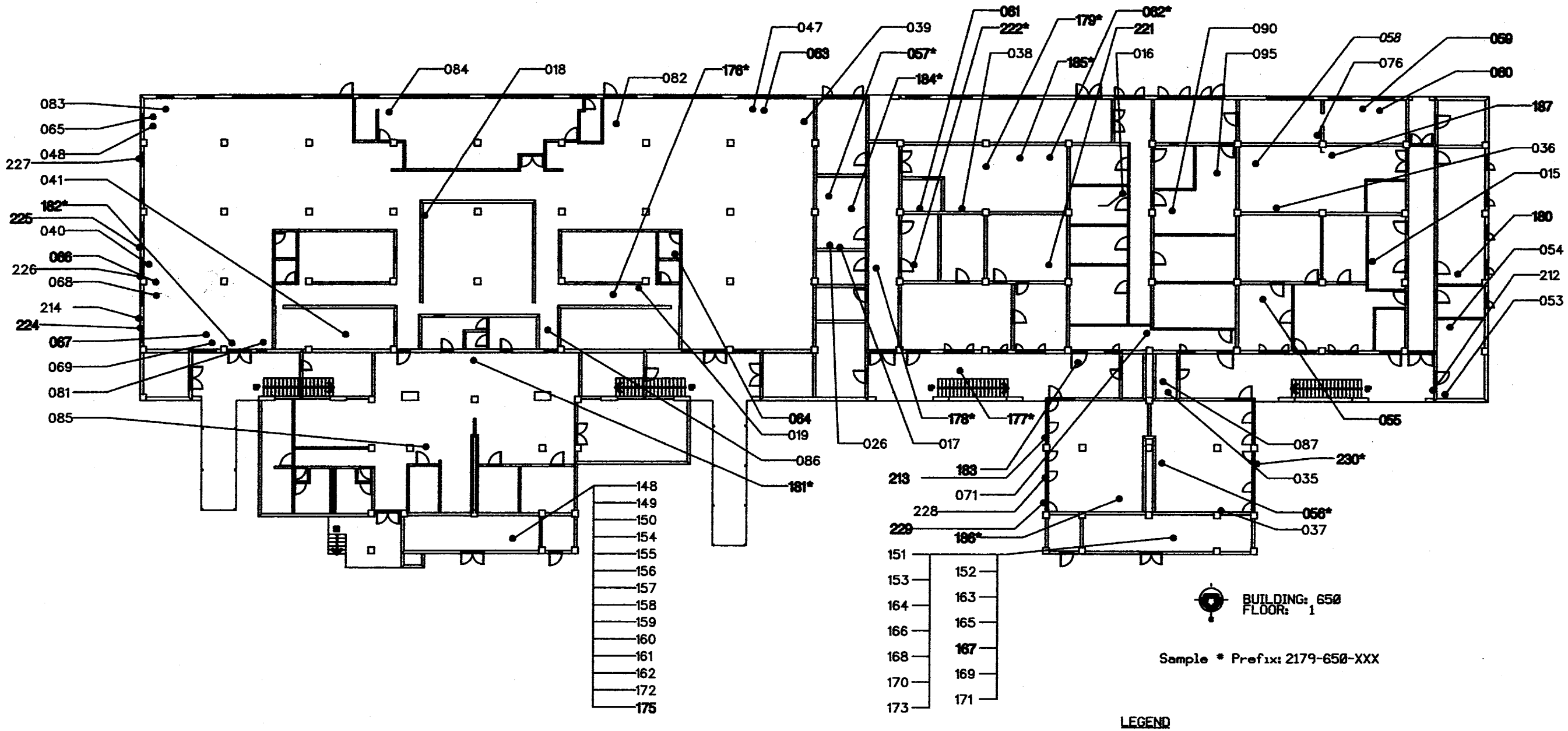
NON-FIBROUS MATERIALS:
Sample not analyzed

ASBESTOS TYPE:	*PERCENT*
Sample not analyzed	ND

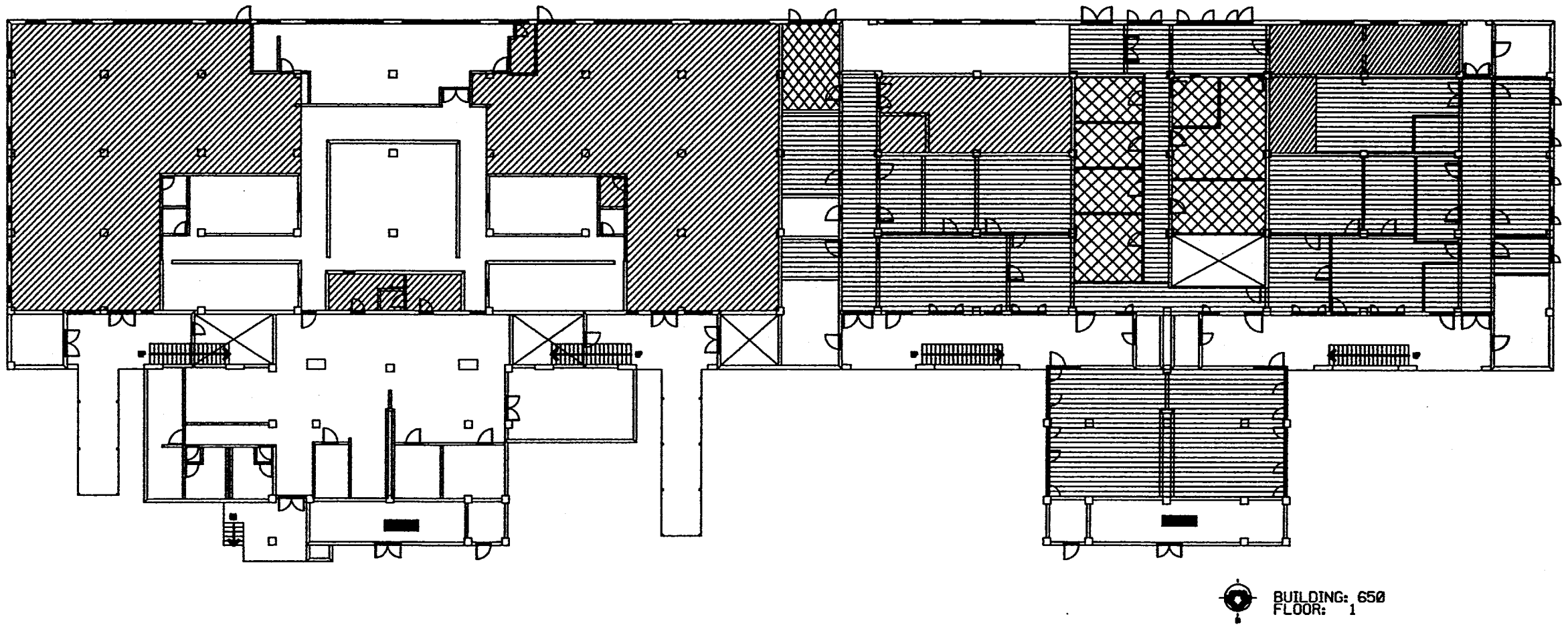
Sampled by: Client
Analyzed by: Steve Zhang Date: 02/26/2001
Reviewed by: Nick Ly Date: 02/26/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.



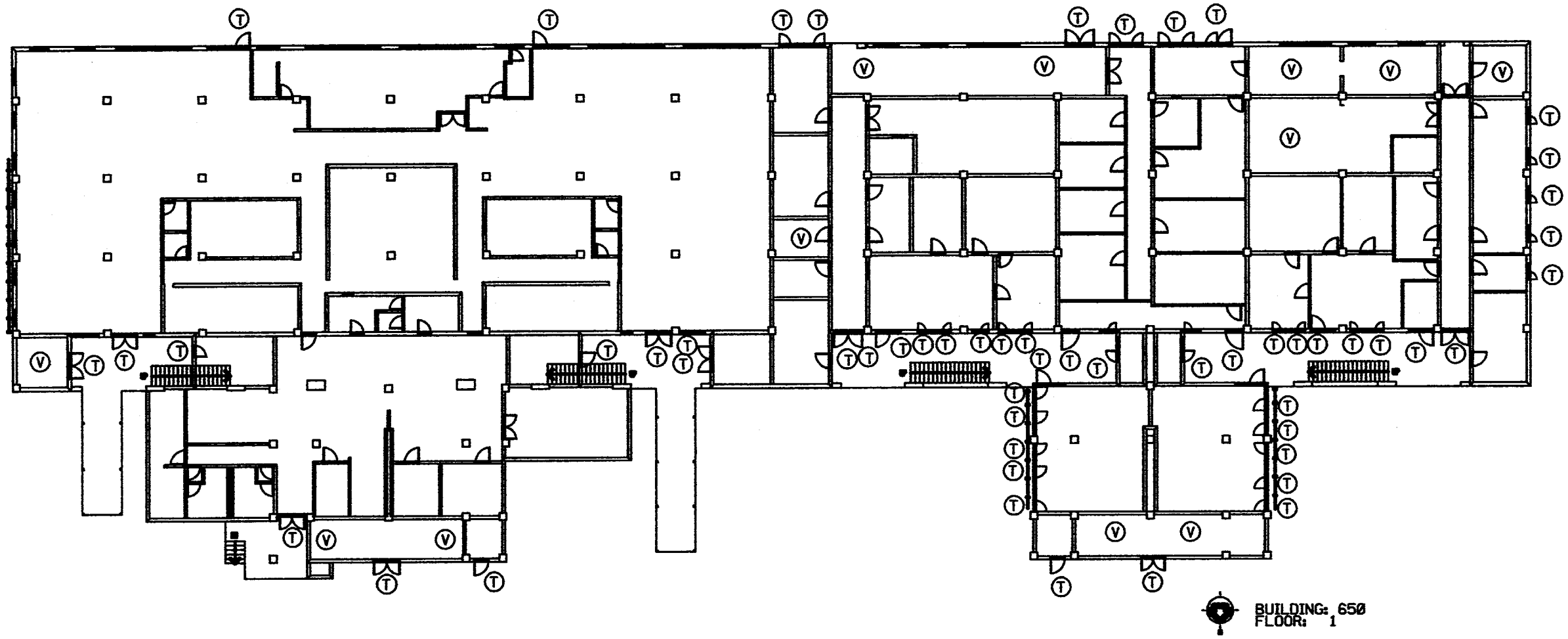
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Sample Locations First Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Asbestos Containing Pipe Insulation Residue
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Extent of Identified ACBM First Floor	Figure 2



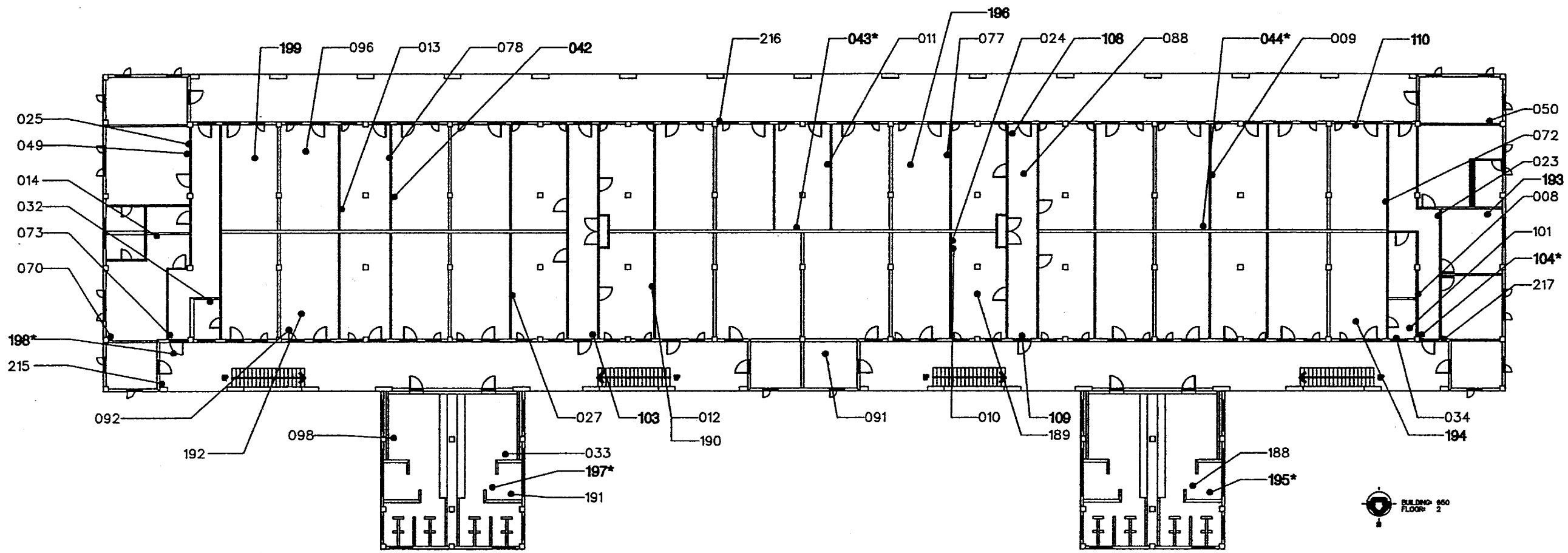
Note:

Asbestos-Containing Joint Adhesive/Sealant-(Off White/Yellow/Orange/Tan) On
Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls
- Wall Plaster-Cementitious Exterior Type II & Exterior Wall Patch Compound

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Extent of Identified ACBM First Floor	Figure 3



Sample * Prefix: 2179-650-XXX

LEGEND

XXX Non-Asbestos-Containing Sample Location

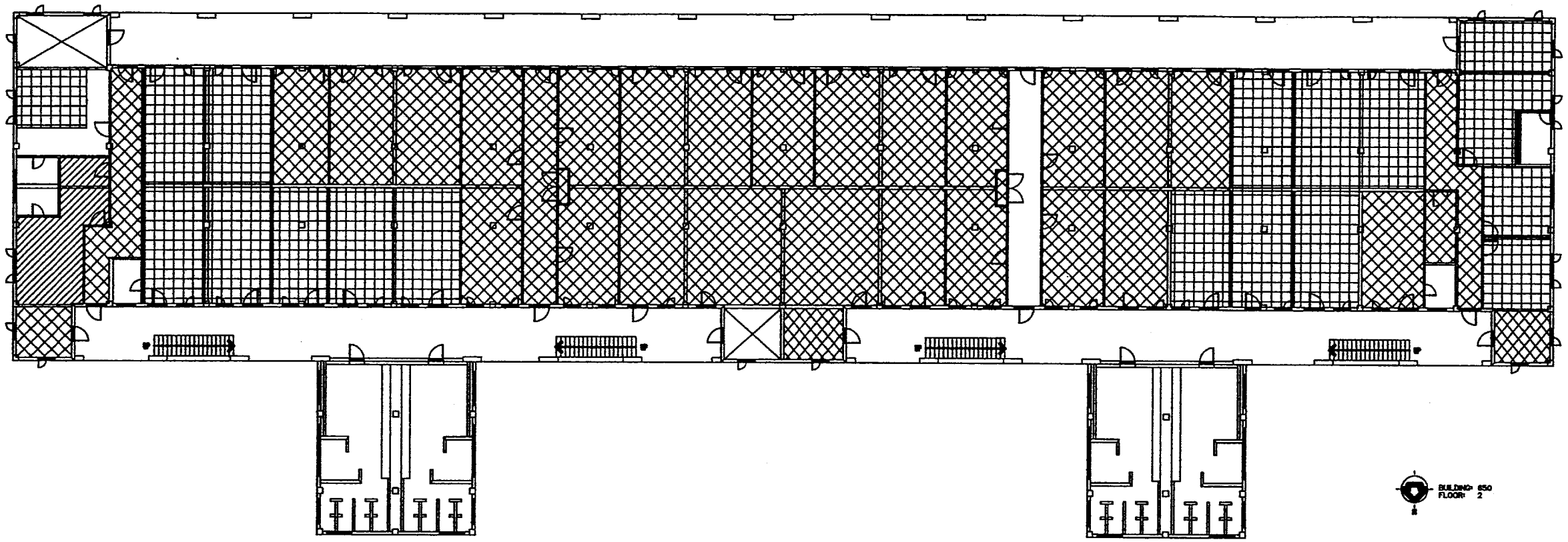
XXX Asbestos-Containing Sample Location

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

XXXP Laboratory Results Pending and/or Investigation Results Pending

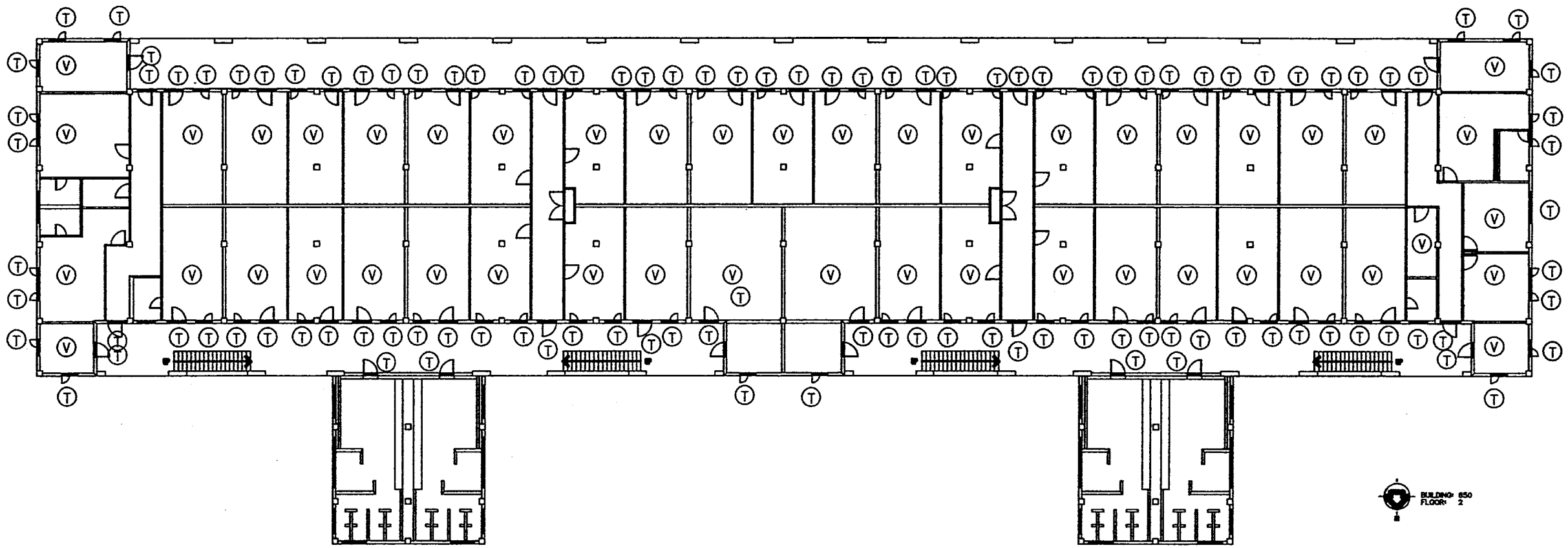
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Sample Locations Second Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Asbestos Containing Pipe Insulation Residue
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Extent of Identified ACBM Second Floor	Figure 2



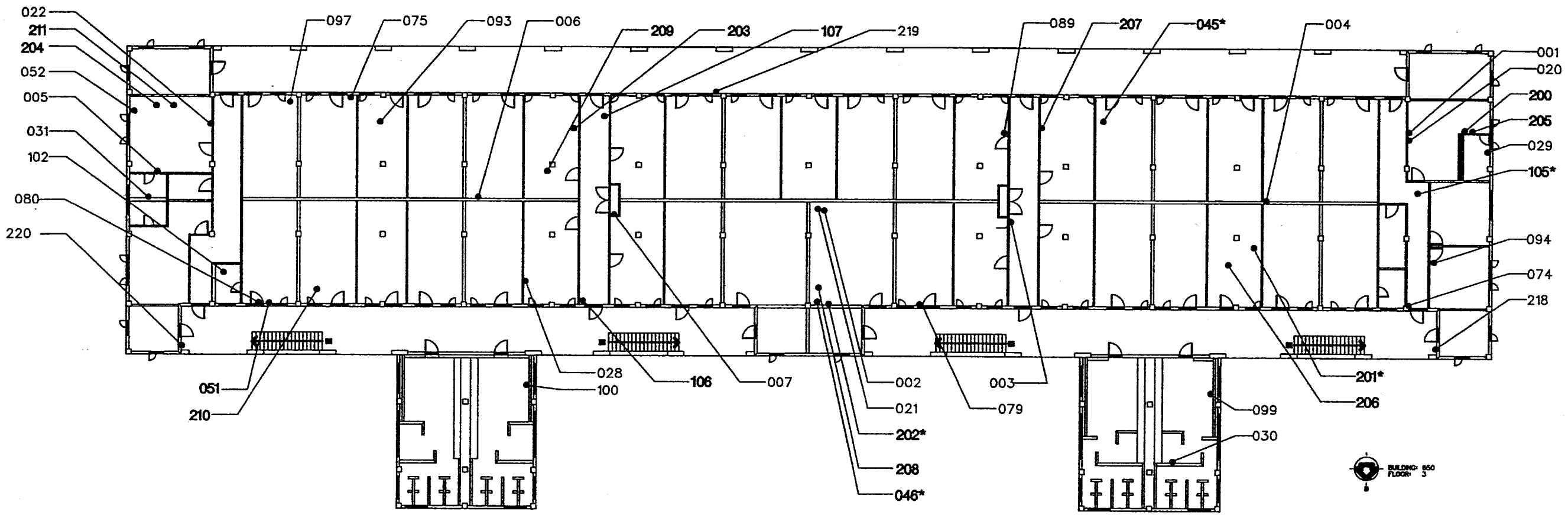
Note:

Asbestos–Containing Joint Adhesive/Sealant–(Off White/Yellow/Orange/Tan) On Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Extent of Identified ACBM Second Floor	Figure 3



Sample * Prefix: 2179-650-XXX

LEGEND

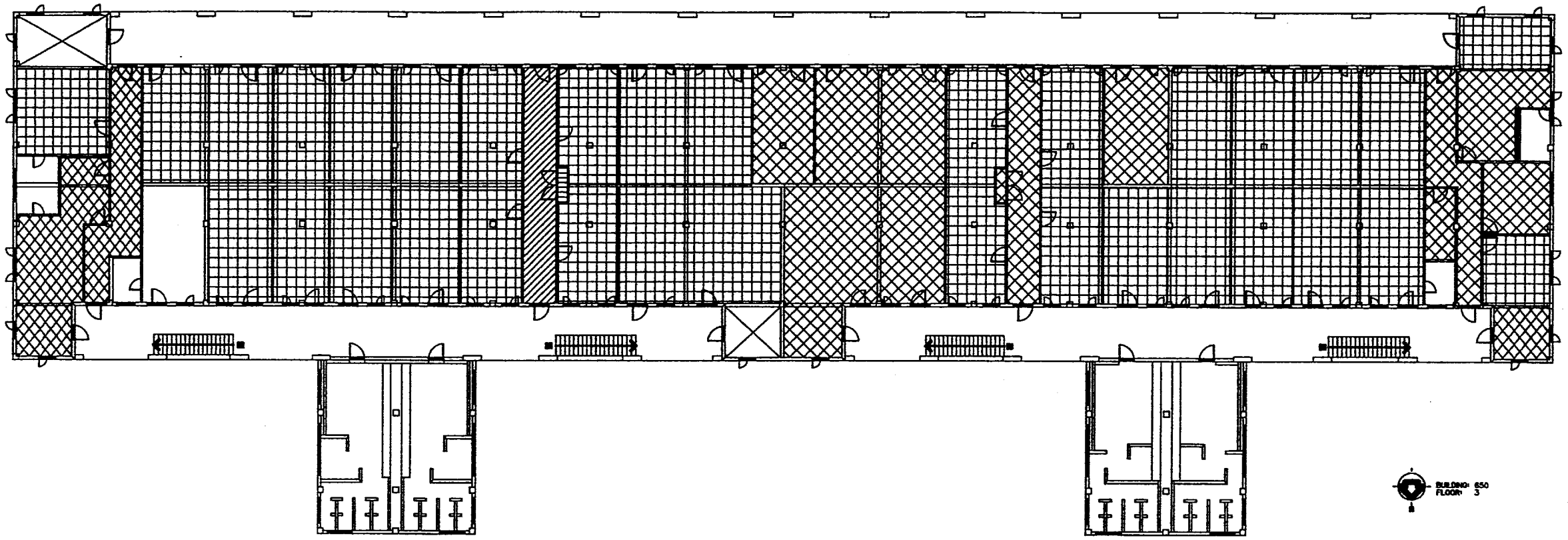
XXX Non-Asbestos-Containing Sample Location

XXX Asbestos-Containing Sample Location

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

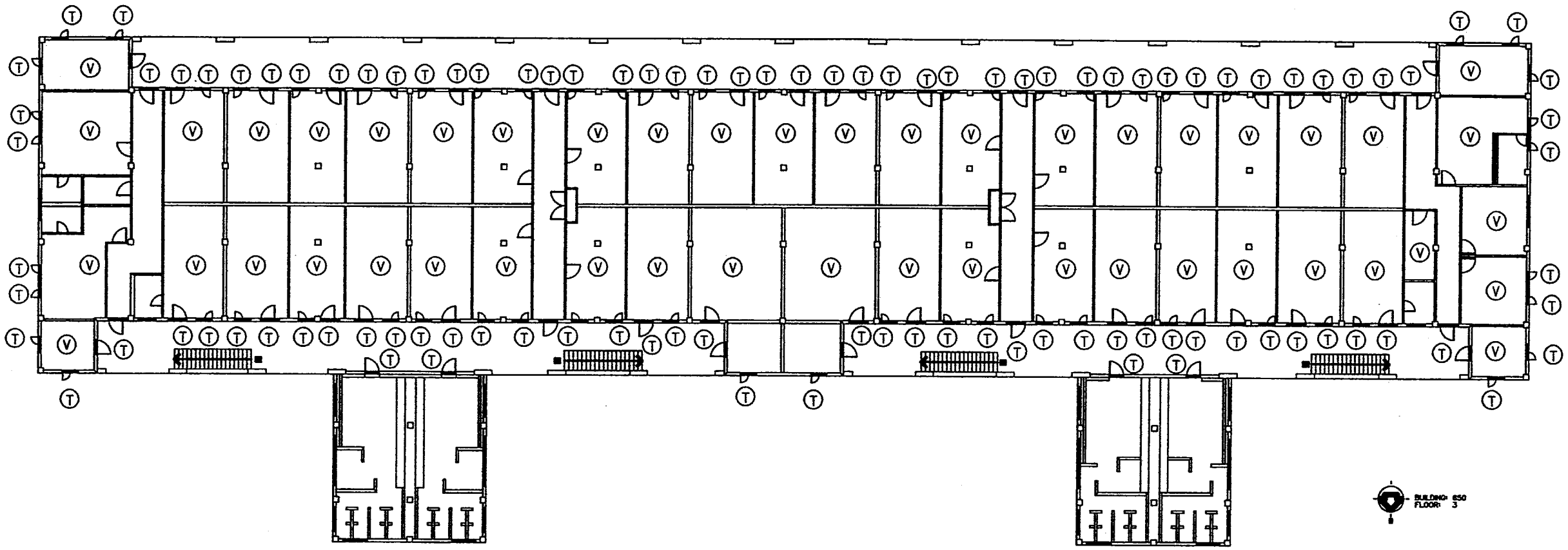
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Sample Locations Third Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Extent of Identified ACBM Third Floor	Figure 2



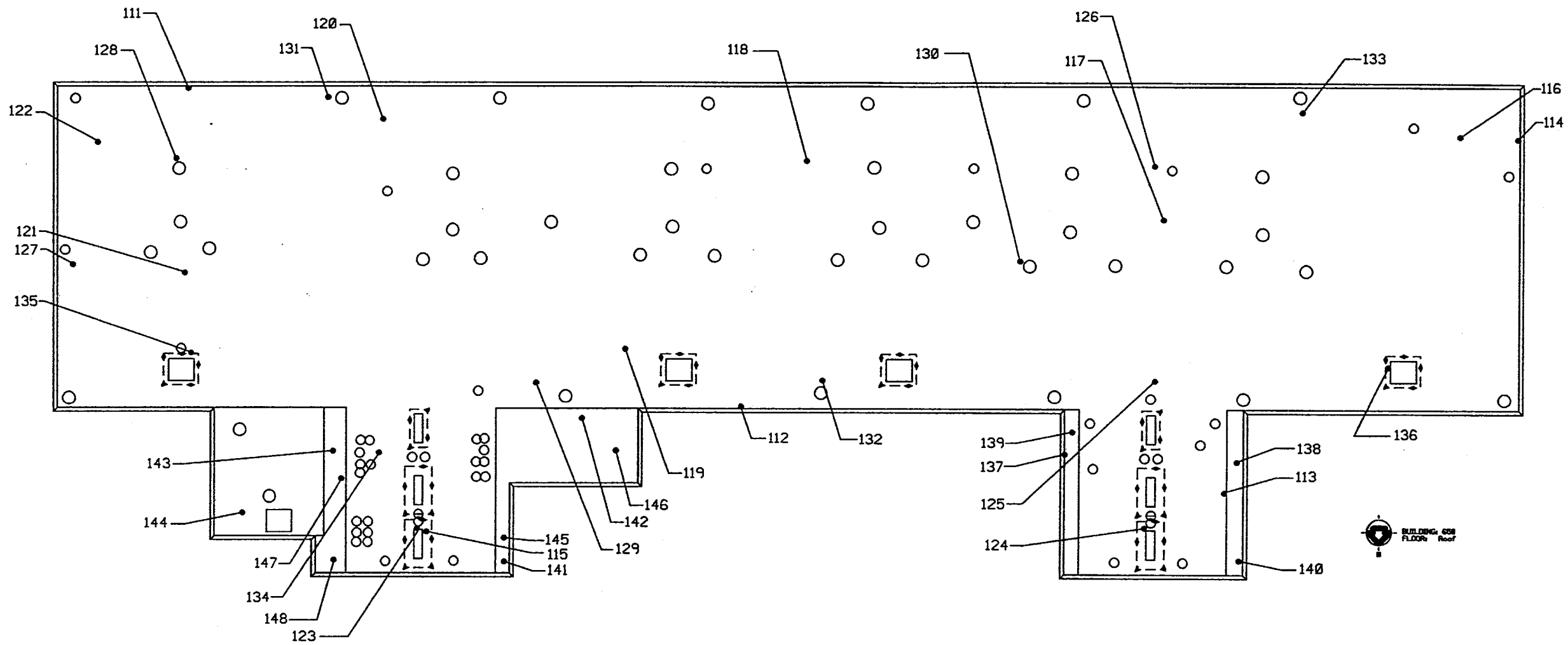
Note:

Asbestos–Containing Joint Adhesive/Sealant–(Off White/Yellow/Orange/Tan) On
Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Extent of Identified ACBM Third Floor	Figure 3



Sample # Prefix: 2179-650-XXX

LEGEND

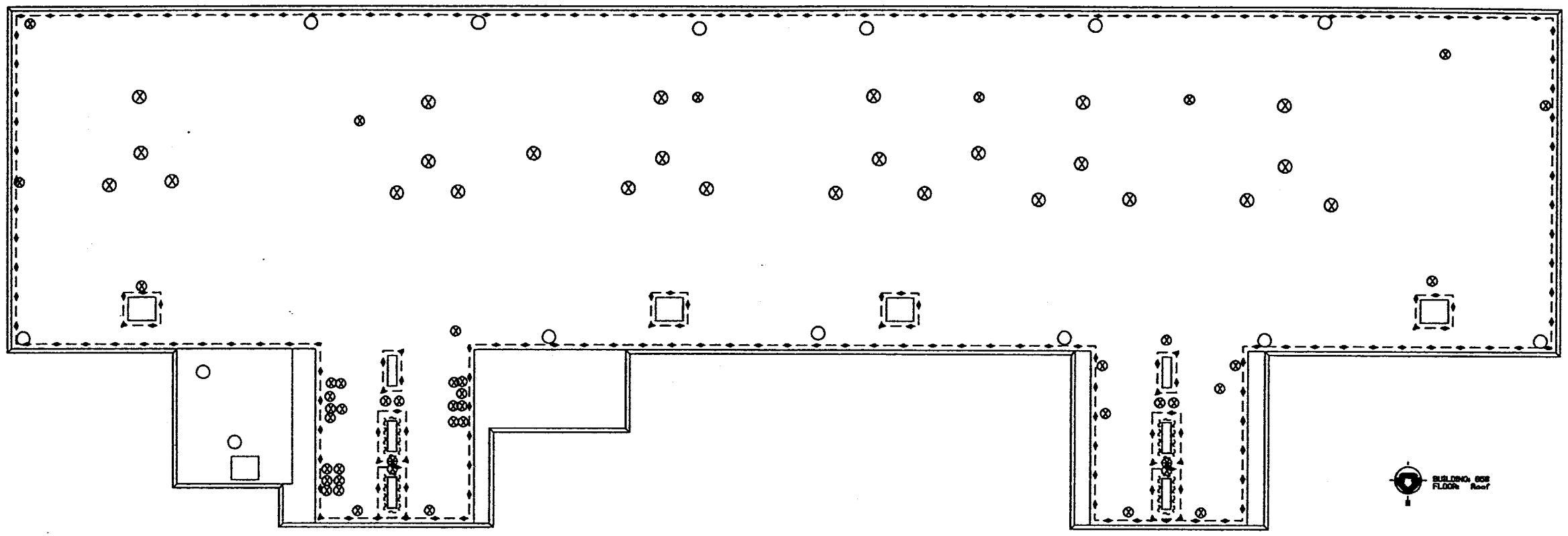
XXX Non-Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Locations

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Sample Locations Roof	Figure 1



LEGEND

- ⊗ Asbestos-Containing Flashing/Sealant, Gas Vents and Mount Points
- —•—•— Asbestos-Containing Main Roof Flashing
- ~~~ Asbestos-Containing Silver Paint Undercoat
- ••• Asbestos-Containing Flashing/Sealant , Large Air Vents
- ▨ Asbestos-Containing Built-Up Roofing Material & Flashing

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 650	Extent of Identified ACBM Roof	Figure 2

APPENDIX C

BUILDING 651

I Introduction

Building 651 is a 3-story concrete structure which provides office space on the first floor, the second and third floor consist of living quarters. A primary hot water heater and storage tank are located on the first floor of the building. Building 651 is currently unoccupied.

II Summary of Identified ACBM

Materials found to contain >1% asbestos by laboratory analysis are listed below. An asterisk preceding the material description indicates the material is considered friable or potentially friable. Revision/additional identified materials types are indicated by a (☛).

12"x12" Vinyl Floor Tile (VFT) - Beige w/Olive Specks and Mastic
12"x12" VFT - Off-White w/Brown Streaks
12"x12" VFT - Olive Marble and Mastic
12"x12" VFT - Light Green w/Specks and Mastic
12"x12" VFT - Tan w/Brown & White Specks and Mastic
12"x12" VFT - White w/Dark Grey Stripes and Black Mastic
12"x12" VFT - White w/Dark Grey Streaks and **Black Mastic**
12"x12" VFT - Lt. Blue w/White Streaks **and Mastic**
VFT - Tan w/Olive Streaks
☛ **Wall Plaster - Cementitious Exterior - Type II**
Cementitious Wall Plaster - Restrooms 1st Floor
Cementitious Wall Plaster - Restrooms 2nd Floor
Cementitious Panel - Above Doors and Windows
Mastic/Sealant at Mounting Points - Main Roof
Mastic/Sealant at Roof Vents - 8"-10" - Main Roof
***Vibration Cloth- Woven Fabric - White**
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 3rd Floor
Black Mastic on HVAC System

III Survey Findings

EKNAs inspectors, Christine Arouh, Steven Chun, William Harris, Prudy Stoudt-McRea, Kennyson Thomas and Doug Tisdell (see Appendix E for Inspector Certificates) identified fifty three (53) distinct material types and submitted two hundred one (201) suspect samples for laboratory analysis. Material types sampled are listed below. Materials found to contain >1% asbestos are indicated in **bold** print, an asterisk indicates a friable or potentially friable material. Materials found to contain <1% asbestos are indicated in *italic* print. Revision/additional identified materials types are indicated by a (☛).

12"x12" Vinyl Floor Tile (VFT) - Beige w/Olive Specks and Mastic
12"x12" VFT - Off-White w/Brown Streaks
12"x12" VFT - Olive Marble and Mastic
12"x12" VFT - Tan w/Brown & White Specks and Mastic
12"x12" VFT - Light Green w/Specks and Mastic
12"x12" VFT - White w/Dark Grey Stripes and Black Mastic
12"x12" VFT - Lt. Blue w/White Streaks and **Mastic**
12"x12" VFT - White w/Dark Grey Streaks and **Black Mastic**
12"x12" VFT - Medium Grey Marble
12"x12" VFT - White Speckled Stick on Tile
12"x12" VFT - Tan w/Black & Brown Streaks
VFT - Tan w/Olive Streaks
Gypsum Wall Board and Joint Compound, 1st Floor
Gypsum Wall Board and Joint Compound, 2nd Floor, See "Remarks and Comments"
Gypsum Wall Board and Joint Compound, 3rd Floor
Wall Insulation-Grey Fluffy Material, 1st Floor
Wall Insulation-Grey Fluffy Material, 2nd Floor
Wall Insulation-Grey Fluffy Material, 3rd Floor
Cementitious Wall Plaster - Restrooms 1st Floor
Cementitious Wall Plaster - Community Restrooms 2nd Floor
Cementitious Wall Plaster - Private Restrooms 2nd Floor
Cementitious Wall Plaster - Community Restrooms 3rd Floor
Cementitious Wall Plaster - Private Restrooms 3rd Floor, See "Remarks and Comments"
☛ *Exterior Cementitious Wall Plaster 1st Floor*, See "Remarks and Comments"
Exterior Cementitious Wall Plaster 2nd Floor
Exterior Cementitious Wall Plaster 3rd Floor
☛**Wall Plaster - Cementitious Exterior - Type II**
Cementitious Plaster-Troweled on CMU and Concrete Walls 1st Floor
Cementitious Panel - Above Doors and Windows
4" Cove Base and Adhesive - Black
4" Cove Base and Adhesive - Brown
2'x4' Ceiling Tile - Fissure w/Pinholes - Type I
2'x4' Ceiling Tile - Large Fissure w/Pinholes

2'x4' Ceiling Tile - Pinhole Pattern
2'x4' Ceiling Tile - Hole Pattern
Composition Roofing Material - Type I - Main Roof
Composition Flashing Material - Type I - Main Roof
Flashing at Access Hatch - Main Roof
Beige Paint w/Black Asphaltic Undercoat - Main Roof
Mastic/Sealant at Mounting Points - Main Roof
Mastic/Sealant at Roof Vents - 8"-10" - Main Roof
Composition Built-up Roofing Material - Type II - Lower Roof
Hot Water Tank Insulation
Fiberglass Pipe Insulation - Joint Adhesive / Mastic (Heater Room)
***Vibration Cloth- Woven Fabric - White**
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 3rd Floor
Brown Mastic on HVAC System
Black Mastic on HVAC System

IV Remarks and Comments

Review "Volume I, Asbestos Survey, Analytical and Report for: Quad F - Buildings 649, 650, 651 and 652 - Schofield Barracks, Oahu, Hawaii", "Discussion" and "Recommendations". See "Survey Methodology" for survey protocol.

Further analysis of the *Gypsum Wall Board and Joint Compound*, 2nd *Floor*, *Exterior Cementitious Wall Plaster 1st Floor* and *Cementitious Wall Plaster - Restrooms 3rd Floor* by "NESHAP Point Count Method" indicates that these material types contains <1% asbestos and is considered **non-regulated asbestos-containing materials**, see "NESHAP Point Count Method Results Forms".

Although these material types are not considered asbestos-containing materials, caution should be exercised if/when disturbing these materials. Proposed work methods which may involve sawing, cutting, drilling abrading, etc. of these materials should be evaluated for their potential for airborne asbestos fiber release.

EKNA also collected three (3) samples and identified one (1) additional material type. Analytical results indicates that the **Wall Plaster - Cementitious Exterior - Type II,** contains asbestos at a concentration >1%.

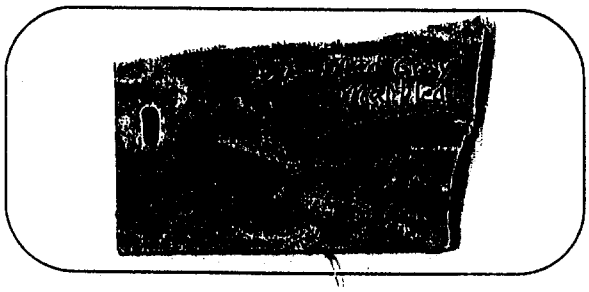
EKNA concludes that the "Exterior Cementitious Wall Plaster 1st Floor" is non-asbestos. Caution should be exercised and work practices evaluated if/when disturbing the exterior plaster walls, identifying the extent of asbestos-containing "Wall Plaster - Cementitious Exterior - Type II" and possible asbestos-containing plaster patches cannot be completely identified due to the exterior surface paint, that restricts identification.

Building 651

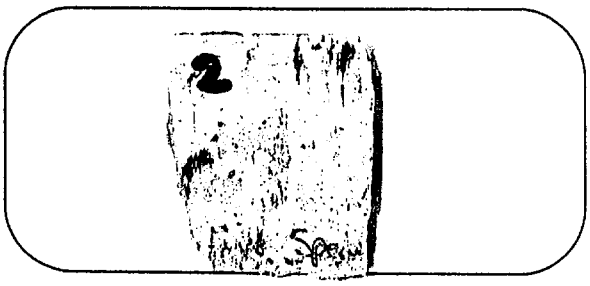
Floor Tile Log

Vinyl Floor Tile Log
Quad F - Building 651

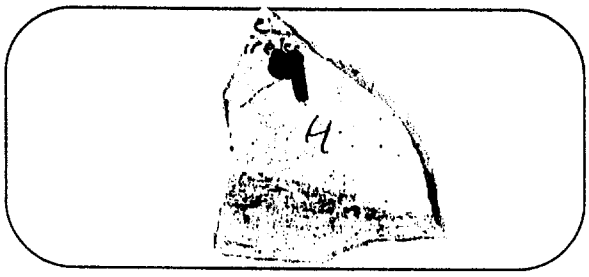
Bold indicates asbestos-containing vinyl floor tile and/or mastic.



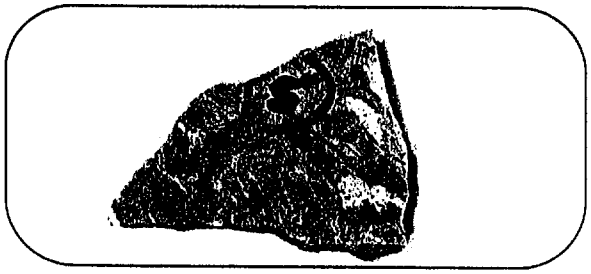
12"X12" Vinyl Floor Tile
-Medium Gray Marbled



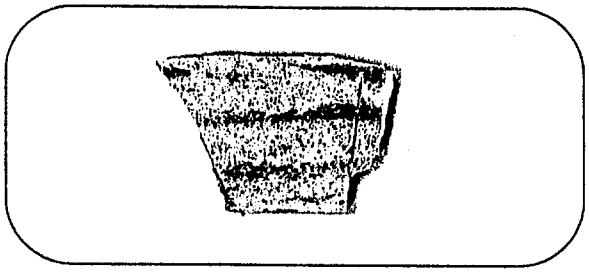
12"X12" Vinyl Floor Tile
Beige w/Olive Specks and Mastic



12"X12" Vinyl Floor Tile
Off-White w/Brown Streaks

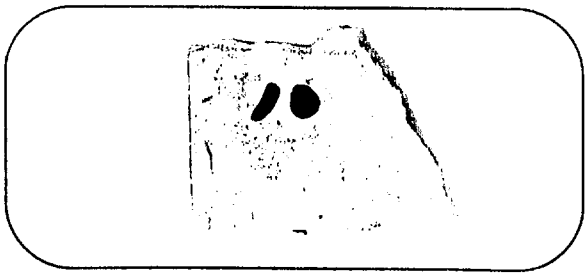


12"X12" Vinyl Floor Tile
Olive Marbled and Mastic

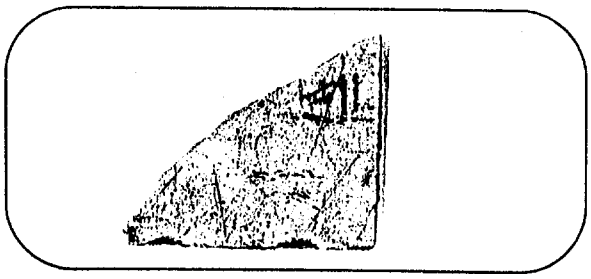


12"X12" Vinyl Floor Tile
Tan w/Black & Brown Streaks

12"X12" Vinyl Floor Tile
Light Green w/Specks and Mastic



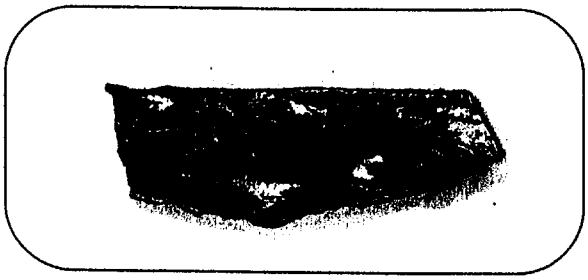
12"X12" Vinyl Floor Tile
White w/Dark Grey Streaks & **Black Mastic**



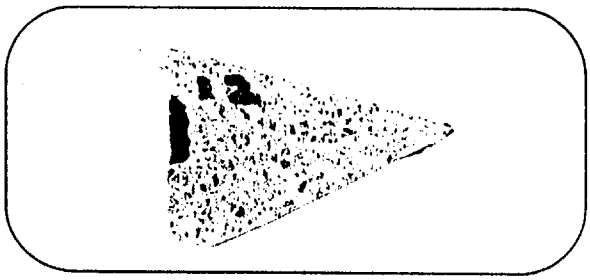
12"X12" Vinyl Floor Tile
White w/Dark Grey Stripes and Mastic

Vinyl Floor Tile Log
Quad F - Building 651

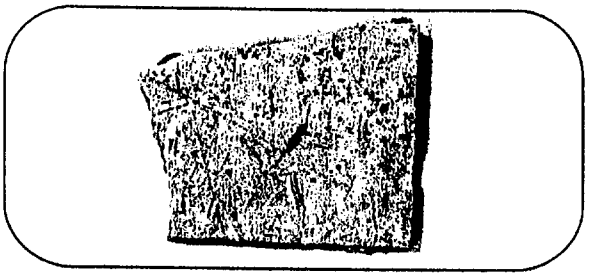
Bold indicates asbestos-containing vinyl floor tile and/or mastic.



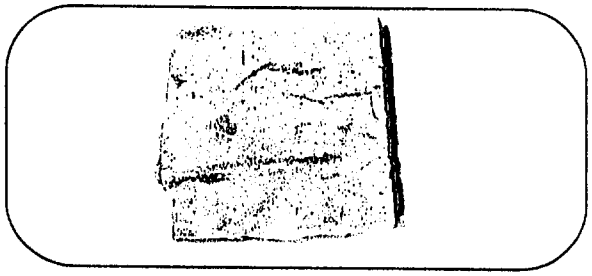
12"X12" Vinyl Floor Tile
Light Blue w/White Streaks and **Mastic**



12"X12" Vinyl Floor Tile
White Speckled Stick-on



12"X12" Vinyl Floor Tile
Tan w/Brown & White Specks & Mastic



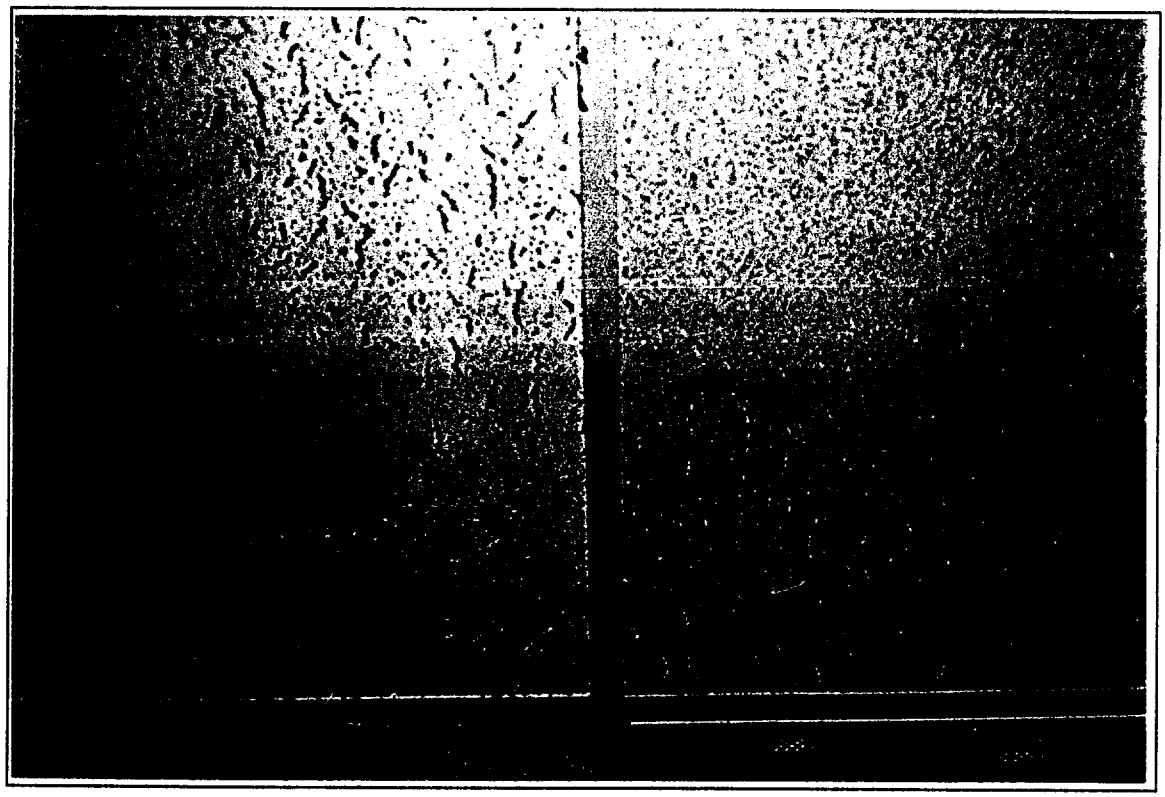
Vinyl Floor Tile
Tan w/Olive Streaks

Building 651

Photo Log

BUILDING 651 - PHOTO LOG

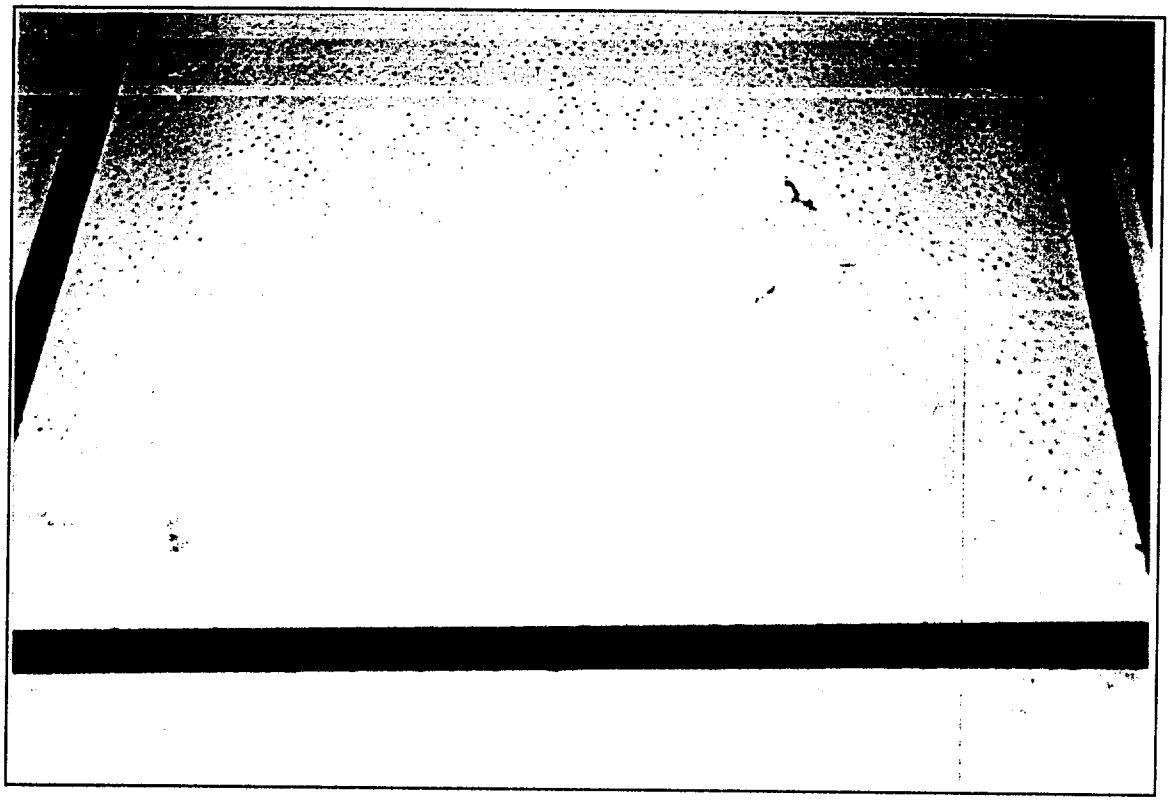
Building 651 - Exterior



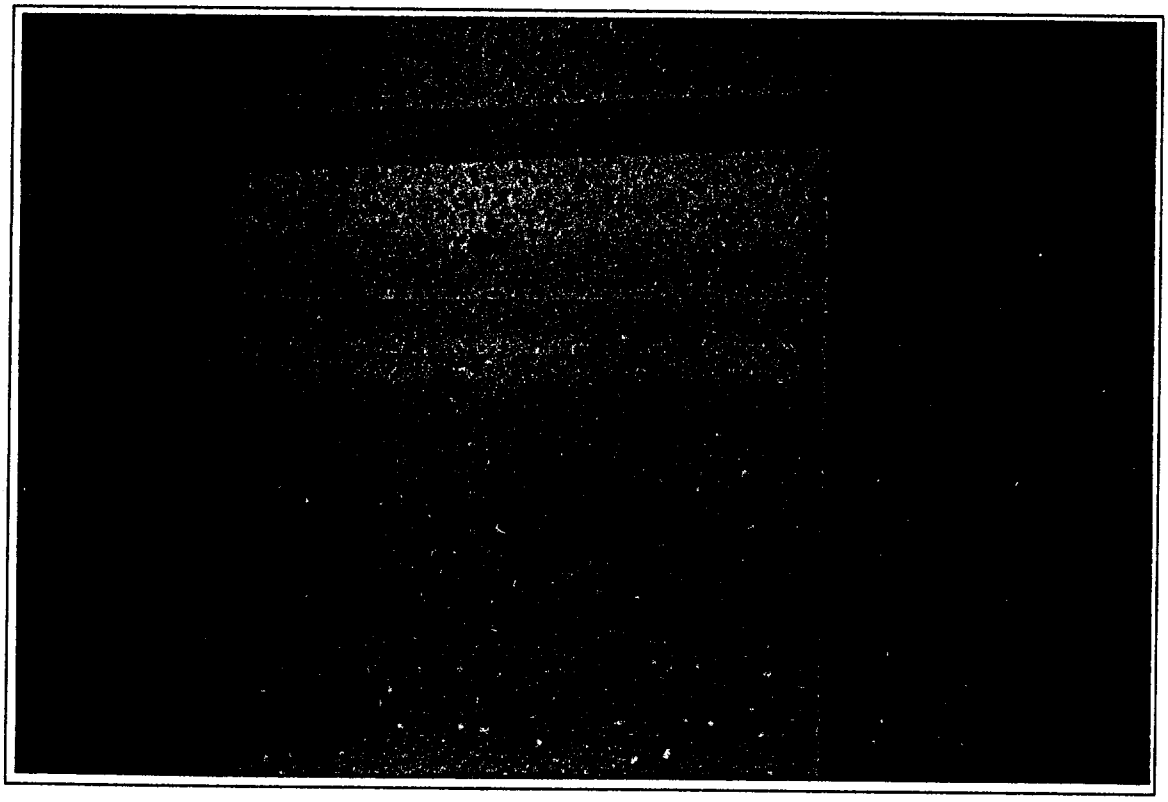
2'x4' Ceiling Tile - Fissure w/Pinholes - Type I
2'x4' Ceiling Tile - Large Fissure w/Pinholes

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 651 - PHOTO LOG



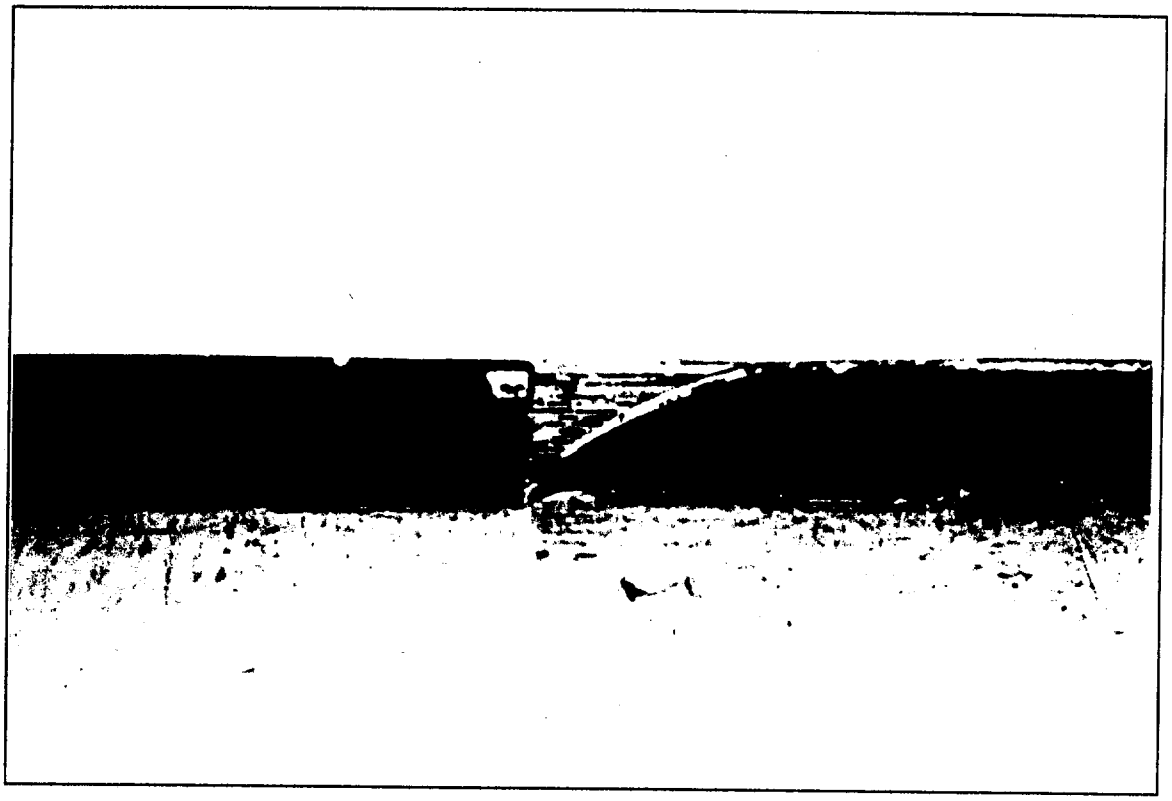
2'x4' Ceiling Tile - Pinhole Pattern



2'x4' Ceiling Tile - Hole Pattern

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 651 - PHOTO LOG

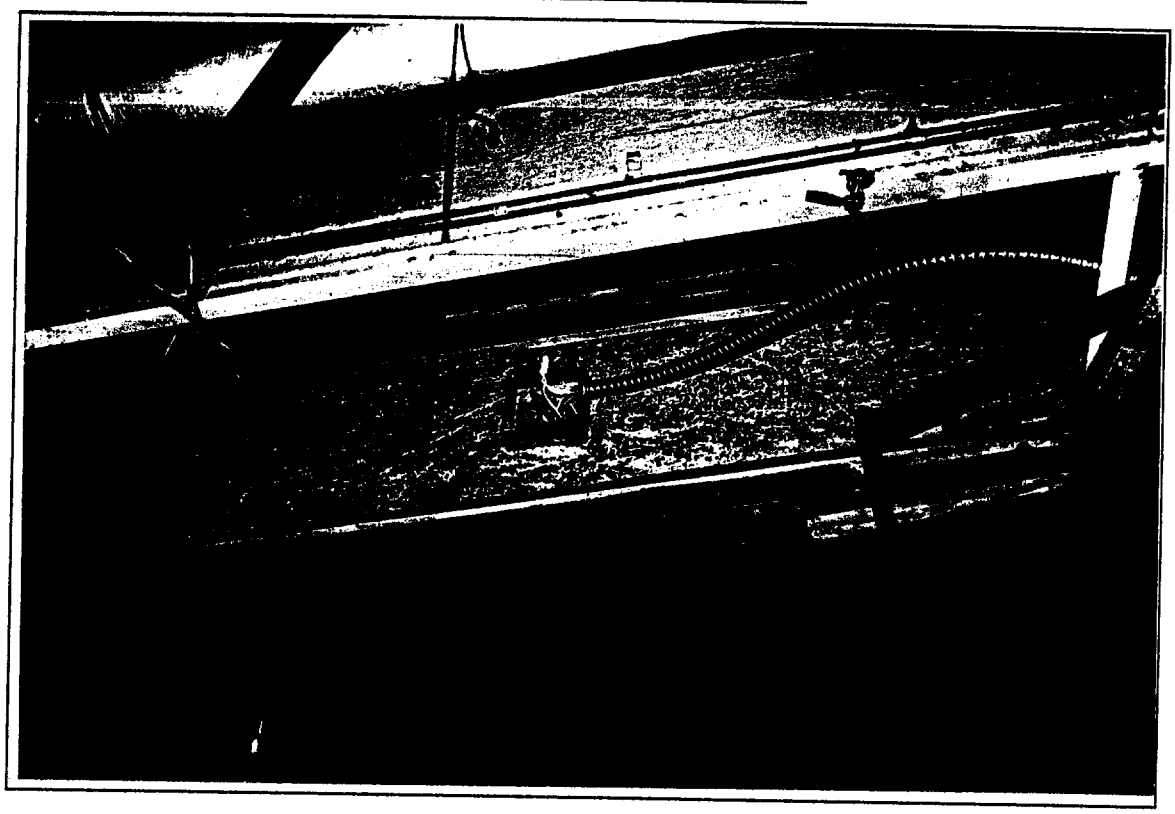


4" Cove Base and Adhesive - Black / Brown

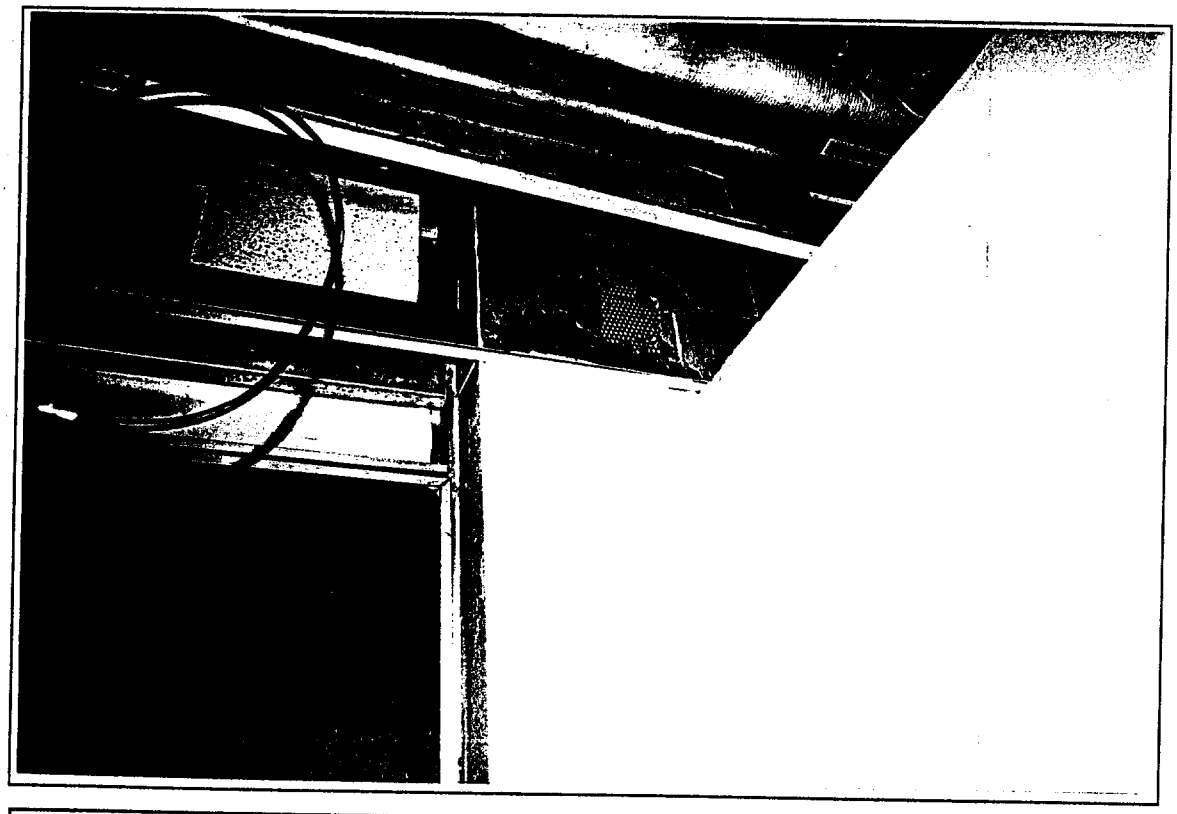
Gypsum Wall Board and Joint Compound - 1st & 3rd Fl.
Gypsum Wall Board and Joint Compound - 2nd Fl.
Wall Insulation - Grey Fluffy Material

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 651 - PHOTO LOG



Cementitious Panel - Above Doors and Windows

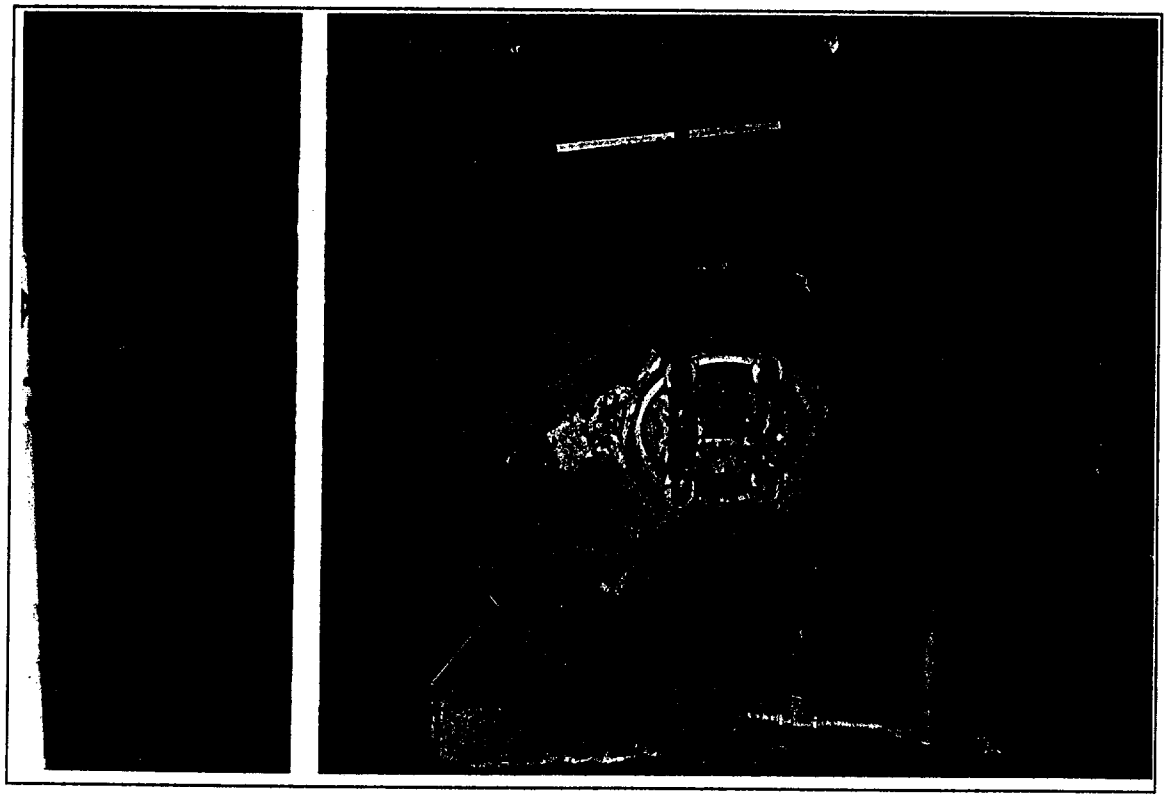


Cementitious Wall Plaster - Restrooms 1st Fl., Private Restrooms 2nd Fl.
Cementitious Wall Plaster - Private Restrooms 3rd Fl.

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 651 - PHOTO LOG

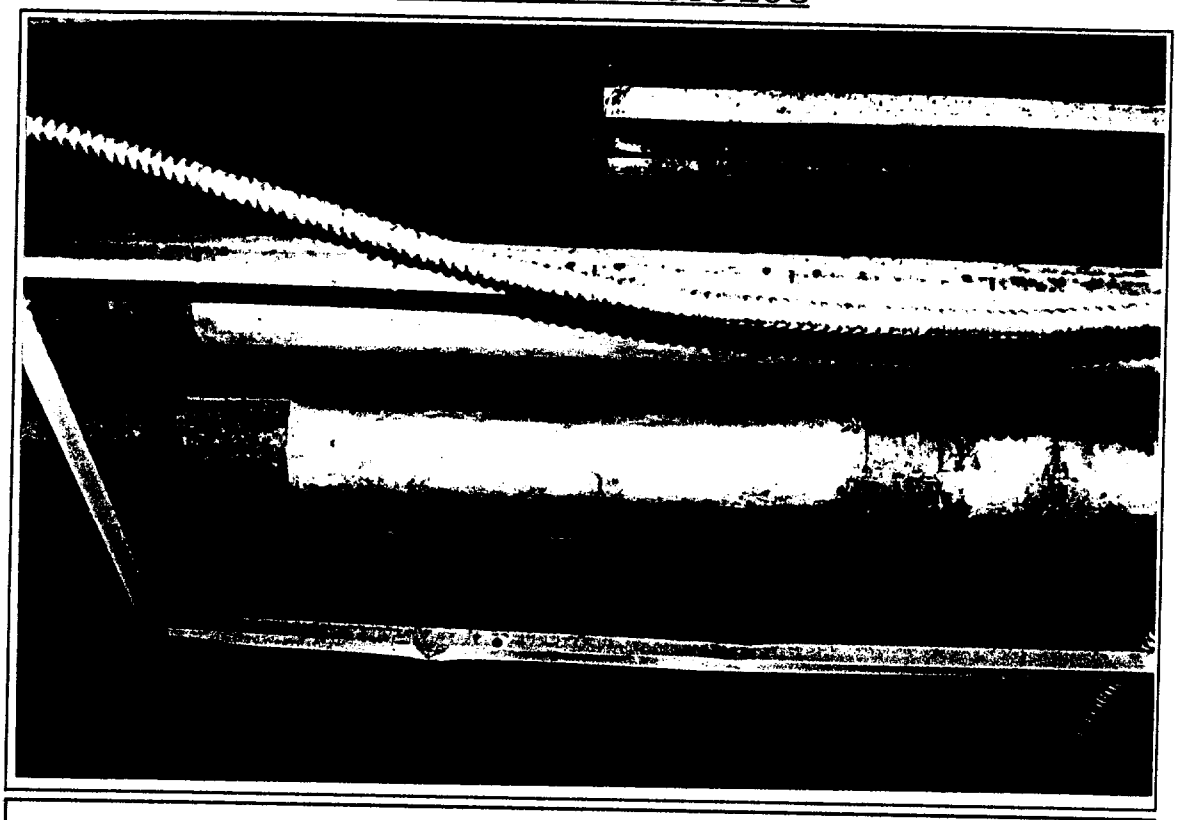
Cementitious Plaster - Troweled on CMU and Concrete Walls



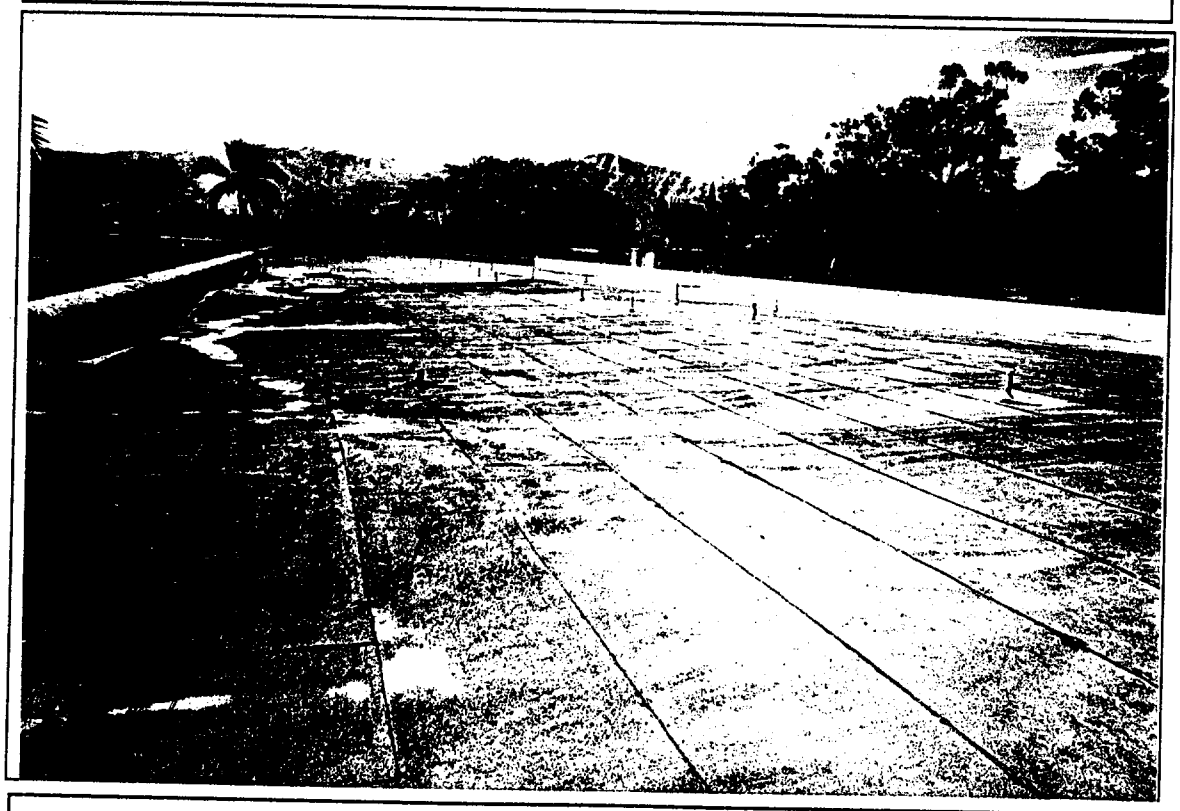
Hot Water Tank Insulation

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 651 - PHOTO LOG



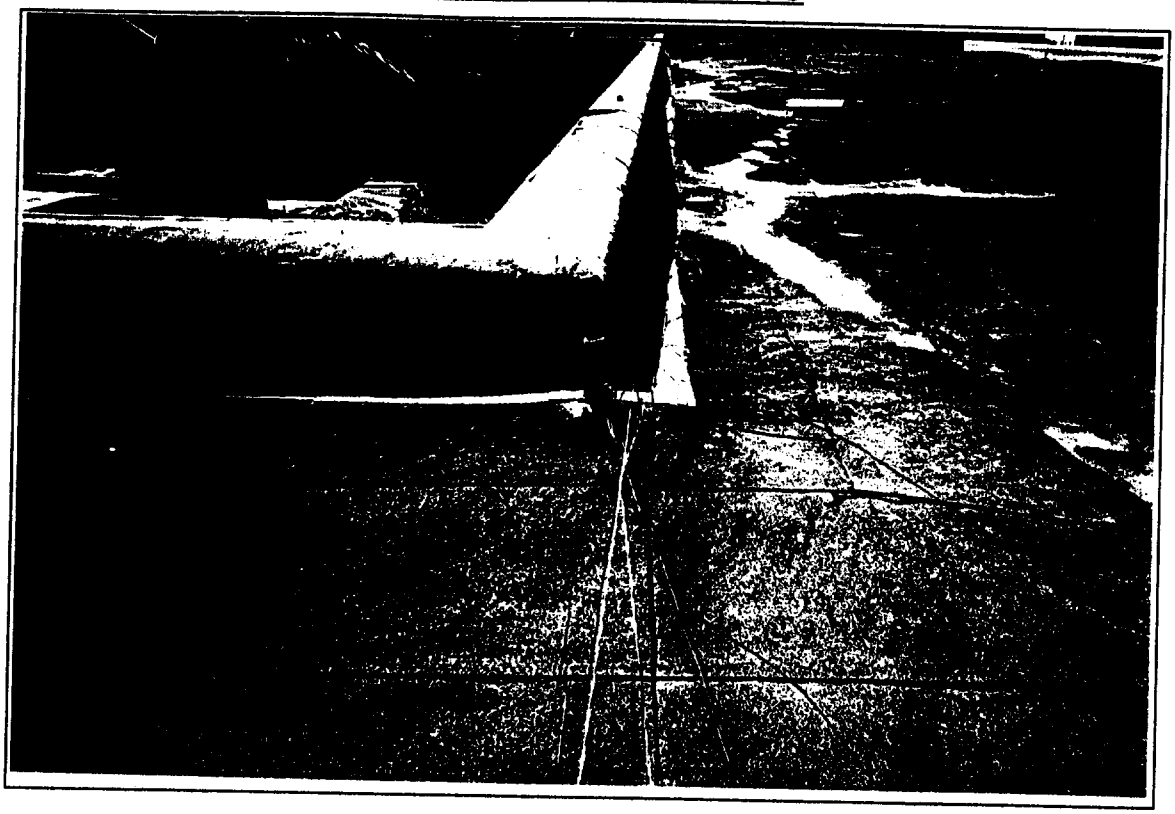
*** Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st, 2nd 3rd Fl.,
*** Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 1st, 2nd 3rd Fl.,
***Vibration Cloth - Woven Fabric - White**



Composition Roofing Material - Type I - Main Roof
Beige Paint w/ Black Asphaltic Undercoat - Main Roof

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 651 - PHOTO LOG



Composition Flashing Material - Type I - Main Roof
Mastic/Sealant at Roof Vents - 8"-10"- Main Roof
Flashing at Access Hatch - Main Roof

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

Building 651

Chain of Custody Forms
and
Asbestos Bulk Analysis Forms

40

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00455 — SHEET 1 OF 68

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	1	2197 - 651 - 001	B	1	179	Gypsum Wall Board w/ Joint Compound - 1st Floor
2	1	2197 - 651 - 002	B	1	175	
3	1	2197 - 651 - 003	B	1	153	
4	1	2197 - 651 - 004	B	1	118	
5	1	2197 - 651 - 005	B	1	106	
6	2	2197 - 651 - 006	B	2	202	Gypsum Wall Board w/ Joint Compound - 2nd Floor
7	2	2197 - 651 - 007	B	2	216	
8	2	2197 - 651 - 008	B	2	224	
9	2	2197 - 651 - 009	B	2	231	
10	2	2197 - 651 - 010	B	2	243	

Set 1

Set 2

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013033							
2	3034							
3	3035							
4	3036							
5	3037							
6	3038							
7	3039							
8	3040							
9	3041							
10	3042							

Analyzed by [illegible] 1/26/01

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 1-17-01 TIME: 1:45pm INITIALS: JP
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: NL
DATE: 1/26/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00455 — SHEET 2 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	2	2197 - 651 - 011	B	2	263	Gypsum Wall Board w/ Joint Compound - 2nd Floor
2	2	2197 - 651 - 012	B	2	247	
3	3	2197 - 651 - 013	B	3	341	Gypsum Wall Board w/ Joint Compound - 3rd Floor
4	3	2197 - 651 - 014	B	3	343	
5	3	2197 - 651 - 015	B	3	336	
6	3	2197 - 651 - 016	B	3	330	
7	3	2197 - 651 - 017	B	3	314	
8	3	2197 - 651 - 018	B	3	321	
9	3	2197 - 651 - 019	B	3	301	
10	4	2197 - 651 - 020	B	1	144	Wall Insulation - Grey Fluffy Material - 1st Floor

set 2 — set 3 — set 4

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013043							
2	3044							
3	3045							
4	3046							
5	3047							
6	3048							
7	3049							
8	3050							
9	3051							
10	3052							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: John Cate
DATE: 01/17/01 TIME: 1:45 pm INITIALS: JP
ANALYZED BY: SZ
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00455 — SHEET 3 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	5	2197 - 651 - 021	B	2	HALLWAY	Wall Insulation - Grey Fluffy Material - 2nd Floor
2	5	2197 - 651 - 022	B	2	230	↓
3	5	2197 - 651 - 023	B	2	243	↓
4	6	2197 - 651 - 024	B	3	HALLWAY	Wall Insulation - Grey Fluffy Material - 3rd Floor
5	6	2197 - 651 - 025	B	3	330	↓
6	6	2197 - 651 - 026	B	3	301	↓
7	7	2197 - 651 - 027	B	1	165	Cementitious Plaster - Hollow Plaster & Lathe Wall System - 1st Fl.
8	8	2197 - 651 - 028	B	2	210	Cementitious Plaster - Hollow Plaster & Lathe Wall System - 2nd Fl.
9	8	2197 - 651 - 029	B	2	W side Restroom	↓
10	8	2197 - 651 - 030	B	2	260 RK	↓

Set 5 (samples 1–3); Set 6 (samples 4–6); Set 7 (sample 7); Set 8 (samples 8–10)

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013253							
2	3254							
3	3255							
4	3256							
5	3257							
6	3258							
7	3259							
8	3260							
9	3261							
10	3262							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01-17-01 TIME: 1:45pm INITIALS: JP
ANALYZED BY: [signature]
LAB Q.C. APPROVAL: [signature]
DATE: 1/26/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00455 — SHEET 4 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
Set 9	1	9	2197 - 651 - 031	B	3	360 RR	Cementitious Plaster - Hollow Plaster & Lathe Wall System - 3rd Fl.
	2	9	2197 - 651 - 032	B	3	E. Side RR	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
	3	9	2197 - 651 - 033	B	3	301 RR	
Set 10	4	10	2197 - 651 - 034	B	1	NW Side Storage	Cementitious Plaster - Trowelled-on CMU & Concrete walls - 1st Fl.
	5	10	2197 - 651 - 035	B	1	166	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
	6	10	2197 - 651 - 036	B	1	139	
	7	10	2197 - 651 - 037	B	1	126	
	8	10	2197 - 651 - 038	B	1	102	
Set 11	9	11	2197 - 651 - 039	B	1	123	12x12 VFT - Medium Grey Marble - Mat. #1 - 1st Fl
	10	11	2197 - 651 - 040	B	1	105	↓ ↓ ↓ - ↓ ↓ ↓ ↓ - ↓ ↓ - ↓ ↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013003							
2	3004							
3	3005							
4	3006							
5	3007							
6	3008							
7	3009							
8	3010							
9	3011							
10	3012							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01/10/01 TIME: 1125 INITIALS: JP
ANALYZED BY: SZ
LAB Q.C. APPROVAL: VL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

(34)

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00456 — SHEET 5 OF 10

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	12	2197 - 651 - 041	B	2	262	12x12 VFT - Beige w/Olive Specks - Mat. #2
2	12	2197 - 651 - 042	B	2	248	
3	12	2197 - 651 - 043	B	3	328	
4	12	2197 - 651 - 044	B	3	344	
5	12	2197 - 651 - 045	B	3	363	
6	13	2197 - 651 - 046	B	1	163	12" x 12" VFT - off White w/Brown Streaks - Mat. #4
7	13	2197 - 651 - 047	B	1	135	
8	13	2197 - 651 - 048	B	1	126	
9	14	2197 - 651 - 049	B	1	HALLWAY	12" x 12" VFT - Olive Marble - Mat. # 5
10	14	2197 - 651 - 050	B	2	hallway	

set 12 — set 13 — set 14

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013073							
2	3074							
3	3075							
4	3076							
5	3077							
6	3078							
7	3079							
8	3080							
9	3081							
10	3082							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/17/01 TIME: 1:45pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00456 — SHEET 6 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
set 14 1	14	2197 - 651 - 051	B	3	hallway	12 x 12 VFT - Olive Marble - Mat. #5
2	15	2197 - 651 - 052	B	1	107	12 x 12 VFT - Tan w/ Black + Brown streaks - Mat. # 7
set 15 3	15	2197 - 651 - 053	B	1	107	↓ ↓ ↓ - ↓ ↓ ↓ ↓ ↓ ↓ - ↓ ↓
4	16	2197 - 651 - 054	B	1	121	12 x 12 VFT - Light Green w/ specks - Mat. # 8
5	16	2197 - 651 - 055	B	1	138	↓ ↓ ↓ - ↓ ↓ ↓ ↓ - ↓ ↓
set 16 6	16	2197 - 651 - 056	B	3	305	↓ ↓ ↓ - ↓ ↓ ↓ ↓ - ↓ ↓
7	16	2197 - 651 - 057	B	3	313	12 x 12 VFT - White w/ Dark Grey Streaks - Mat. # 10
8	17	2197 - 651 - 058	B	1	HALLWAY	↓ ↓ ↓ - ↓ ↓ ↓ ↓ ↓ - ↓ ↓
set 17 9	17	2197 - 651 - 059	B	1	159	
10	17	2197 - 651 - 060	B	2	211	

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	210130983							
2	30984							
3	30985							
4	30986							
5	30987							
6	30988							
7	30989							
8	30990							
9	30991							
10	30992							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/17/01 TIME: 1:45pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00456 — SHEET 7 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
set 17 1	17	2197 - 651 - 061	B	2	230	12x12 VFT - white w/Dark Grey Streaks - Mat. #10 ✓
2	17	2197 - 651 - 062	B	3	311	↓ ↓ ↓ - ↓ ↓ ↓ ↓ ↓ - ↓ ↓ ✓
3	17	2197 - 651 - 063	B	3	330	12x12 VFT - Lt. Blue w/White streaks - Mat. #11
set 18 4	18	2197 - 651 - 064	B	1	115	↓ ↓ ↓ - ↓ ↓ ↓ ↓ ↓ - ↓ ↓
5	18	2197 - 651 - 065	B	1	112	12x12 VFT - White Speckled Stick on Tile. - Mat. #12
set 19 6	19	2197 - 651 - 066	B	1	117	12x12 VFT - Tan w/ Brown + white Specks. - Mat. #13
7	20	2197 - 651 - 067	B	2	240	↓ ↓ ↓ ↓ - ↓ ↓ ↓ ↓ ↓ ↓ - ↓ ↓
set 20 8	20	2197 - 651 - 068	B	2	234	Cove Base + Adhesive - Black, 4"
9	21	2197 - 651 - 069	B	1	~~[illegible]~~ 113	↓ ↓ ↓ ↓ - ↓ ↓
set 21 10	21	2197 - 651 - 070	B	1	143	

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013093							
2	3094							
3	3095							
4	3096							
5	3097							
6	3098							
7	3099							
8	3100							
9	3101							
10	3102							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 1/10/00 TIME: 1:45p INITIALS: JP
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00456 SHEET 8 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	21	2197 - 651 - 071	B	1	159	Cove Base & Adhesive - Black, 4"
2	21	2197 - 651 - 072	B	2	N SIDE HALLWAY	↓
3	21	2197 - 651 - 073	B	2	219	↓
4	21	2197 - 651 - 074	B	3	N SIDE HALLWAY	↓
5	22	2197 - 651 - 075	B	1	102	Cove Base & Adhesive - Brown, 4"
6	22	2197 - 651 - 076	B	1	135	↓
7	22	2197 - 651 - 077	B	1	169	↓
8	22	2197 - 651 - 078	B	2	240	↓
9	22	2197 - 651 - 079	B	2	233	↓
10	22	2197 - 651 - 080	B	2	209	↓

set 21

set 22

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013103							
2	3104							
3	3105							
4	3106							
5								
6								
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01/17/01 TIME: 1:25 pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

38

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00457 — SHEET 8 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO:	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	21	2197 - 651 - 071	B	1	159	Cove Base & Adhesive - Black, 4"
2	21	2197 - 651 - 072	B	2	N Side Hallway	
3	21	2197 - 651 - 073	B	2	219	
4	21	2197 - 651 - 074	B	3	N Side Hallway	
5	22	2197 - 651 - 075	B	1	102	Cove Base & Adhesive - Brown, 4"
6	22	2197 - 651 - 076	B	1	135	
7	22	2197 - 651 - 077	B	1	169	
8	22	2197 - 651 - 078	B	2	200	
9	22	2197 - 651 - 079	B	2	233	
10	22	2197 - 651 - 080	B	2	209	

set 21

set 22

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	210113107							
2	3108							
3	3109							
4	3110							
5	3111 210113107							
6	3112 3108							
7	3113 3109							
8	3114 3110							
9	3115 3111							
10	3116 3112							

analyzed by 1/26/01 3:00 pm

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01/10/01 TIME: 12:15pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00457 — SHEET 9 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	22	2197 - 651 - 081	B	3	331	Cove Base & Adhesive - Brown, 4"
2	22	2197 - 651 - 082	B	3	316	↓
3	22	2197 - 651 - 083	B	3	353	↓
4	23	2197 - 651 - 084	B	1	143	2'x4' Ceiling Tile - Fissure w/Pinholes - Type 1
5	23	2197 - 651 - 085	B	1	hallway	↓
6	23	2197 - 651 - 086	B	1	R.R.	↓
7	23	2197 - 651 - 087	B	1	159	↓
8	23	2197 - 651 - 088	B	1	179	↓
9	23	2197 - 651 - 089	B	2	255	↓
10	23	2197 - 651 - 090	B	2	240	↓

set 22

set 23

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013113							
2	3114							
3	3115							
4	3116							
5	3117							
6	3118							
7	3119							
8	3120							
9	3121							
10	3122							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 1-17-01 TIME: 1:28 pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00457 — SHEET 10 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	23	2197 - 651 - 091	B	2	hallway	2' x 4' Ceiling Tile - Fissure w/Pinholes - Type 1
2	23	2197 - 651 - 092	B	3	310	↓ ↓ ↓ ↓ - ↓ ↓ ↓ - ↓ ↓
3	23	2197 - 651 - 093	B	3	324	↓ ↓ ↓ ↓ - ↓ ↓ ↓ - ↓ ↓
4	23	2197 - 651 - 094	B	3	361	↓ ↓ ↓ ↓ - ↓ ↓ ↓ - ↓ ↓
5	24	2197 - 651 - 095	B	1	162	2' x 4' Ceiling Tile - Large Fissure w/Pinholes
6	24	2197 - 651 - 096	B	1	162	↓ ↓ ↓ ↓ - ↓ ↓ ↓ ↓
7	25	2197 - 651 - 097	B	1	113	2' x 4' Ceiling Tile - Pinhole Pattern
8	25	2197 - 651 - 098	B	1	111	↓ ↓ ↓ ↓ - ↓ ↓
9	25	2197 - 651 - 099	B	1	101	↓ ↓ ↓ ↓ - ↓ ↓
10	26	2197 - 651 - 100	B	2	R.R.	2' x 4' Ceiling Tile - Hole Pattern

Set 23 (samples 2–4); Set 24 (samples 5–6); Set 25 (samples 7–9); Set 26 (sample 10)

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013123							
2	3124							
3	3125							
4	3126							
5	3127							
6	3128							
7	3129							
8	3130							
9	3131							
10	3132							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 2/17/01 TIME: 1:45pm INITIALS: JT
ANALYZED BY: SZ
LAB Q.C. APPROVAL: NL
DATE: 2/21/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00457 — SHEET 11 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	26	2197 - 651 - 101	B	2	~~[illegible]~~ R.R.	2'x4' Ceiling Tile - Hole Pattern
2	26	2197 - 651 - 102	B	3	~~[illegible]~~ R.R.	↓
3	26	2197 - 651 - 103	B	3	~~[illegible]~~ R.R.	↓
4	27	2197 - 651 - 104	B	2	210	Cementitious Panel - Above Doors and Windows
5	28	2197 - 651 - 105	B	Roof	Main	Composition Roofing Material - Type 1 - Main Roof
6	28	2197 - 651 - 106	B	Roof	Main	↓
7	28	2197 - 651 - 107	B	Roof	Main	↓
8	28	2197 - 651 - 108	B	Roof	Main	↓
9	28	2197 - 651 - 109	B	Roof	Main	↓
10	28	2197 - 651 - 110	B	Roof	Main	↓

set 26 — set 27 — 28

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013133							
2	3134							
3	3135							
4	3136							
5	3137							
6	3138							
7	3139							
8	3140							
9	3141							
10	3142							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01-17-01 TIME: 1:45pm INITIALS: JP
ANALYZED BY: [signature]
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00457 — SHEET 12 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	28	2197 - 651 - 111	B	Roof	Main	Composition Roofing Material - Type 1 - Main Roof
2	28	2197 - 651 - 112	B	Roof	Main	
3	29	2197 - 651 - 113	B	Roof	Main	Composition Flashing Material - Type 1 - Main Roof
4	29	2197 - 651 - 114	B	Roof	Main	
5	29	2197 - 651 - 115	B	Roof	Main	
6	29	2197 - 651 - 116	B	Roof	Main	
7	29	2197 - 651 - 117	B	Roof	Main	Flashing at Access Hatches - Main Roof
8	30	2197 - 651 - 118	B	Roof	Main	
9	30	2197 - 651 - 119	B	Roof	Main	Beige Paint w/Black Asphaltic Under Coat. - Main Roof
10	31	2197 - 651 - 120	B	Roof	Main	

28 29 30 31

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013143							
2	3144							
3	~~3145~~							
4	~~3146~~							
5								
6								
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 01-17-01 TIME: 12:15pm INITIALS: JP
ANALYZED BY: [signature]
LAB Q.C. APPROVAL: [signature]
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

(26)

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00456 — SHEET 12 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
28	1	28	2197 - 651 - 111	B	Roof	Main	Composition Roofing Material - Type 1 - Main Roof
	2	28	2197 - 651 - 112	B	Roof	Main	Composition Flashing Material - Type 1 - Main Roof
	3	29	2197 - 651 - 113	B	Roof	Main	
	4	29	2197 - 651 - 114	B	Roof	Main	
29	5	29	2197 - 651 - 115	B	Roof	Main	
	6	29	2197 - 651 - 116	B	Roof	Main	
	7	29	2197 - 651 - 117	B	Roof	Main	Flashing at Access Hatches - Main Roof
30	8	30	2197 - 651 - 118	B	Roof	Main	
	9	30	2197 - 651 - 119	B	Roof	Main	Beige Paint w/Black Asphaltic Under Coat - Main Roof
31	10	31	2197 - 651 - 120	B	Roof	Main	

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1								
2								
3	21013145							
4	3146							
5	3147							
6	3148							
7	3149							
8	3150							
9	3151							
10	3152							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

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D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: Julian Parker
DATE: 01-17-01 TIME: 12:15 pm INITIALS: JP
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-004156 — SHEET 13 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
31	1	31	2197 - 651 - 121	B	Roof	Main	Beige Paint w/Black Asphaltic Under Coat - Main Roof
	2	32	2197 - 651 - 122	B	Roof	Main	Mastic @ Roof Vents - 8"-10" - Main Roof
32	3	32	2197 - 651 - 123	B	Roof	Main	↓ ↓ ↓ ↓ - ↓ ↓ - ↓ ↓
	4	33	2197 - 651 - 124	B	Roof	Main	Mastic @ Roof Vents - 2" - main Roof
33	5	33	2197 - 651 - 125	B	Roof	MAIN	↓ ↓ ↓ ↓ - ↓ - ↓ ↓
	6	34	2197 - 651 - 126	B	Roof	Lower-	Composition Built-up Roofing Material - Type 2 - Lower Roof
34	7	34	2197 - 651 - 127	B	Roof	Lower-	↓ ↓ ↓ ↓ ↓ - ↓ ↓ - ↓ ↓
	8	34	2197 - 651 - 128	B	Roof	Lower-	-
	9	34	2197 - 651 - 129	B	Roof	Lower-	-
35	10	35	2197 - 651 - 130	B		MK	HOT WATER TANK INSULATION

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21013153							
2	3154							
3	3155							
4	3156							
5	3157							
6	3158							
7	3159							
8	3160							
9	3161							
10	3162							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 01/10/01 TIME: 1:45 pm INITIALS: JP
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00458 — SHEET 14 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	35	2197 - 651 - 131	B	1	MR	HOT WATER TANK INSULATION
2	35	2197 - 651 - 132	B			FIBERGLASS PIPE INSULATION - JOINT ADHESIVE/MASTIC
3	36	2197 - 651 - 133	B			
4		2197 - 651 - 134	B			
5		2197 - 651 - 135	B			
6		2197 - 651 - 136	B			
7		2197 - 651 - 137	B			FIBERGLASS PIPE INSULATION - HANGERS
8	37	2197 - 651 - 138	B			
9	37	2197 - 651 - 139	B	1	MR	VIBRATION CLOTH - WOVEN FABRIC - WHITE
10	38	2197 - 651 - 140	B			

35 / 36 / 37 / 38

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	21,21,21,23							
2	2124							
3	2125							
4	2126							
5	2127							
6	2128							
7	2129							
8	2170							
9	2171							
10	2172							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

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D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 01/10/01 TIME: 1:45 INITIALS: JT
ANALYZED BY: [illegible]
LAB Q.C. APPROVAL: NC
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

38

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM 21-00459 SHEET 15 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	39	2197 - 651 - 141	B	1		FIBERGLASS PIPE INSULATION - JOINT ADHESIVE/SEALANT
2		2197 - 651 - 142	B			
3		2197 - 651 - 143	B			
4		2197 - 651 - 144	B			
5		2197 - 651 - 145	B			
6		2197 - 651 - 146	B			
7	39	2197 - 651 - 147	B			HANGAR/SADDLE
8	40	2197 - 651 - 148	B			
9	40	2197 - 651 - 149	B			
10	40	2197 - 651 - 150	B			

39

40

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 3173							
2	3174							
3	3175							
4	3176							
5	3177							
6	3178							
7	3179							
8	3180							
9	3181							
10	3182							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: peelgar
DATE: 1/10/01 TIME: 1:45pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00459 — SHEET 16 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	40	2197 - 651 - 151	B	1		SADDLES - FIBERGLASS PIPE INSULATION
2	40	2197 - 651 - 152	B	1		
3	41	2197 - 651 - 153	B	1		BROWN MASTIC - HVAC SYSTEM
4	42	2197 - 651 - 154	B	1		BLACK MASTIC - HVAC SYSTEM
5	43	2197 - 651 - 155	B	2	263	JOINT ADHESIVE / MASTIC - FIBERGLASS PIPE INSULATION
6		2197 - 651 - 156	B	2	247	
7		2197 - 651 - 157	B	2	R.R.	
8		2197 - 651 - 158	B	2	233	
9		2197 - 651 - 159	B	2	213	
10	43	2197 - 651 - 160	B	2	210	JOINT ADHESIVE / MASTIC

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 3183							
2	3184							
3	3185							
4	3186							
5	3187							
6	3188							
7	3189							
8	3190							
9	3191							
10	3192							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

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D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/11/01 TIME: INITIALS: JR
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00459 — SHEET 17 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	43	2197 - 651 - 161	B	2	RR	Joint Adhesive/Mastic — Fiberglass Pipe Insulation
2	44	2197 - 651 - 162	B	2	260	Saddle
3		2197 - 651 - 163	B	2	R.R.	
4		2197 - 651 - 164	B	2	231	
5		2197 - 651 - 165	B	2	210	
6	44	2197 - 651 - 166	B	2	R.R.	Saddle
7	45	2197 - 651 - 167	B	3	305	Joint Adhesive Mastic
8		2197 - 651 - 168	B	3	316	
9		2197 - 651 - 169	B	3	328	
10	45	2197 - 651 - 170	B	3	R.R.	

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 3193							
2	3194							
3	3195							
4	3196							
5	3197							
6	3198							
7	3199							
8	3200							
9	3201							
10	3202							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01.17.01 TIME: 11:45 pm INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-00459 — SHEET 16 OF 18

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	45	2197 - 651 - 171	B	3	343	Joint Adhesive Mastic - Fiberglass Pipe Insulation
2	↓	2197 - 651 - 172	B	3	360	↓ ↓ ↓
3	45	2197 - 651 - 173	B	3	R.R.	
4	46	2197 - 651 - 174	B	3	hallway	Saddles
5	↓	2197 - 651 - 175	B	3	R.R.	↓
6		2197 - 651 - 176	B	3	335	
7	↓	2197 - 651 - 177	B	3	360	
8	46	2197 - 651 - 178	B	3	R.R.	
9		2197 - 651 -	B			Clothing Follows
10		2197 - 651 -	B			

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	3203							
2	3204							
3	3205							
4	3206							
5	3207							
6	3208							
7	3209							
8	3210							
9								
10								

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 01/10/01 TIME: 11:45pr INITIALS: JP
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/2/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — (23) 21-01142 — SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	1	2197 - 651 - 179	B	1	Exterior Walkway	Cementitious Wall Plaster - Exterior - 1st Floor
2		2197 - 651 - 180	B	1	↓	↓
3		2197 - 651 - 181	B	1	↓	↓
4	2	2197 - 651 - 182	B	1	Rest Room	Cementitious Wall Plaster - 1st Floor Restrooms
5		2197 - 651 - 183	B	1	Restroom	↓
6	3	2197 - 651 - 184	B	2	Comm. RR	Cementitious Plaster - Hollow Plaster & Lathe Wall System - 2nd Fl.
7		2197 - 651 - 185	B	2	Comm. RR	↓
8	4	2197 - 651 - 186	B	2	Rest Room	Cementitious Plaster - Private Restrooms (Walls) 2nd Fl.
9		2197 - 651 - 187	B	2	Restroom	↓
10	5	2197 - 651 - 188	B	2	Walkway	Cementitious Wall Plaster - Exterior Walkways - 2nd Fl.

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2102 2067							
2	2068							
3	2069							
4	2070							
5	2071							
6	2072							
7	2073							
8	2074							
9	2075							
10	2076							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 48 (per mon) Rush -5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 2/8/01 TIME: 1:15PM INITIALS: TG
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 2/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-01142 — SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	5	2197 - 651 - 189	B	2	Walkway	Cementitious Wall Plaster - Exterior Walkways - 2nd Fl.
2		2197 - 651 - 190	B	2	Walkway	↓
3	6	2197 - 651 - 191	B	3	Restroom	Cementitious Plaster - Hollow Plaster & Lathe Wall System, 3rd Fl.
4		2197 - 651 - 192	B	3	Restroom	↓
5	7	2197 - 651 - 193	B	3	Private BR	Cementitious Wall Plaster - Private Restrooms, 3rd Floor
6		2197 - 651 - 194	B	3	Private BR	↓
7	8	2197 - 651 - 195	B	3	walkway	Cementitious Wall Plaster - Exterior Walkways, 3rd Floor
8		2197 - 651 - 196	B	3	↓	↓
9		2197 - 651 - 197	B	3	↓	↓
10	9	2197 - 651 - 198	B	Roof	Roof	Asphaultic Mount Flashing

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2102 2077							
2	2078							
3	2079							
4	2080							
5	2081							
6	2082							
7	2083							
8	2084							
9	2085							
10	2086							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

Rush

REQUESTED COMPLETION DATE: -5 -10 day turn-around-
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: Thum
DATE: 2/8/01 TIME: 1:15 PM INITIALS: TG
ANALYZED BY: wl
LAB Q.C. APPROVAL: NL
DATE: 2/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-01142 SHEET 1 OF ___

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	9	2197 - 651 - 199	B	Roof	Roof	Asphaltic Mount Flashing
2	10	2197 - 651 - 200	B	1	Office	VFT - Tan w/Olive Streaks MAT 20
3	10	2197 - 651 - 201	B	1	↓	↓ ↓ ↓ ↓ " "
4		2197 - 651 -	B			
5		2197 - 651 -	B			
6		2197 - 651 -	B			
7		2197 - 651 -	B			
8		2197 - 651 -	B			
9		2197 - 651 -	B			
10		2197 - 651 -	B			

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2102 2087							
2	2088							
3	2089							
4								
5								
6								
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: Rush ~~5-10 day turn around~~
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 2/8/01 TIME: 1:15pm INITIALS: TG
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 2/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-01568 — SHEET 1 OF 1

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 651, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1		2197 - 651 -	B			
2	01	2197 - 651 - 202	B	1	Exterior	Cementitious Wall Plaster - Type II
3	01	2197 - 651 - 203	B	1	↓	↓
4	01	2197 - 651 - 204	B	1	↓	↓
5		2197 - 651 -	B			
6		2197 - 651 -	B			
7		2197 - 651 -	B			
8		2197 - 651 -	B			
9		2197 - 651 -	B			
10		2197 - 651 -	B			

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2102 5389							
2	5390							
3	5391							
4								
5								
6								
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

***SAMPLE TYPE CODES**

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: RUSH
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: David Napoleon & Douglas Tisdell
SIGNATURE: [illegible]
DATE: 2/01/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 2/ 21/01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [illegible]
DATE: 2/23/01 TIME: 9AM INITIALS: TC
ANALYZED BY:
LAB Q.C. APPROVAL: NVL
DATE: 2/28/01

APPROVAL SIGNATURE (PROJECT MANAGER):

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013033 **Client Sample #: 2197-651-001**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Blue paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 25%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013034 **Client Sample #: 2197-651-002**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint with white fibrous material LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint, Fine particles
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013035 **Client Sample #: 2197-651-003**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint with white fibrous material LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint, Fine particles
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013036 **Client Sample #: 2197-651-004**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint with white fibrous material LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint, Fine particles
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013037 Client Sample #: 2197-651-005

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint with white fibrous material LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint, Fine particles
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013038 Client Sample #: 2197-651-006

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013039 **Client Sample #: 2197-651-007**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: White paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	<1%
LAYER 3:	*None Detected	ND

Lab ID #: 21013040 **Client Sample #: 2197-651-008**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013041 Client Sample #: 2197-651-009

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013042 Client Sample #: 2197-651-010

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013043 **Client Sample #: 2197-651-011**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013044 **Client Sample #: 2197-651-012**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix, Metal

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Tel: 206.547.0100
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NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013045 **Client Sample #: 2197-651-013**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Fine particles, Calcareous matrix, Metal

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013046 **Client Sample #: 2197-651-014**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix, Metal

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013047 **Client Sample #: 2197-651-015**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Fine particles, Calcareous matrix, Metal

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

ASBESTOS TYPE:		PERCENT
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013048 Client Sample #: 2197-651-016

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: White paint LAYER 2: White compacted powdery material with blue woven fiber LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%, Glass fibers 5%
LAYER 3: Cellulose 35%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix, Metal

ASBESTOS TYPE:		PERCENT
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013049 Client Sample #: 2197-651-017

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material with LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix, Metal

ASBESTOS TYPE:		PERCENT
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013050 **Client Sample #: 2197-651-018**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/green paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Fine particles, Calcareous matrix, Metal

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013051 **Client Sample #: 2197-651-019**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/green paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 35%, Glass fibers 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Fine particles, Calcareous matrix, Metal

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013052 **Client Sample #: 2197-651-020**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013053 **Client Sample #: 2197-651-021**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013054 **Client Sample #: 2197-651-022**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013055 **Client Sample #: 2197-651-023**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013056 **Client Sample #: 2197-651-024**
Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013057 **Client Sample #: 2197-651-025**
Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013058 **Client Sample #: 2197-651-026**
Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Brown fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013059 **Client Sample #: 2197-651-027**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: White/green paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	2%

Lab ID #: 21013060 **Client Sample #: 2197-651-028**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	2%

Lab ID #: 21013061 **Client Sample #: 2197-651-029**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: White paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Glass fibers 3%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013062 **Client Sample #: 2197-651-030**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White compacted powdery material LAYER 3: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Polyethylene fibers 4%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Calcareous matrix, Sands

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013063 **Client Sample #: 2197-651-031**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013064 **Client Sample #: 2197-651-032**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013065 **Client Sample #: 2197-651-033**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	<1%

Lab ID #: 21013066 **Client Sample #: 2197-651-034**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013067 **Client Sample #: 2197-651-035**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: White granular/sandy material

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013068 **Client Sample #: 2197-651-036**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013069 **Client Sample #: 2197-651-037**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: White granular/sandy material

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

*None Detected	ND

Lab ID #: 21013070 **Client Sample #: 2197-651-038**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: White granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013071 **Client Sample #: 2197-651-039**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Grey tile LAYER 2: Brown mastic and trace black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder, Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Lab ID #: 21013072 **Client Sample #: 2197-651-040**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Grey tile LAYER 2: Brown mastic LAYER 3: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder
LAYER 3: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00456.00
Client Project #: 2197-01F
Number of samples: 24

Lab ID #: 21013073 **Client Sample #: 2197-651-041**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige vinyl tile with white/oilve specks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 7%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	5%

Lab ID #: 21013078 **Client Sample #: 2197-651-046**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white vinyl with brown streaks, LAYER 2: Black/yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	2%

Lab ID #: 21013079 **Client Sample #: 2197-651-047**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white vinyl with brown streaks, LAYER 2: Black/yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE: *PERCENT*

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00456.00
Client Project #: 2197-01F
Number of samples: 24

LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND

Lab ID #: 21013080 **Client Sample #: 2197-651-048**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white vinyl with brown streaks, LAYER 2: Black/yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND

Lab ID #: 21013081 **Client Sample #: 2197-651-049**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Olive vinyl tile, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	3%
LAYER 2:	Chrysotile	4%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00456.00
Client Project #: 2197-01F
Number of samples: 24

Lab ID #: 21013084 **Client Sample #: 2197-651-052**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile with brown/black streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013085 **Client Sample #: 2197-651-053**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile with brown/black streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013086 **Client Sample #: 2197-651-054**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Light green vinyl tile, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00456.00
Client Project #: 2197-01F
Number of samples: 24

LAYER 1:	Chrysotile	3%
LAYER 2:	Chrysotile	4%

Lab ID #: 21013090 **Client Sample #: 2197-651-058**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White vinyl tile with black streaks, LAYER 2: Black/yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21013091 **Client Sample #: 2197-651-059**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White vinyl tile with black streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00456.00
Client Project #: 2197-01F
Number of samples: 24

Lab ID #: 21013092 **Client Sample #: 2197-651-060**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White vinyl tile with black streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013093 **Client Sample #: 2197-651-061**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile with black/gray streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	4%

Sample comments: This sample appears to be different from samples 058,059,060 and 062

Lab ID #: 21013094 **Client Sample #: 2197-651-062**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White vinyl tile with black/gray streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00456.00
Client Project #: 2197-01F
Number of samples: 24

ASBESTOS TYPE:		PERCENT
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013095 **Client Sample #: 2197-651-063**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile with black/gray streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		PERCENT
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	4%

Sample comments: This sample appears to be different from samples 058,059,060 and 062

Lab ID #: 21013096 **Client Sample #: 2197-651-064**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Blue vinyl tile, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:		PERCENT
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	4%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00456.00
Client Project #: 2197-01F
Number of samples: 24

Lab ID #: 21013097 **Client Sample #: 2197-651-065**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Blue vinyl tile, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	4%

Lab ID #: 21013098 **Client Sample #: 2197-651-066**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White/gray vinyl material, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013099 **Client Sample #: 2197-651-067**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl material, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00456.00
Client Project #: 2197-01F
Number of samples: 24

LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	3%

Lab ID #: 21013101 **Client Sample #: 2197-651-069**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black flat rubbery material, LAYER 2: Yellow/brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013102 **Client Sample #: 2197-651-070**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black flat rubbery material, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00456.00
Client Project #: 2197-01F
Number of samples: 24

Lab ID #: 21013103 **Client Sample #: 2197-651-071**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black flat rubbery material, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013104 **Client Sample #: 2197-651-072**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black flat rubbery material, LAYER 2: Yellow/brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013105 **Client Sample #: 2197-651-073**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black flat rubbery material, LAYER 2: Yellow/brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00456.00
Client Project #: 2197-01F
Number of samples: 24

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013106 **Client Sample #: 2197-651-074**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black flat rubbery material, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013107 Client Sample #: 2197-651-075

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/black/green paint LAYER 2: Brown brittle mastic LAYER 3: Brown rubbery material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 4%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Mastic/binder
LAYER 3: Rubber/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013108 Client Sample #: 2197-651-076

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Red paint LAYER 2: Brown brittle mastic LAYER 3: Brown rubbery material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 4%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Mastic/binder
LAYER 3: Rubber/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

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Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013109 **Client Sample #: 2197-651-077**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/black paint LAYER 2: Brown brittle mastic LAYER 3: Brown rubbery material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 4%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Mastic/binder
LAYER 3: Rubber/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013110 **Client Sample #: 2197-651-078**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Blue/black paint LAYER 2: Brown brittle mastic LAYER 3: Brown rubbery material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 4%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Mastic/binder
LAYER 3: Rubber/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013111 Client Sample #: 2197-651-079

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/black paint LAYER 2: Brown brittle mastic LAYER 3: Brown rubbery material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 4%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Mastic/binder
LAYER 3: Rubber/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013112 Client Sample #: 2197-651-080

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: Brown soft mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013113 **Client Sample #: 2197-651-081**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: Brown mastic LAYER 3: Beige/black paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder
LAYER 3: Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013114 **Client Sample #: 2197-651-082**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: Brown mastic LAYER 3: LAYER 3: Brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 75%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder
LAYER 3: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

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NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013115 Client Sample #: 2197-651-083

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Brown/black paint LAYER 2: Brown brittle mastic LAYER 3: Brown rubbery material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Talc fibers 4%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Mastic/binder
LAYER 3: Rubber/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013116 Client Sample #: 2197-651-084

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013117 Client Sample #: 2197-651-085

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

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NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013118 **Client Sample #: 2197-651-086**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013119 **Client Sample #: 2197-651-087**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013120 **Client Sample #: 2197-651-088**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013121 **Client Sample #: 2197-651-089**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013122 **Client Sample #: 2197-651-090**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013123 **Client Sample #: 2197-651-091**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

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Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013124 **Client Sample #: 2197-651-092**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013125 **Client Sample #: 2197-651-093**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013126 **Client Sample #: 2197-651-094**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

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NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013127 **Client Sample #: 2197-651-095**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Fine particles, Paint, Perlite, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013128 **Client Sample #: 2197-651-096**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Fine particles, Paint, Perlite, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013129 **Client Sample #: 2197-651-097**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Fine particles, Paint, Perlite, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

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NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013130 **Client Sample #: 2197-651-098**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Fine particles, Paint, Perlite, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013131 **Client Sample #: 2197-651-099**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Fine particles, Paint, Perlite, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013132 **Client Sample #: 2197-651-100**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey brittle material with fibers and surface paint

OTHER FIBROUS MATERIALS:
Glass fibers 45%, Cellulose 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Glass beads, Fine particles, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

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Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013133 **Client Sample #: 2197-651-101**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey brittle material with fibers and surface paint

OTHER FIBROUS MATERIALS:
Glass fibers 45%, Cellulose 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Glass beads, Fine particles, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013134 **Client Sample #: 2197-651-102**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey brittle material with fibers and surface paint

OTHER FIBROUS MATERIALS:
Glass fibers 45%, Cellulose 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Glass beads, Fine particles, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013135 **Client Sample #: 2197-651-103**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey brittle material with fibers and surface paint

OTHER FIBROUS MATERIALS:
Glass fibers 45%, Cellulose 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Glass beads, Fine particles, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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4708 Aurora Ave. N., Seattle, WA 98103
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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013136 **Client Sample #: 2197-651-104**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey brittle material with surface paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	35%

Lab ID #: 21013137 **Client Sample #: 2197-651-105**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material LAYER 2: Grey fibrous and porous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 3%
LAYER 2: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Fine particles, Perlite

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013138 **Client Sample #: 2197-651-106**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material LAYER 2: Grey fibrous and porous material LAYER 3: Brown foamy material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 3%
LAYER 2: Cellulose 45%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Fine particles, Perlite
LAYER 3: Synthetic foam

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

(Lab ID#: 21013138 Client Sample #: 2197-651-106 results continued from previous page)

LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013139 Client Sample #: 2197-651-107

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material with mineral grains LAYER 2: Grey fibrous and porous material LAYER 3: Brown foamy material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 3%
LAYER 2: Cellulose 45%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder, Mineral grains
LAYER 2: Fine particles, Perlite
LAYER 3: Synthetic foam

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013140 Client Sample #: 2197-651-108

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material with mineral grains LAYER 2: Grey fibrous and porous material LAYER 3: Brown foamy material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 3%
LAYER 2: Cellulose 45%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder, Mineral grains
LAYER 2: Fine particles, Perlite
LAYER 3: Synthetic foam

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

Lab ID #: 21013141 **Client Sample #: 2197-651-109**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material with mineral grains LAYER 2: Grey fibrous and porous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 3%
LAYER 2: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder, Mineral grains
LAYER 2: Fine particles, Perlite

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013142 **Client Sample #: 2197-651-110**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material with mineral grains LAYER 2: Grey fibrous and porous material LAYER 3: Brown foamy material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 3%
LAYER 2: Cellulose 45%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder, Mineral grains
LAYER 2: Fine particles, Perlite
LAYER 3: Synthetic foam

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013143 **Client Sample #: 2197-651-111**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material with mineral grains LAYER 2: Grey fibrous and porous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 3%
LAYER 2: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder, Mineral grains
LAYER 2: Fine particles, Perlite

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00457.00
Client Project #: 2197-01F
Number of samples: 38

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013144 **Client Sample #: 2197-651-112**

Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material with mineral grains LAYER 2: Grey fibrous and porous material LAYER 3: Brown foamy material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 3%
LAYER 2: Cellulose 45%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder, Mineral grains
LAYER 2: Fine particles, Perlite
LAYER 3: Synthetic foam

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00458.00
Client Project #: 2197-01F
Number of samples: 26

Lab ID #: 21013145 **Client Sample #: 2197-651-113**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic material with granules

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fiber 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Sand/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013146 **Client Sample #: 2197-651-114**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic material with granules

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fiber 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Sand/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013147 **Client Sample #: 2197-651-115**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic material with granules

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fiber 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Sand/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00458.00
Client Project #: 2197-01F
Number of samples: 26

Lab ID #: 21013148 **Client Sample #: 2197-651-116**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic material with granules

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fiber 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Sand/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013149 **Client Sample #: 2197-651-117**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic material with granules

OTHER FIBROUS MATERIALS:
Cellulose 5%, Synthetic fiber 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Sand/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013150 **Client Sample #: 2197-651-118**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material, LAYER 2: Black asphaltic material with granules

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%, Glass fibers 25%
LAYER 2: Glass fibers 20%, Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Asphalt/binder, Sand/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00458.00
Client Project #: 2197-01F
Number of samples: 26

Lab ID #: 21013151 **Client Sample #: 2197-651-119**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material with granules, LAYER 2: Tan fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%, Synthetic fiber 30%
LAYER 2: Cellulose 80%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder, Sand/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013152 **Client Sample #: 2197-651-120**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material, LAYER 2: Black asphaltic material with granules, LAYER 3: Gray sandy brittle mterial

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 30%
LAYER 2: Cellulose 3%, Synthetic fiber 25%
LAYER 3: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Asphalt/binder, Sand/binder
LAYER 3: Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013153 **Client Sample #: 2197-651-121**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic material, LAYER 2: Black asphaltic material with granules

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%, Synthetic fiber 30%
LAYER 2: Cellulose 3%, Synthetic fiber 25%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder
LAYER 2: Asphalt/binder, Sand/binder

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00458.00
Client Project #: 2197-01F
Number of samples: 26

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013154 **Client Sample #: 2197-651-122**
Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 7%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	PERCENT
Chrysotile	5%

Lab ID #: 21013156 **Client Sample #: 2197-651-124**
Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic built-up material

OTHER FIBROUS MATERIALS:
Cellulose 10%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	PERCENT
Chrysotile	7%

Lab ID #: 21013158 **Client Sample #: 2197-651-126**
Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic built-up material

OTHER FIBROUS MATERIALS:
Cellulose 3%, Glass fibers 30%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	PERCENT
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00458.00
Client Project #: 2197-01F
Number of samples: 26

Lab ID #: 21013159 **Client Sample #: 2197-651-127**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic built-up material

OTHER FIBROUS MATERIALS:
Cellulose 3%, Glass fibers 30%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013160 **Client Sample #: 2197-651-128**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Black asphaltic built-up material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 27%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Asphalt/binder, Sand
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013161 **Client Sample #: 2197-651-129**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic built-up material

OTHER FIBROUS MATERIALS:
Cellulose 3%, Glass fibers 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Sand

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00458.00
Client Project #: 2197-01F
Number of samples: 26

Lab ID #: 21013162 **Client Sample #: 2197-651-130**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Gray brittle material with paint, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%, Glass fibers 35%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013163 **Client Sample #: 2197-651-131**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Gray brittle material with paint, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%, Glass fibers 35%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013164 **Client Sample #: 2197-651-132**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Gray brittle material with paint, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%, Glass fibers 35%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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4708 Aurora Ave. N., Seattle, WA 98103
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Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00458.00
Client Project #: 2197-01F
Number of samples: 26

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013165 **Client Sample #: 2197-651-133**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating with gray paint, LAYER 2: Sliver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 55%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013166 **Client Sample #: 2197-651-134**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating with gray paint, LAYER 2: Sliver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 55%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00458.00
Client Project #: 2197-01F
Number of samples: 26

Lab ID #: 21013167 **Client Sample #: 2197-651-135**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating with gray paint, LAYER 2: Sliver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 55%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013168 **Client Sample #: 2197-651-136**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White plastic material, LAYER 2: Sliver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 55%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00458.00
Client Project #: 2197-01F
Number of samples: 26

Lab ID #: 21013169 **Client Sample #: 2197-651-137**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating with paint, LAYER 2: Sliver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 55%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013170 **Client Sample #: 2197-651-138**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black lumpy foamy material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Synthetic foam, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013171 **Client Sample #: 2197-651-139**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black lumpy foamy material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Synthetic foam, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00458.00
Client Project #: 2197-01F
Number of samples: 26

Lab ID #: 21013172 **Client Sample #: 2197-651-140**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: White woven fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 40%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
Chrysotile	50%

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21013173 Client Sample #: 2197-651-141

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and paper, LAYER 2: White plastic material, LAYER 3: Silver paper with mastic and paper, LAYER 4: Pink fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 35%, Glass fibers 15%
LAYER 2: *None Detected
LAYER 3: Cellulose 35%, Glass fibers 15%
LAYER 4: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler
LAYER 3: Binder & filler, Mastic/binder
LAYER 4: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND
LAYER 4:	*None Detected	ND

Lab ID #: 21013174 Client Sample #: 2197-651-142

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: White plastic material, LAYER 3: Silver paper with mastic and paper, LAYER 4: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: *None Detected
LAYER 3: Cellulose 40%, Glass fibers 13%
LAYER 4: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler
LAYER 3: Binder & filler, Mastic/binder
LAYER 4: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND
LAYER 4:	*None Detected	ND

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21013175 **Client Sample #: 2197-651-143**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White woven fibrous material with white soft material LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material, LAYER 4: Tan paper with mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%, Glass fibers 40%
LAYER 2: Cellulose 35%, Glass fibers 15%
LAYER 3: Glass fibers 80%
LAYER 4: Cellulose 60%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler
LAYER 4: Binder & filler, Mastic/binder
LAYER 2:

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND
LAYER 4:	*None Detected	ND

Lab ID #: 21013176 **Client Sample #: 2197-651-144**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21013177 **Client Sample #: 2197-651-145**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013178 **Client Sample #: 2197-651-146**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21013179 **Client Sample #: 2197-651-147**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating with paint, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013180 **Client Sample #: 2197-651-148**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating with paint, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21013181 **Client Sample #: 2197-651-149**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating with paint, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013182 **Client Sample #: 2197-651-150**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating with paint, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21013183 **Client Sample #: 2197-651-151**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White coating with paint, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 40%, Glass fibers 13%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Paint
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013184 **Client Sample #: 2197-651-152**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and paper and paint, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 35%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder, Paint
LAYER 2: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21013185 **Client Sample #: 2197-651-153**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Yellow mastic

OTHER FIBROUS MATERIALS:
Cellulose 3%

NON-FIBROUS MATERIALS:
Mastic/binder

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21013186 **Client Sample #: 2197-651-154**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black mastic

OTHER FIBROUS MATERIALS:
Cellulose 15%

NON-FIBROUS MATERIALS:
Mastic/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	7%

Lab ID #: 21013187 **Client Sample #: 2197-651-155**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21013188 **Client Sample #: 2197-651-156**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013189 **Client Sample #: 2197-651-157**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21013190 **Client Sample #: 2197-651-158**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21013191 **Client Sample #: 2197-651-159**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white coating, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

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Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21013192 **Client Sample #: 2197-651-160**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Gray soft material, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 15%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21013193 **Client Sample #: 2197-651-161**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: White soft material, LAYER 2: Silver paper with mastic and paper, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 15%
LAYER 2: Cellulose 40%, Glass fibers 15%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-00459.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21013194 **Client Sample #: 2197-651-162**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and paper, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 15%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21013195 **Client Sample #: 2197-651-163**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and paper, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 15%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Sampled by: Client
Analyzed by: Wei Long Tai Date: 01/29/2001
Reviewed by: Nick Ly Date: 01/29/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

NVLAP #102063

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Address: 615 Pikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21022067 **Client Sample #: 2197-651-179**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 1%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022068 **Client Sample #: 2197-651-180**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 1%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022069 **Client Sample #: 2197-651-181**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 1%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21022070 **Client Sample #: 2197-651-182**
Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 1%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022071 **Client Sample #: 2197-651-183**
Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 1%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022072 **Client Sample #: 2197-651-184**
Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: **Edward K. Noda & Associates**
Address: **615 Pikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F-Bldg-651, Schofield Barracks, Hawaii**

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21022073 **Client Sample #: 2197-651-185**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022074 **Client Sample #: 2197-651-186**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022075 **Client Sample #: 2197-651-187**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: **Edward K. Noda & Associates**
Address: **615 Pikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F-Bldg-651, Schofield Barracks, Hawaii**

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21022076 **Client Sample #: 2197-651-188**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022077 **Client Sample #: 2197-651-189**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022078 **Client Sample #: 2197-651-190**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: **Edward K. Noda & Associates**
Address: **615 Pikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F-Bldg-651, Schofield Barracks, Hawaii**

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21022079 **Client Sample #: 2197-651-191**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022080 **Client Sample #: 2197-651-192**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022081 **Client Sample #: 2197-651-193**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21022082 **Client Sample #: 2197-651-194**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Lab ID #: 21022083 **Client Sample #: 2197-651-195**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022084 **Client Sample #: 2197-651-196**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: **Edward K. Noda & Associates**
Address: **615 Pikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F-Bldg-651, Schofield Barracks, Hawaii**

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21022085 **Client Sample #: 2197-651-197**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Gray sandy brittle material with paint

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Binder & filler, Granules

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022086 **Client Sample #: 2197-651-198**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 3%, Glass fibers 17%

NON-FIBROUS MATERIALS:
Asphalt/binder, Granules

ASBESTOS TYPE:	*PERCENT*
Chrysotile	3%

Sample comments: This sample appears to be different from other samples

---

Lab ID #: 21022087 **Client Sample #: 2197-651-199**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 3%, Glass fibers 17%

NON-FIBROUS MATERIALS:
Asphalt/binder, Granules

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
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Fax: 206.634.1936

Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Lab ID #: 21022088 **Client Sample #: 2197-651-200**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND

Lab ID #: 21022089 **Client Sample #: 2197-651-201**

Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii
Description: LAYER 1: Tan vinyl tile, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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4708 Aurora Ave. N., Seattle, WA 98103
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Fax: 206.634.1936

Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-01568.00
Client Project #: 2197-01F
Number of samples: 3

Lab ID #: 21025389 **Client Sample #: 2197-651-202**
Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Sands

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

Lab ID #: 21025390 **Client Sample #: 2197-651-203**
Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Sample not analyzed

OTHER FIBROUS MATERIALS:
Sample not analyzed

NON-FIBROUS MATERIALS:
Sample not analyzed

ASBESTOS TYPE:	*PERCENT*
Sample not analyzed	ND

Lab ID #: 21025391 **Client Sample #: 2197-651-204**
Sample Location: Quad F - Bldg - 651, Schofield Barracks, Hawaii
Description: Sample not analyzed

OTHER FIBROUS MATERIALS:
Sample not analyzed

NON-FIBROUS MATERIALS:
Sample not analyzed

ASBESTOS TYPE:	*PERCENT*
Sample not analyzed	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/26/2001
Reviewed by: Nick Ly Date: 02/26/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Building 651

NESHAP
Point Count Method Result Forms

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: **Edward K. Noda and Associates**
Address: **615 Piikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F - Bldg - 651, Schofield Barracks, Hawaii**
Sample Location: **Quad F - Bldg - 651, Schofield Barracks, Hawaii**

NVL Batch Number: 21-00455.00
Client Project #: 2197-01F
Number of samples: 40

Client Sample #: 2197-651-007

Lab ID #: 21013039

Sample Description: LAYER 1: White paint LAYER 2: White compacted powdery material with white chalky material LAYER 3: Brown paper

NON-FIBROUS MATERIALS:

LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

OTHER FIBROUS MATERIALS:

LAYER 1: Cellulose 2%
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 35%, Glass fibers 5%

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	<1%
LAYER 3:	*None Detected	ND

COMMENTS: Percent determined by NESHAPS Point Count Method = 0.3% asbestos in LAYER 2. Analyzed by NL on 02/23/01.

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/25/2001
Reviewed by: Nick Ly Date: 01/25/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Fax: 206.634.1936

Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii
Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Client Sample #: 2197-651-179

Lab ID #: 21022067

Sample Description: Gray sandy brittle material with paint

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

OTHER FIBROUS MATERIALS:
Cellulose 1%

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

COMMENTS: Percent determined by NESHAPS Point Count Method = 0.3% Asbestos. Analyzed by WL 02/23/2001.

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: **Edward K. Noda & Associates**
Address: **615 Pikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F-Bldg-651, Schofield Barracks, Hawaii**
Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Client Sample #: 2197-651-181

Lab ID #: 21022069

Sample Description: Gray sandy brittle material with paint

NON-FIBROUS MATERIALS:
Binder & filler, Granules, Paint

OTHER FIBROUS MATERIALS:
Cellulose 1%

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

COMMENTS: Percent determined by NESHAPS Point Count Method = 0.3% Asbestos. Analyzed by WL 02/23/2001.

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii
Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Client Sample #: 2197-651-189

Lab ID #: 21022077

Sample Description: Gray sandy brittle material with paint

NON-FIBROUS MATERIALS:
Binder & filler, Granules

OTHER FIBROUS MATERIALS:
Cellulose 2%

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

COMMENTS: Percent determined by NESHAPS Point Count Method = 0.3% Asbestos. Analyzed by WL 02/23/2001.

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-651, Schofield Barracks, Hawaii
Sample Location: Quad F-Bldg-651, Schofield Barracks, Hawaii

NVL Batch Number: 21-01142.00
Client Project #: 2197-01F
Number of samples: 23

Client Sample #: 2197-651-194

Lab ID #: 21022082

Sample Description: Gray sandy brittle material with paint

NON-FIBROUS MATERIALS:
Binder & filler, Granules

OTHER FIBROUS MATERIALS:
Cellulose 2%

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

COMMENTS: Percent determined by NESHAPS Point Count Method = 0.5% Asbestos. Analyzed by WL 02/23/2001.

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
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Summary Report
Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 651, Schofield Barracks, Hawaii

NVL Batch Number: 21-01568.00
Client Project #: 2197-01F
Number of samples: 3

Lab #: 21025389 Client's #: 2197-651-202
Sample description:
Grey granular/sandy material with paint

ASBESTOS TYPE	PERCENT
Chrysotile	2%

Lab #: 21025390 Client's #: 2197-651-203
Sample description:
Sample not analyzed

ASBESTOS TYPE	PERCENT
Sample not analyzed	ND

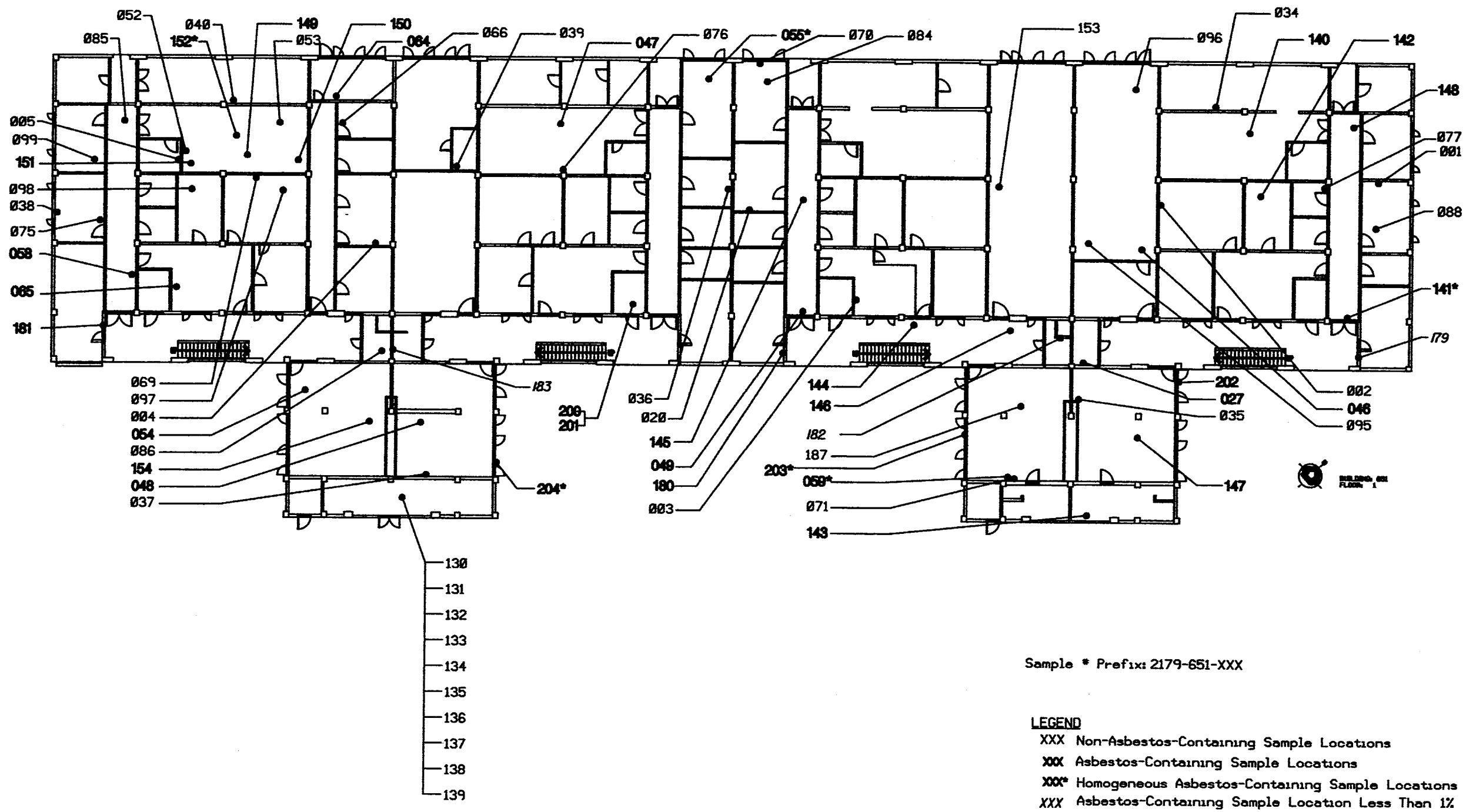
Lab #: 21025391 Client's #: 2197-651-204
Sample description:
Sample not analyzed

ASBESTOS TYPE	PERCENT
Sample not analyzed	ND

DRAFT

Analyzed by: Steve Zhang

Date: 02/26/2001



Sample * Prefix: 2179-651-XXX

LEGEND

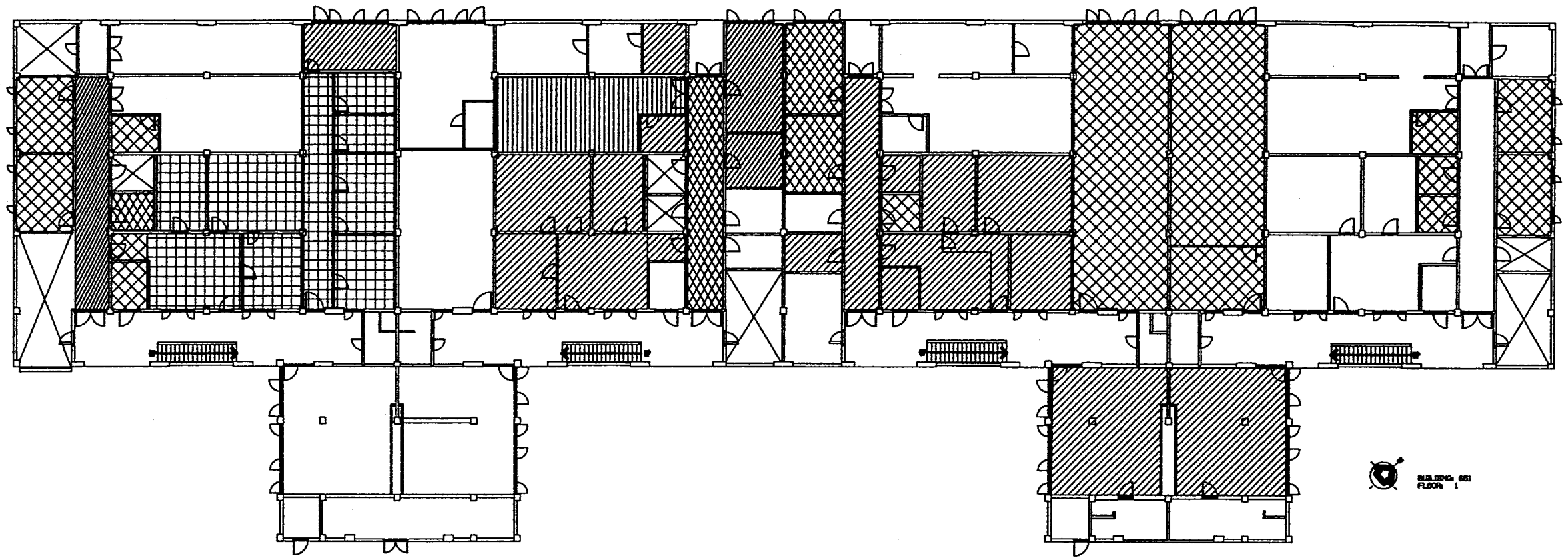
XXX Non-Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Locations

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

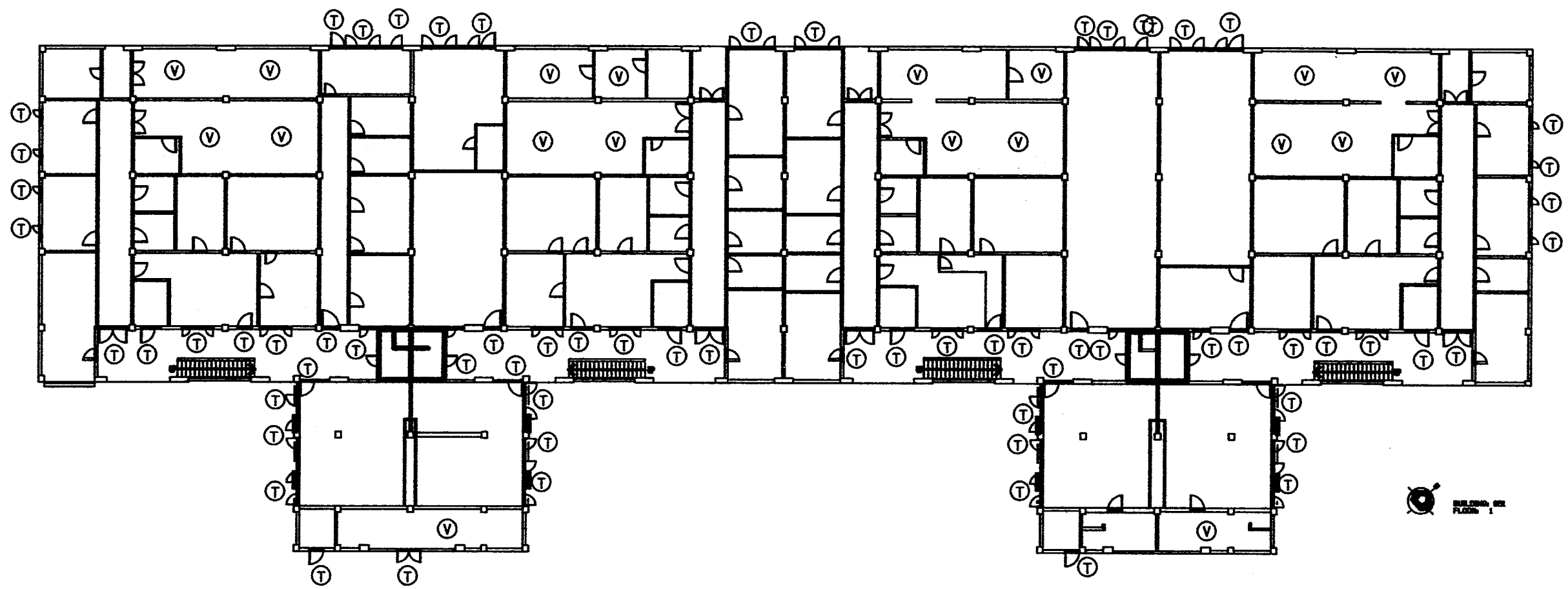
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 651	Sample Locations First Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 651	Extent of Identified ACBM First Floor	Figure 2



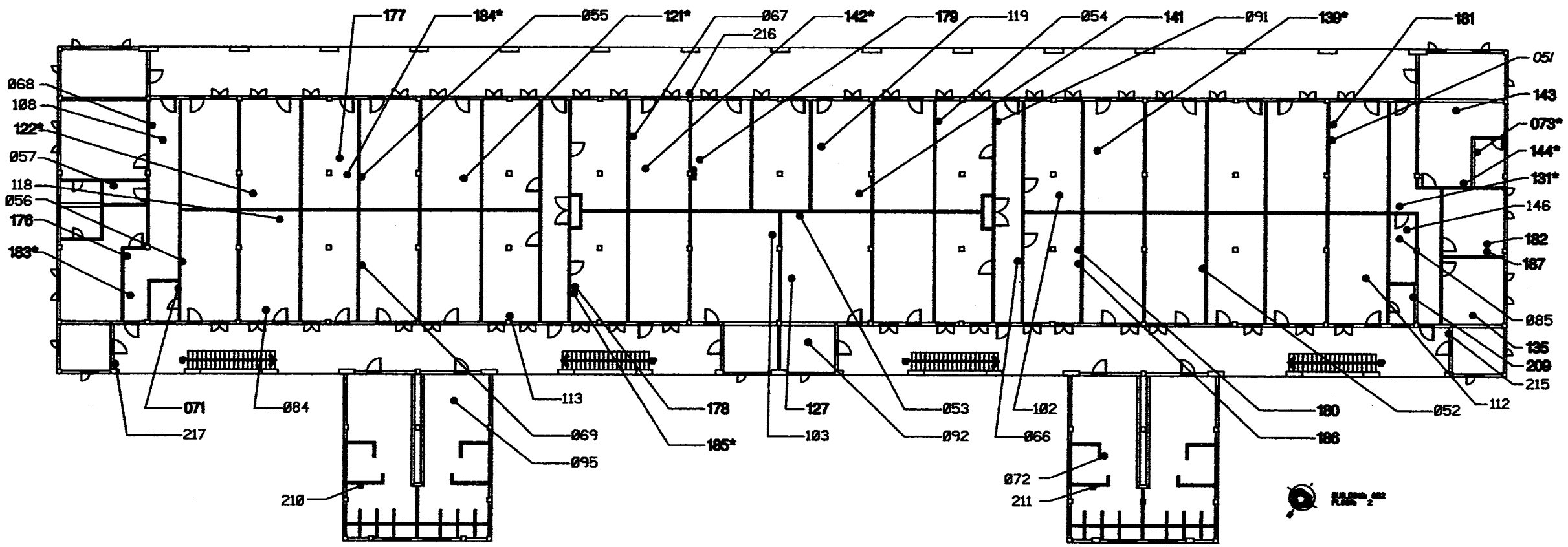
Note:

Asbestos–Containing Joint Adhesive/Sealant–(Off White/Yellow/Orange/Tan) On Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls
- Exterior Cementitious Wall Plaster Type II

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 651	Extent of Identified ACBM First Floor	Figure 3



Sample * Prefix: 2179-652-XXX

LEGEND

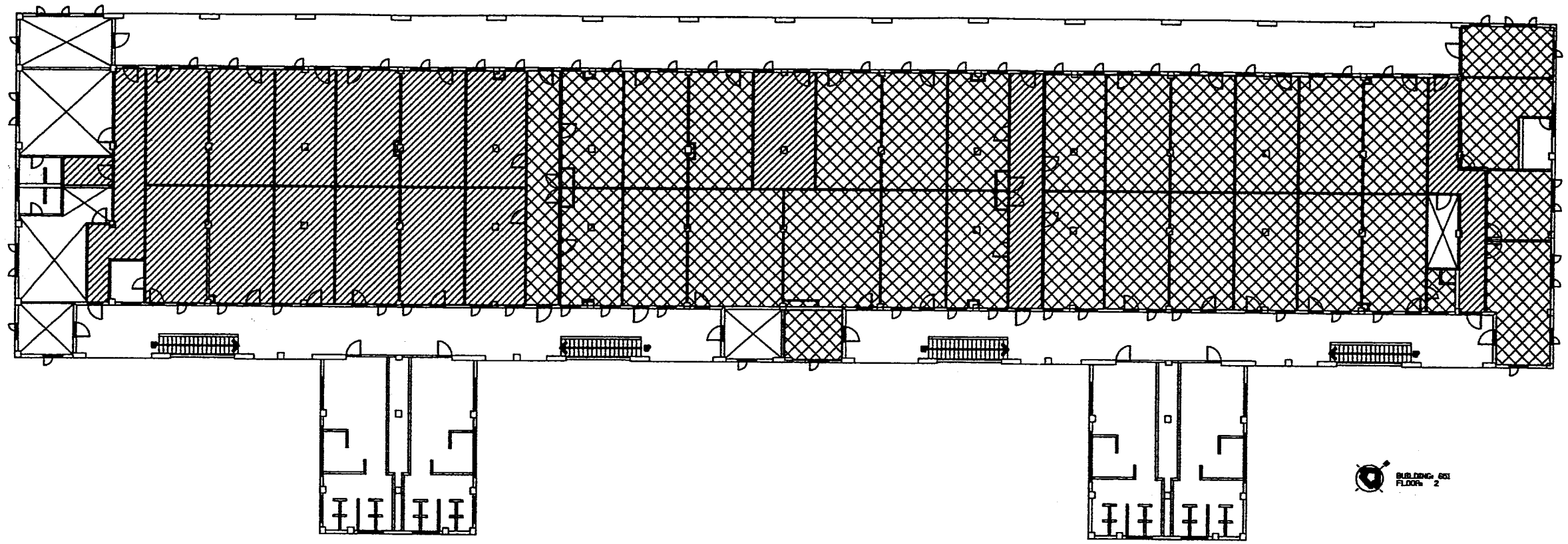
XXX Non-Asbestos-Containing Sample Location

XXX Asbestos-Containing Sample Location

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

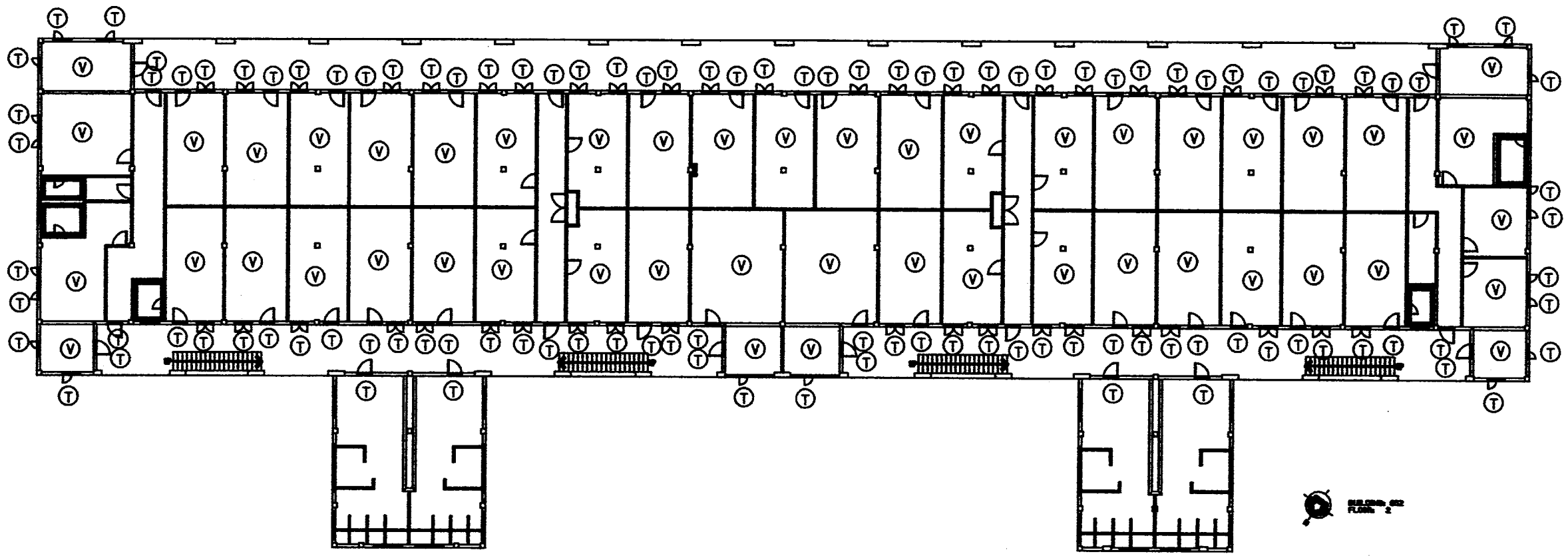
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM Second Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 651	Extent of Identified ACBM Second Floor	Figure 2



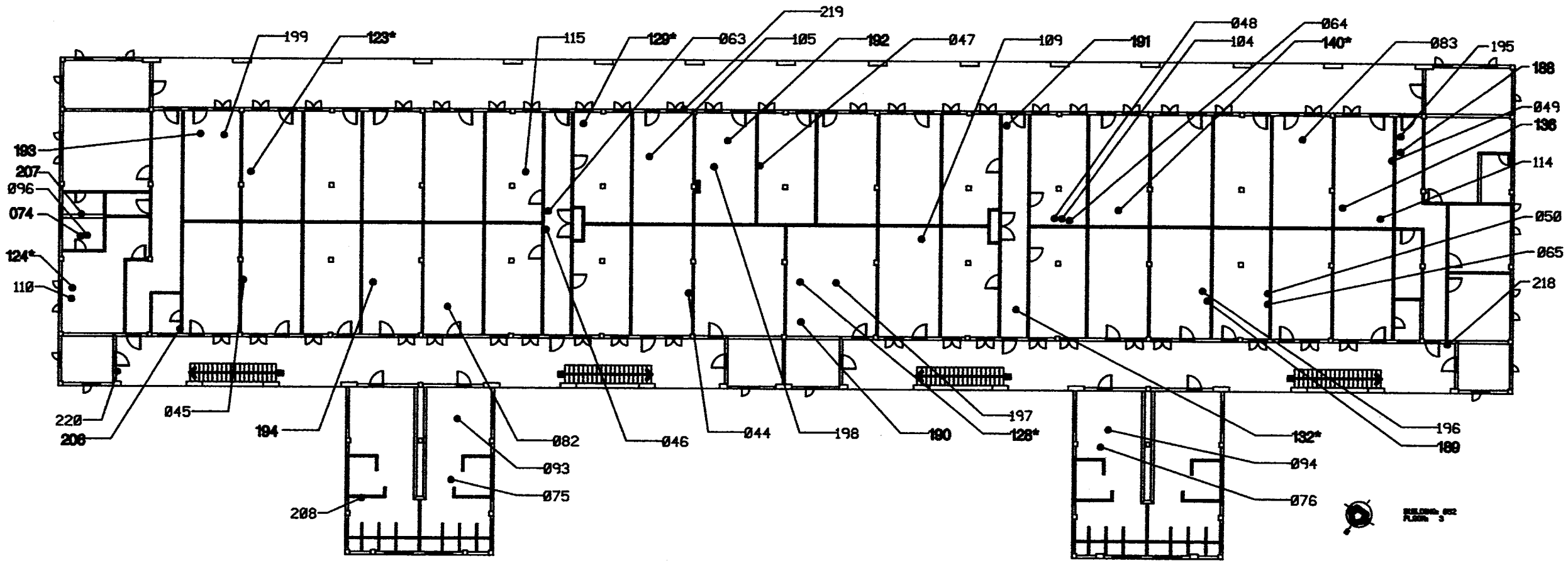
Note:

Asbestos-Containing Joint Adhesive/Sealant-(Off White/Yellow/Orange/Tan) On
Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM Second Floor	Figure 3

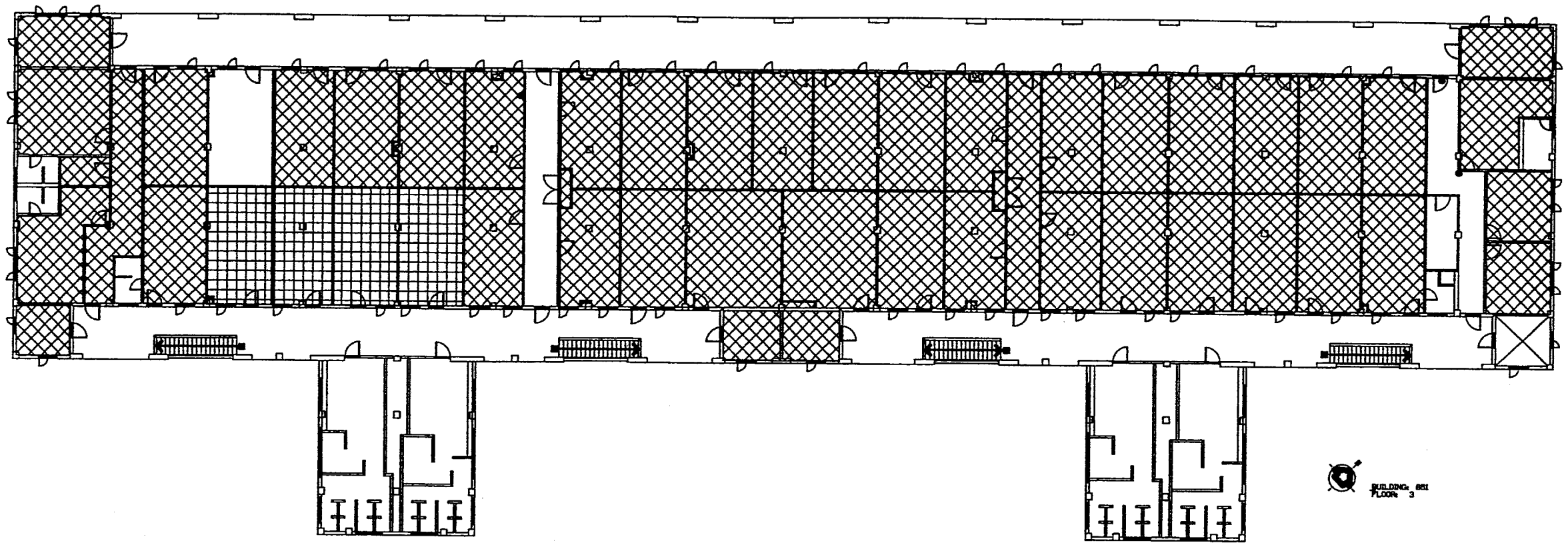


Sample * Prefix: 2179-652-XXX

LEGEND

XXX Non-Asbestos-Containing Sample Locations
XXX Asbestos-Containing Sample Location
XXX* Homogeneous Asbestos-Containing Sample Locations
XXX Asbestos-Containing Sample Location Less Than 1%

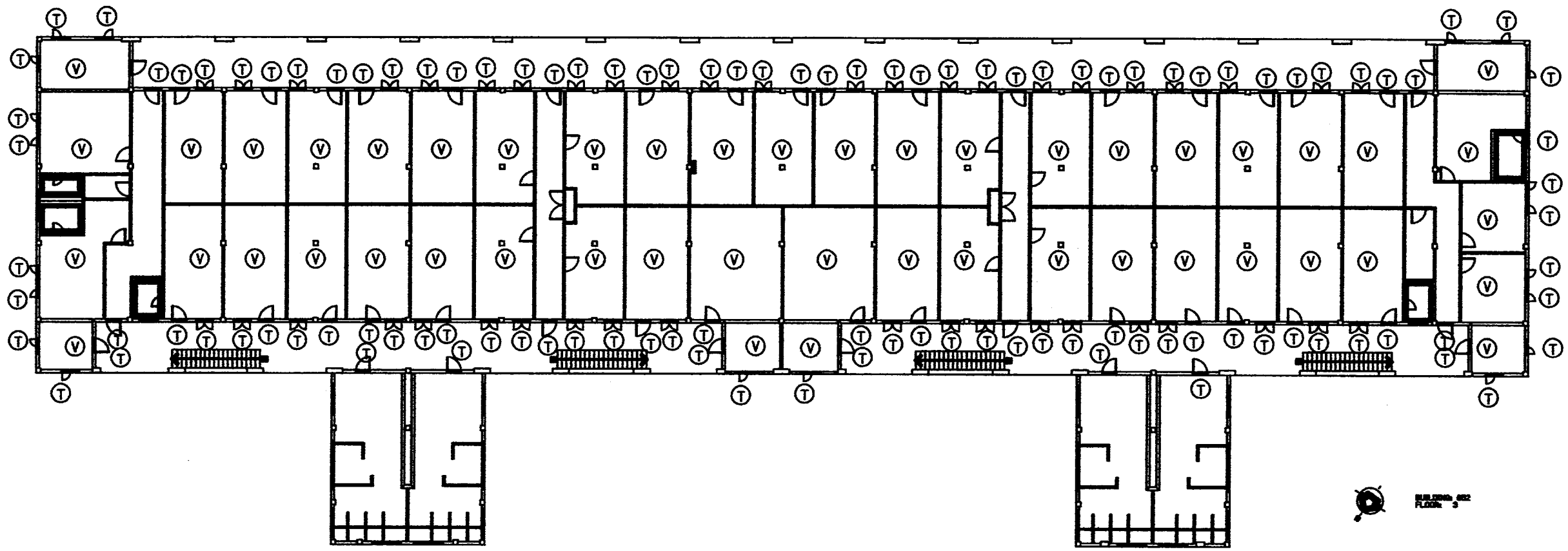
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Sample Locations Third Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 651	Extent of Identified ACBM Third Floor	Figure 2



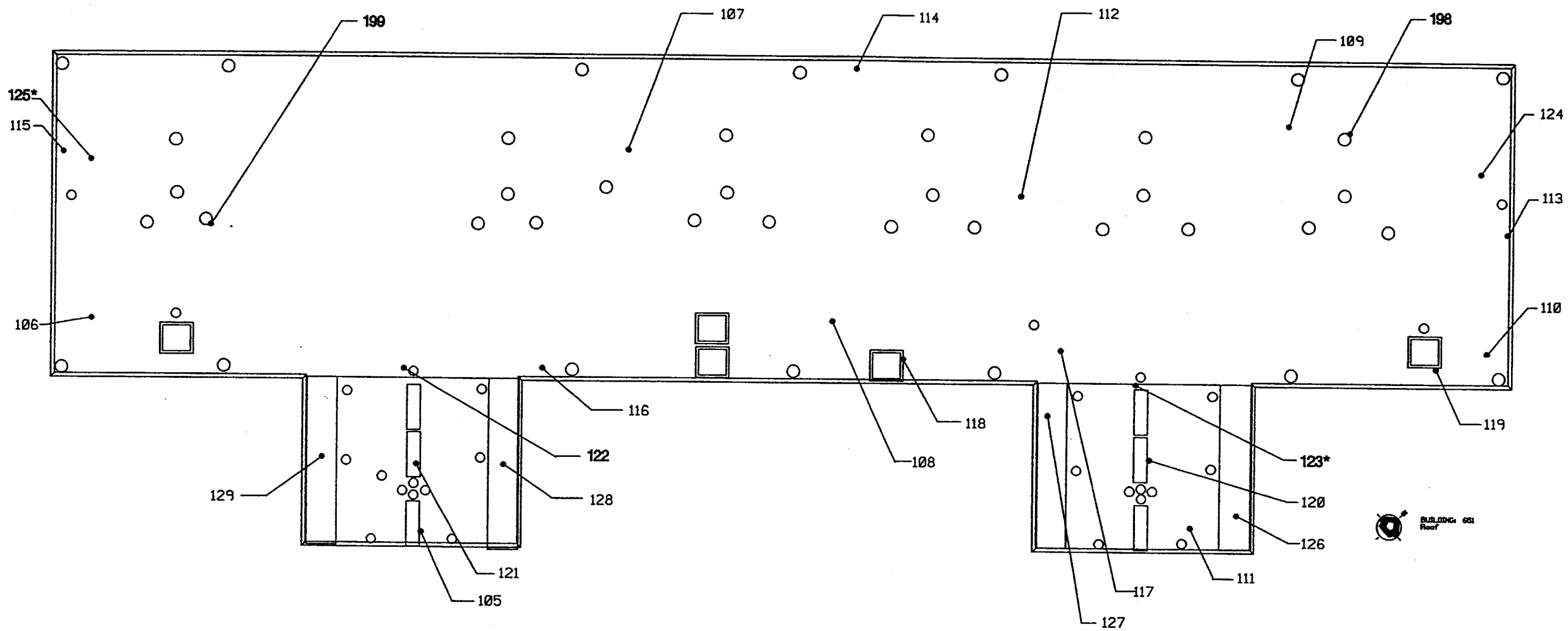
Note:

Asbestos–Containing Joint Adhesive/Sealant–(Off White/Yellow/Orange/Tan) On Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM Third Floor	Figure 3



Sample * Prefix: 2179-651-XXX

LEGEND

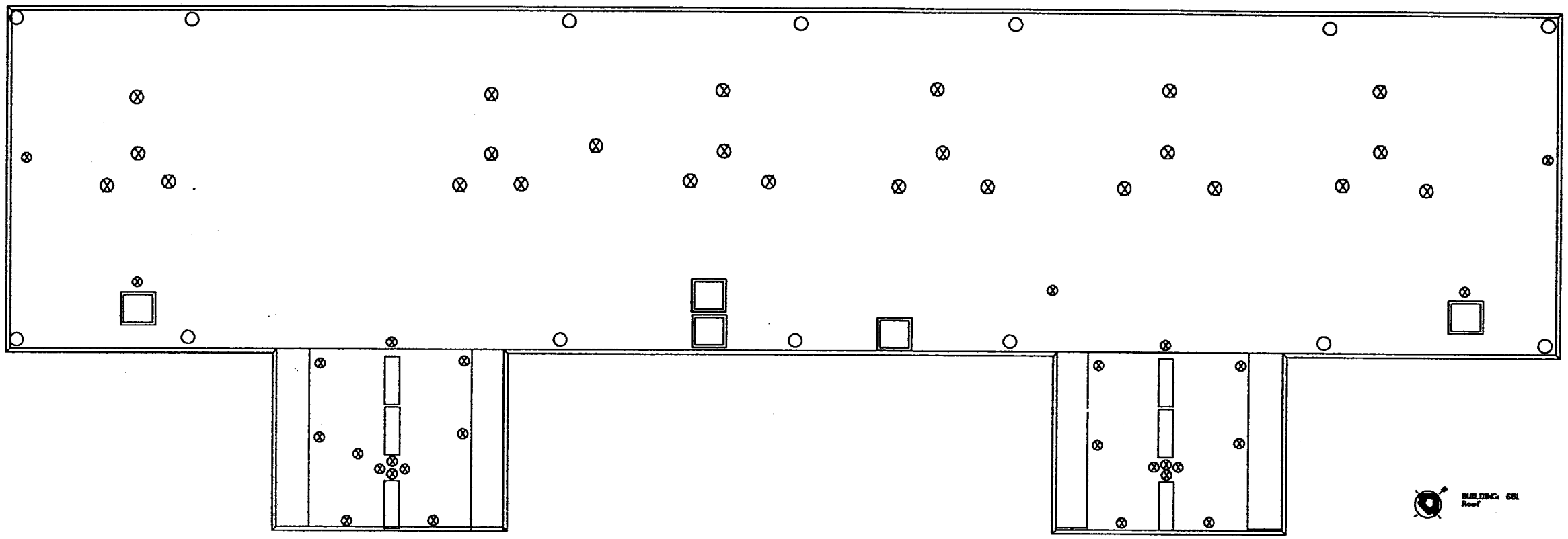
XXX Non-Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Locations

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 651	Sample Locations Roof	Figure 1



LEGEND

⊗ Asbestos-Containing Flashing/Sealant, Gas Vents and Mount Points

XXX Asbestos-Containing Access Hatch Flashing

~~~ Asbestos-Containing Asphaltic Undercoat

••• Asbestos-Containing Flashing/Sealant , Large Air Vents

Asbestos-Containing Built-Up Roofing Material & Flashing

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 651	Extent of Identified ACBM Roof	Figure 2
~~~

APPENDIX D

BUILDING 652

I Introduction

Building 652 is a 3-story concrete structure which provides office space on the first floor, the second and third floor consist of living quarters. A primary hot water heater and storage tank are located on the first floor of the building. Building 652 is currently unoccupied.

II Asbestos Result Summary

Materials found to contain >1% asbestos by laboratory analysis are listed below. An asterisk preceding the material description indicates the material is considered friable or potentially friable. Revision/additional identified materials types are indicated by a (☛).

12"x12" Vinyl Floor Tile (VFT) - Light Green w/Green Marble and Mastic
12"x12" VFT - Brown w/Brown Streaks I and Mastic
12"x12" VFT - Olive Green w/Grey & White Streaks and Mastic
12"x12" VFT - Tan w/Olive Streaks and Mastic
12"x12" VFT - Beige w/Grey Streaks and Mastic
12"x12" VFT - Brown w/Brown Streaks II and **Mastic**
12"x12" VFT - Tan w/Brown Streaks and **Mastic**
12"x12" VFT - Medium Brown w/Black Streaks and **Mastic**
9"x9" VFT - Medium Brown and Mastic
9"x9" VFT - Cocoa Brown and Mastic
Floor Tile Mastic Only - Black
☛ **Cementitious Plaster-Hollow Plaster & Lathe Wall System 1st Floor,** Restrooms
☛ **Cementitious Plaster-Hollow Plaster & Lathe Wall System 2nd Flr.,** Private Restroom
☛ **Cementitious Plaster-Hollow Plaster & Lathe Wall System 3rd Flr.,** Private Restroom
☛ **Cementitious Plaster-Troweled on CMU and Concrete Walls 1st Floor,** East Hallway
☛ **Exterior Cementitious Wall Plaster 1st Floor Type II**
Cementitious Panel - Above Doors and Windows
Composition Built-Up Roofing Material - Type II - Lower Roof
Composition Built-Up Roofing Material - Type II - Flashing
Beige Paint w/Black Asphaltic Undercoat
Mastic/sealant at 2"-4" Pipe Mounts - Flashing
Mastic/sealant at Main Roof Hatches - Flashing
Mastic/sealant at 6"-8" Dia. Vent Pipes - Flashing
***Vibration Cloth - Type I - Woven Fabric - White**
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor

***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, (Hot Water Heater Room)
***White Powder Pipe Insulation** 1st Floor
***White Plaster Pipe Insulation** 2nd Floor

III Survey Findings

EKNAs inspectors, Christine Arouh, Steven Chun, William Harris, Prudy Stoudt-McRea, Kennyson Thomas and Doug Tisdell (see Appendix E for Inspector Certificates) identified sixty one (61) distinct material types and submitted two hundred twenty two (222) suspect samples for laboratory analysis. Material types sampled are listed below. Materials found to contain >1% asbestos are indicated in **bold** print, an asterisk indicates a friable or potentially friable material. Materials found to contain <1% asbestos are indicated in *italic* print.

12"x12" Vinyl Floor Tile (VFT) - Light Green w/Green Marble and Mastic
12"x12" VFT - Brown w/Brown Streaks I and Mastic
12"x12" VFT - Olive Green w/Grey & White Streaks and Mastic
12"x12" VFT - Tan w/Olive Streaks and Mastic
12"x12" VFT - Beige w/Grey Streaks and Mastic
12"x12" VFT - Brown w/Brown Streaks II and **Mastic**
12"x12" VFT - Tan w/Brown Streaks and **Mastic**
12"x12" VFT - Medium Brown w/Black Streaks and **Mastic**
12"x12" VFT - Blue w/Grey Marble and Mastic
12"x12" VFT - Blue w/White Streaks and Mastic
12"x12" VFT - Tan w/Brown Streaks and Mastic
12"x12" VFT - Dark Brown and Mastic
12"x12" VFT - Brown Spots and Mastic
12"x12" VFT - Dark Brown w/Black Marbling and Mastic
9"x9" VFT - Medium Brown and Mastic
9"x9" VFT - Cocoa Brown and Mastic
Floor Tile Mastic Only - Black
Gypsum Wall Board and Joint Compound, 1st Floor
Gypsum Wall Board and Joint Compound, 2nd Floor, see "Remarks and Comments"
Gypsum Wall Board and Joint Compound, 3rd Floor
Wall Insulation-Grey Fluffy Material, 2nd Floór
Wall Insulation-Grey Fluffy Material, 3rd Floor
- **Cementitious Plaster-Hollow Plaster and Lathe Wall System,** 1st Floor Restrooms see "Remarks and Comments".
- **Cementitious Plaster-Hollow Plaster and Lathe Wall System,** 3rd Floor Private Restrooms, see "Remarks and Comments".
- **Cementitious Plaster-Hollow Plaster and Lathe Wall System,** 2nd Floor, Private Restrooms, see "Remarks and Comments".
- **Cementitious Plaster-Troweled on CMU and Concrete Walls,** 1st Floor, see "Remarks and Comments".

Cementitious Panel - Above Doors and Windows

☛ Exterior Cementitious Wall Plaster 1st Floor, see "Remarks and Comments".
Exterior Cementitious Wall Plaster 2nd Floor
Exterior Cementitious Wall Plaster 3rd Floor
☛ **Exterior Cementitious Wall Plaster 1st Floor Type II,** see "Remarks and Comments".
4" Cove Base and Adhesive - Brown
4" Cove Base and Adhesive - Black
4" Cove Base and Adhesive - Dark Brown
Cove Base Adhesive - Brown
2'x4' Ceiling Tile - Fissure & Holes - Type I
2'x4' Ceiling Tile - 1'x1' Square Pattern
2'x4' Ceiling Tile - Dots (Pinhole) - Type I
2'x4' Ceiling Tile - Dots (Pinhole) - Type II
2'x4' Ceiling Tile - Fissure & Holes - Type II (Random)
Composition Built-Up Roofing Material - Type I - Main Roof
Composition Built-Up Roofing Material - Type I - Flashing, see "Remarks and Comments".
Composition Built-Up Roofing Material - Type II, Lower Roof
Composition Built-Up Roofing Material - Type II - Flashing, Lower Roof
Roof Drain Patches - Roofing Material
Beige Paint w/Black Asphaltic Undercoat
Mastic/sealant at 2"-4" Pipe Mounts - Flashing
Mastic/sealant at Main Roof Hatches - Flashing
Mastic/sealant at 6"-8" Dia. Vent Pipes - Flashing
***Vibration Cloth - Type I - Woven Fabric - White**
Vibration Cloth - Type II - Vinyl
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 1st Floor
Fiberglass Pipe Insulation - Hangers (Saddles), 1st Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation - Hangers, 2nd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, 3rd Floor
Fiberglass Pipe Insulation - Hangers (Saddles), 3rd Floor
***Joint Adhesive/Sealant** on Fiberglass Pipe Insulation, Hot Water Heater Room
Joint Adhesive/Sealant on Fiberglass Pipe Insulation - Hangers, Hot Water Heater Room
Hot Water Tank Insulation - White, Hot Water Heater Room
***White Powder Pipe Insulation** 1st Floor
***White Plaster Pipe Insulation** 2nd Floor

IV Remarks and Comments

Review "Volume I, Asbestos Survey, Analytical and Report for: Quad F - Buildings 649, 650, 651 and 652 - Schofield Barracks, Oahu, Hawaii", "Discussion" and "Recommendations". See "Survey Methodology" for survey protocol.

EKNA collected additional samples and determined that the asbestos-containing **Cementitious Plaster-Hollow Plaster and Lathe Wall System** exist at the following locations:

1st Floor - All Restrooms
2nd Floor - All Room/Private Restrooms
3rd Floor - All Room/Private Restrooms

EKNA also conducted further investigations of the following material types.

Cementitious Plaster-Troweled on CMU and Concrete Walls 1st Floor

The "Cementitious Plaster-Troweled on CMU and Concrete Walls 1st Floor" is limited to the furthest east hallway, see figure 3.

EKNA also collected three (3) samples and identified one (1) additional material type. Analytical results indicates that the **Wall Plaster - Cementitious Exterior - Type II,** contains asbestos at a concentration >1%.

EKNA concludes that the "Exterior Cementitious Wall Plaster 1st Floor" is non-asbestos. Caution should be exercised and work practices evaluated if/when disturbing the exterior plaster walls, identifying the extent of asbestos-containing "Wall Plaster - Cementitious Exterior - Type II" and possible asbestos-containing plaster patches cannot be completely identified due to the exterior surface paint, that restricts identification.

The following material type(s) were identified as containing asbestos at a concentration of less than one percent (<1%):

Composition Built-Up Roofing Material - Type I - Flashing
Gypsum Wall Board and Joint Compound, 2nd Floor

Although these material types are not considered asbestos-containing materials (>1% asbestos), caution should be exercised if/when disturbing these materials. Proposed work methods which may involve sawing, cutting, drilling abrading, etc. of these materials should be evaluated for their potential for airborne asbestos fiber release.

Building 652

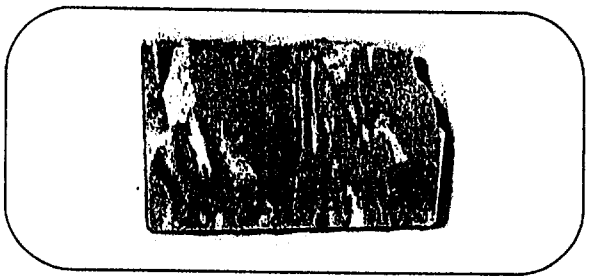
Floor Tile Log

Vinyl Floor Tile Log
Quad F - Building 652

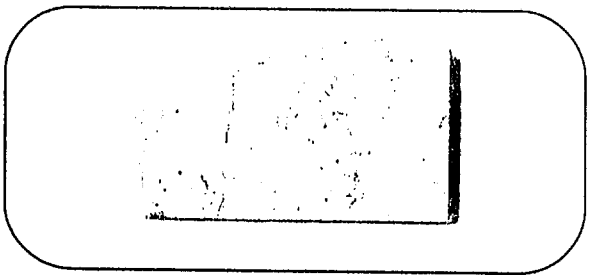
Bold indicates asbestos-containing vinyl floor tile and/or mastic.

12"X12" Vinyl Floor Tile
Light Green w/Green Marble & Mastic

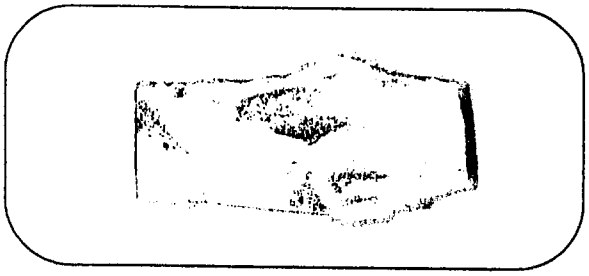
12"X12" Vinyl Floor Tile
Brown w/Brown Streaks & Mastic



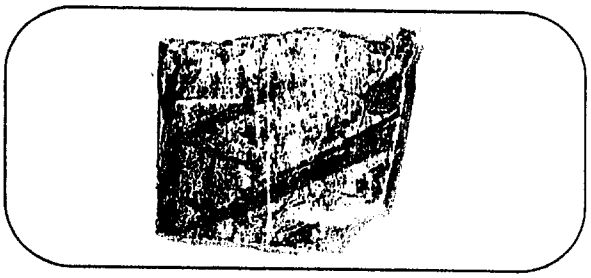
12"X12" Vinyl Floor Tile, **Olive Green w/Grey/White Streaks & Mastic**



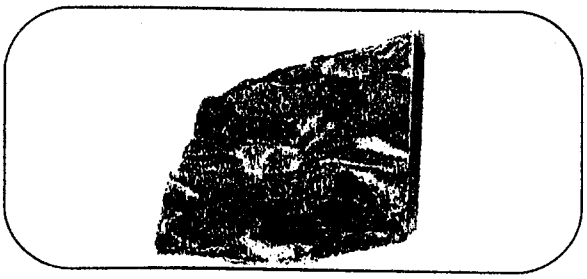
12"X12" Vinyl Floor Tile
Tan w/Brown Streaks & **Mastic**



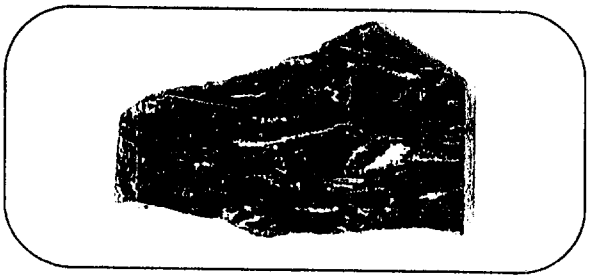
12"X12" Vinyl Floor Tile
Tan w/Olive Streaks & Mastic



12"X12" Vinyl Floor Tile
Beige w/Grey Streaks & Mastic



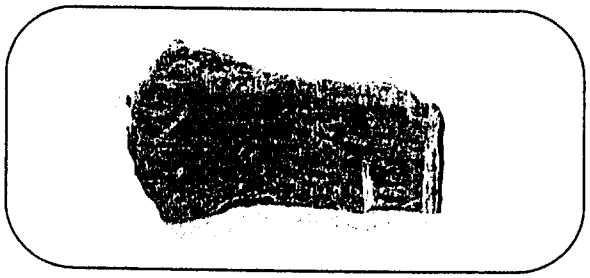
12"X12" Vinyl Floor Tile
Blue w/Grey Marble



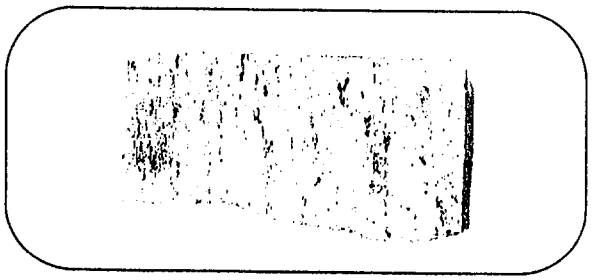
12"X12" Vinyl Floor Tile
Blue w/White Streaks

Vinyl Floor Tile Log
Quad F - Building 652

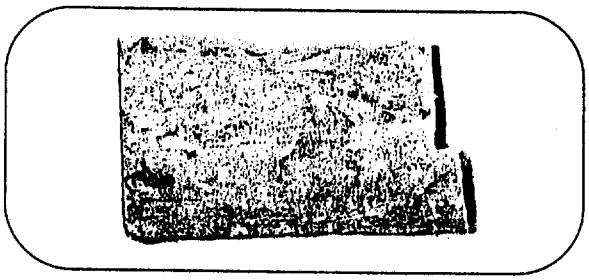
Bold indicates asbestos-containing vinyl floor tile and/or mastic.



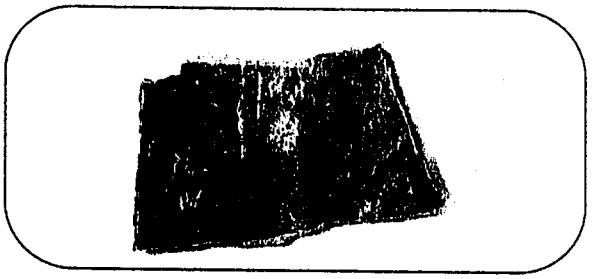
12"X12" Vinyl Floor Tile
Dark Brown



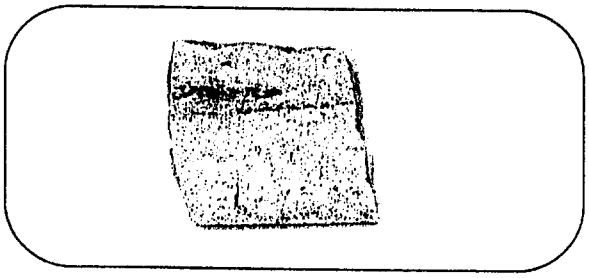
12"X12" Vinyl Floor Tile
Brown Spot



12"X12" Vinyl Floor Tile, Medium Brown
w/Spots & **Mastic**



12"X12" Vinyl Floor Tile
Dark Brown w/Black Marbling

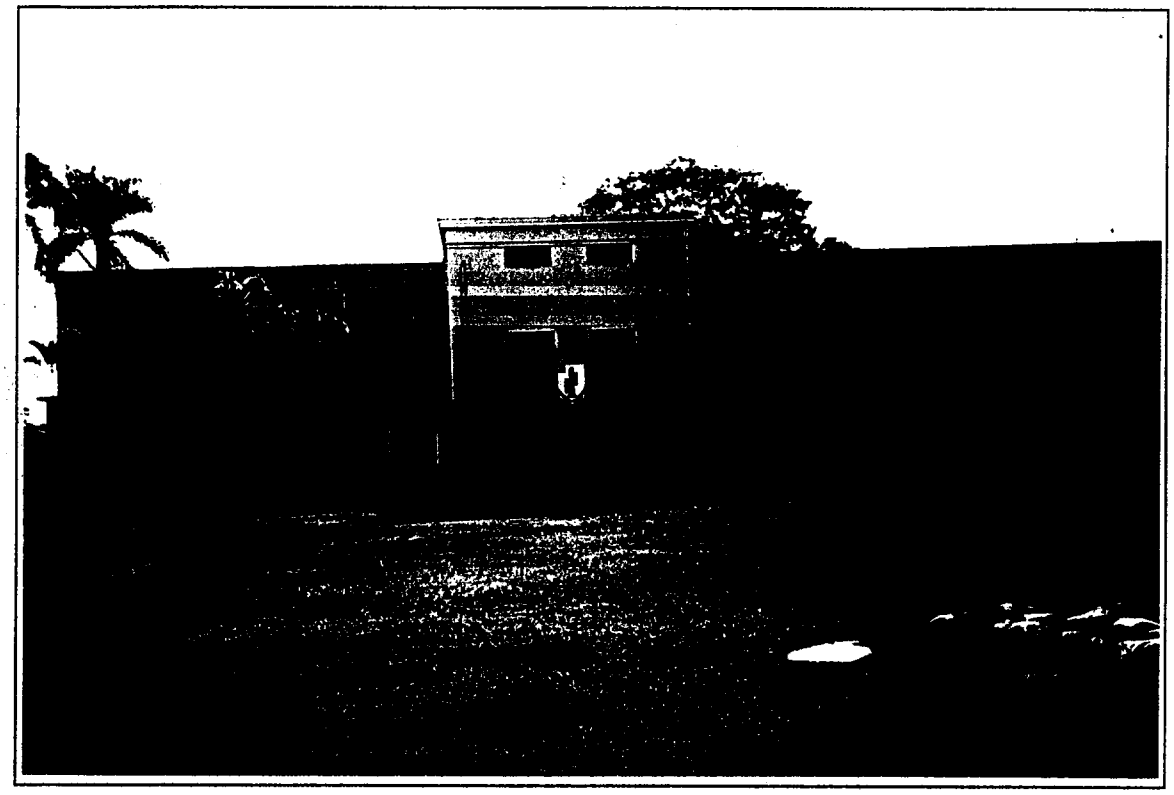


9"X9" Vinyl Floor Tile
Cocoa Brown

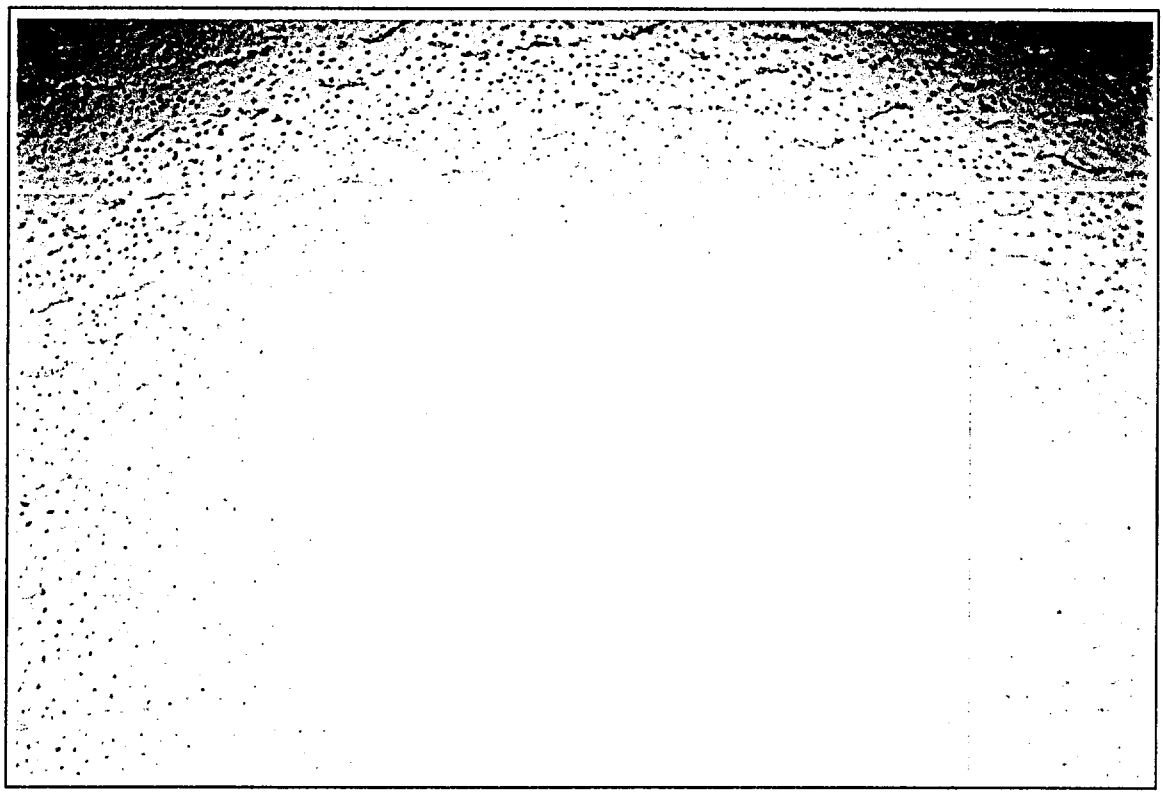
Building 652

Photo Log

BUILDING 652 - PHOTO LOG



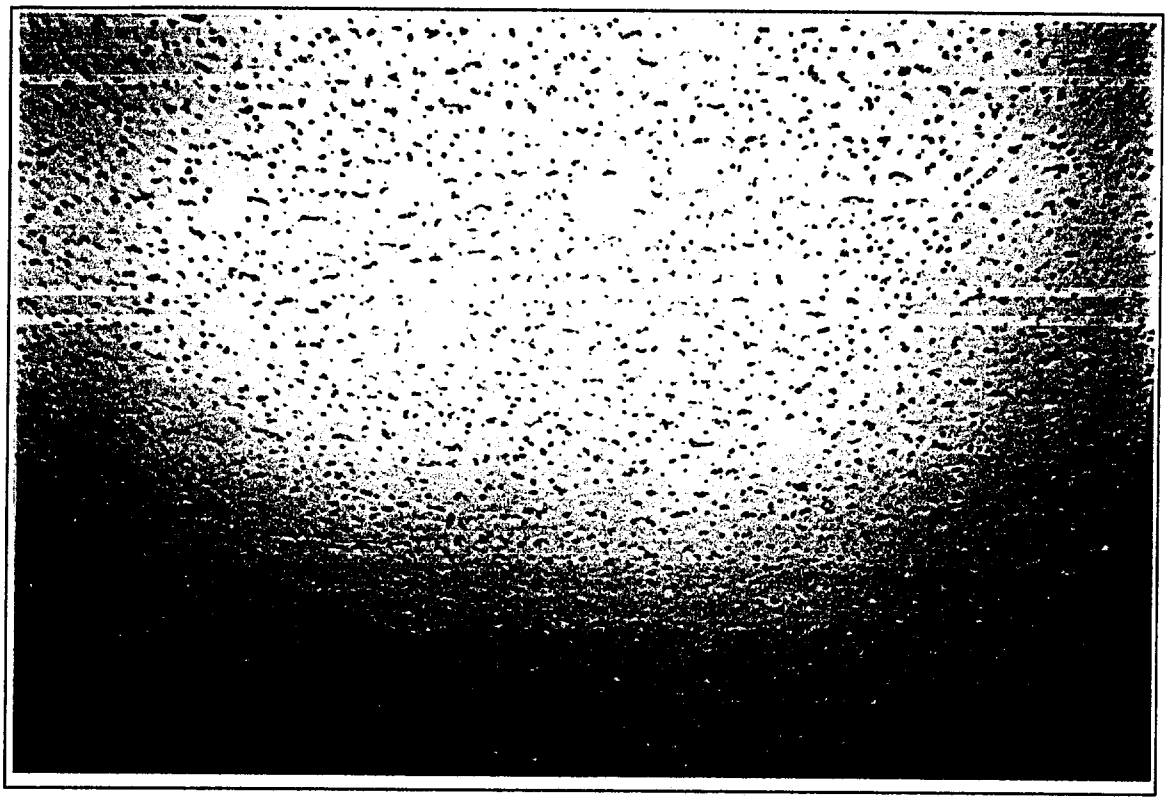
Building 652 - Exterior



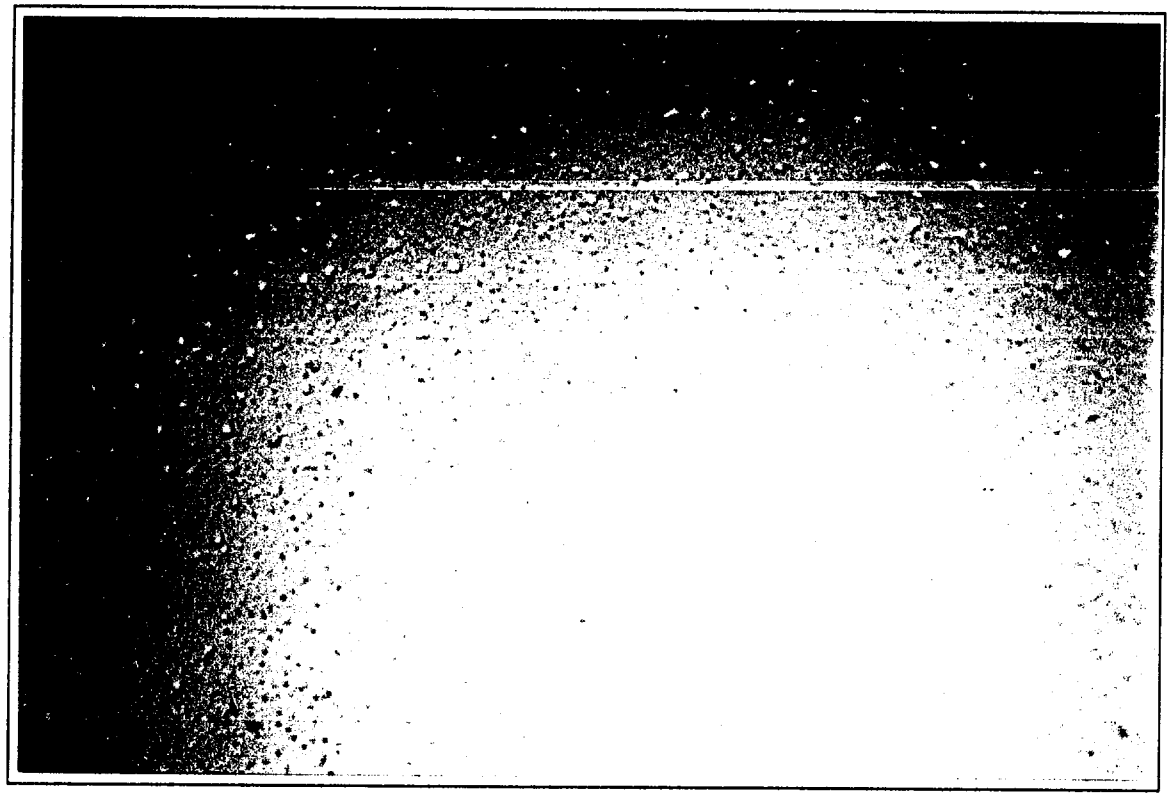
2'x4' Ceiling Tile - Fissure & Holes - Type I

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 652 - PHOTO LOG



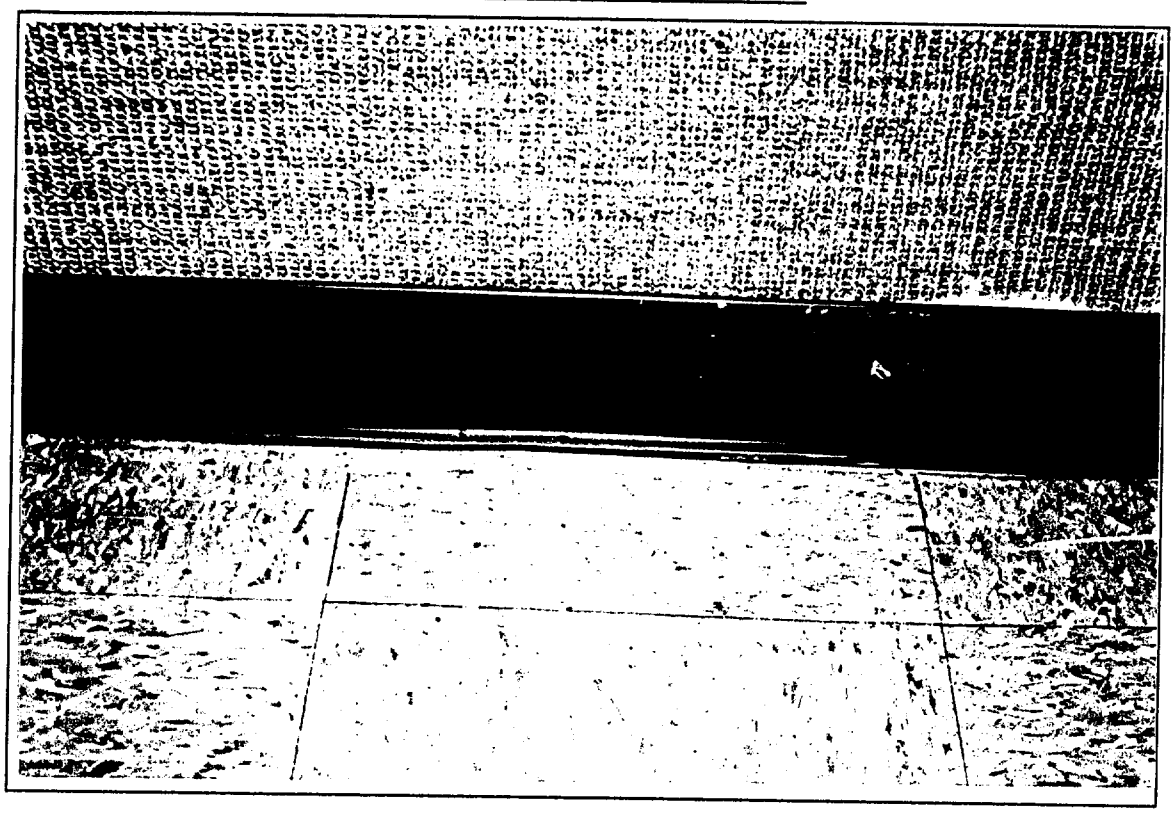
2'x4' Ceiling Tile - Fissure & Holes - Type II (Random)



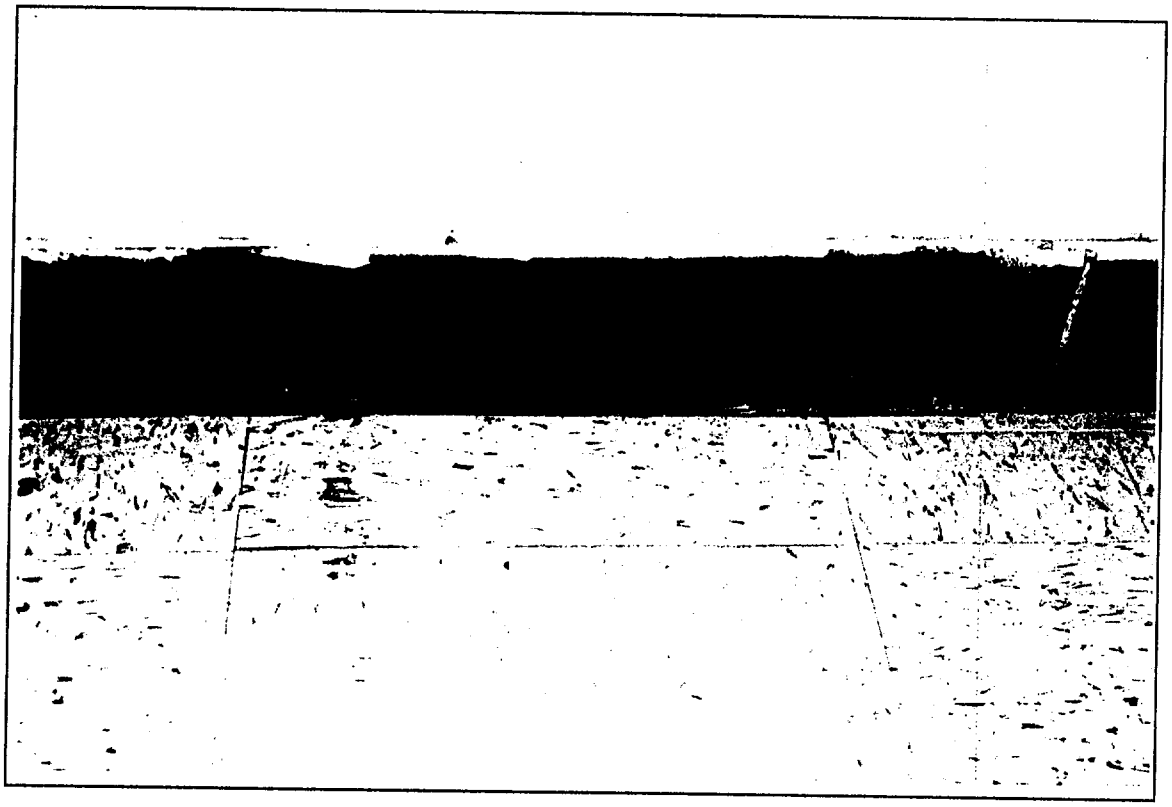
2'x4' Ceiling Tile - Dots (Pinholes) - Type II

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 652 - PHOTO LOG



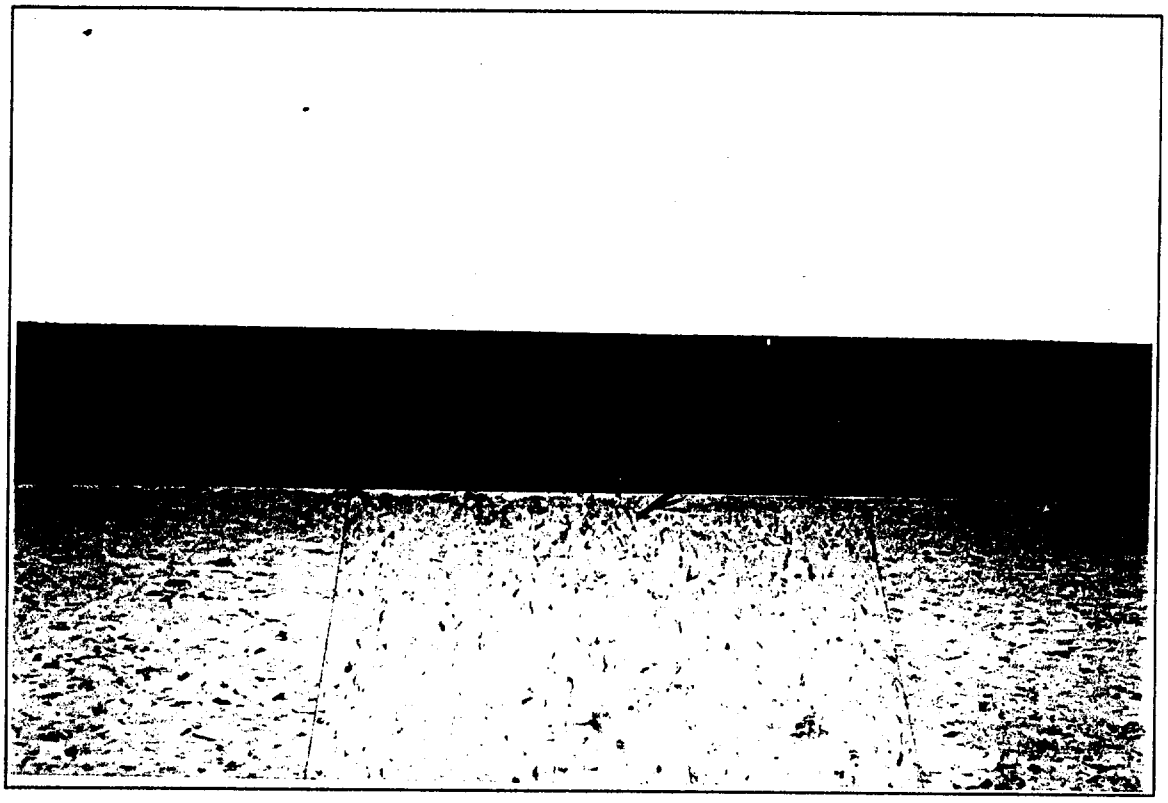
4" Cove Base and Adhesive - Dark Brown



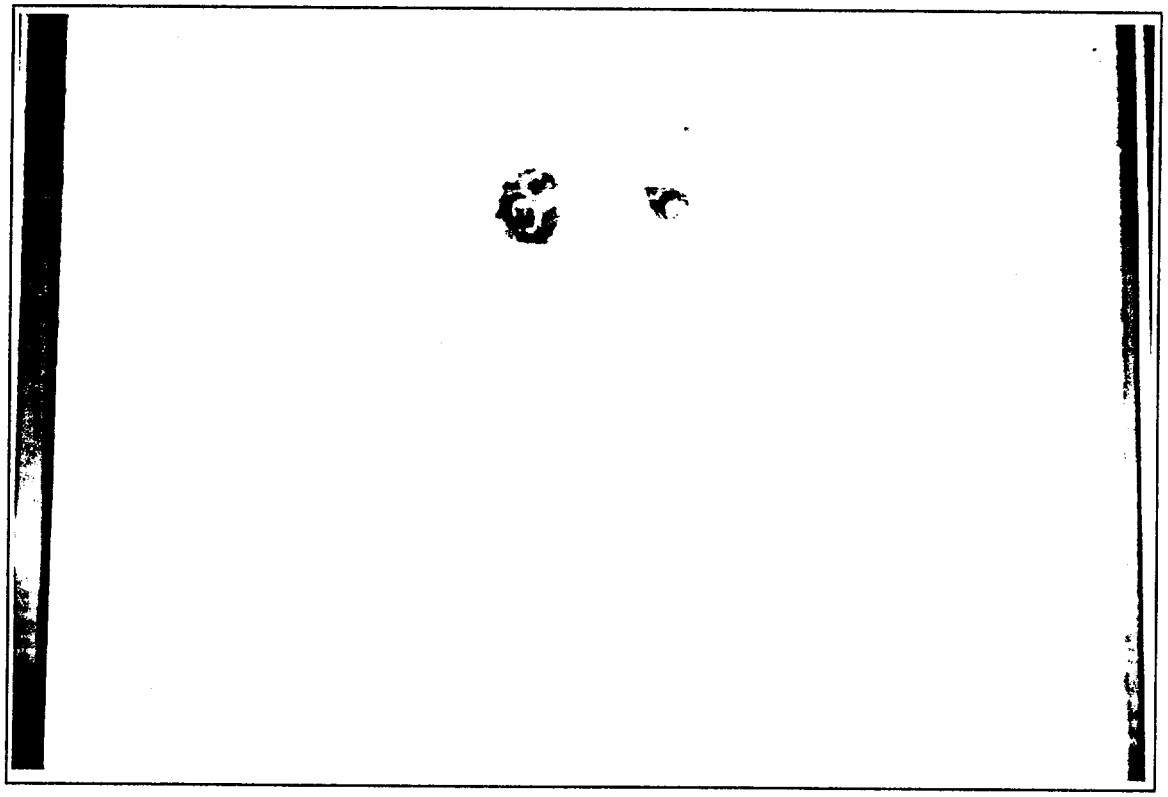
4" Cove Base and Adhesive - Brown

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 652 - PHOTO LOG



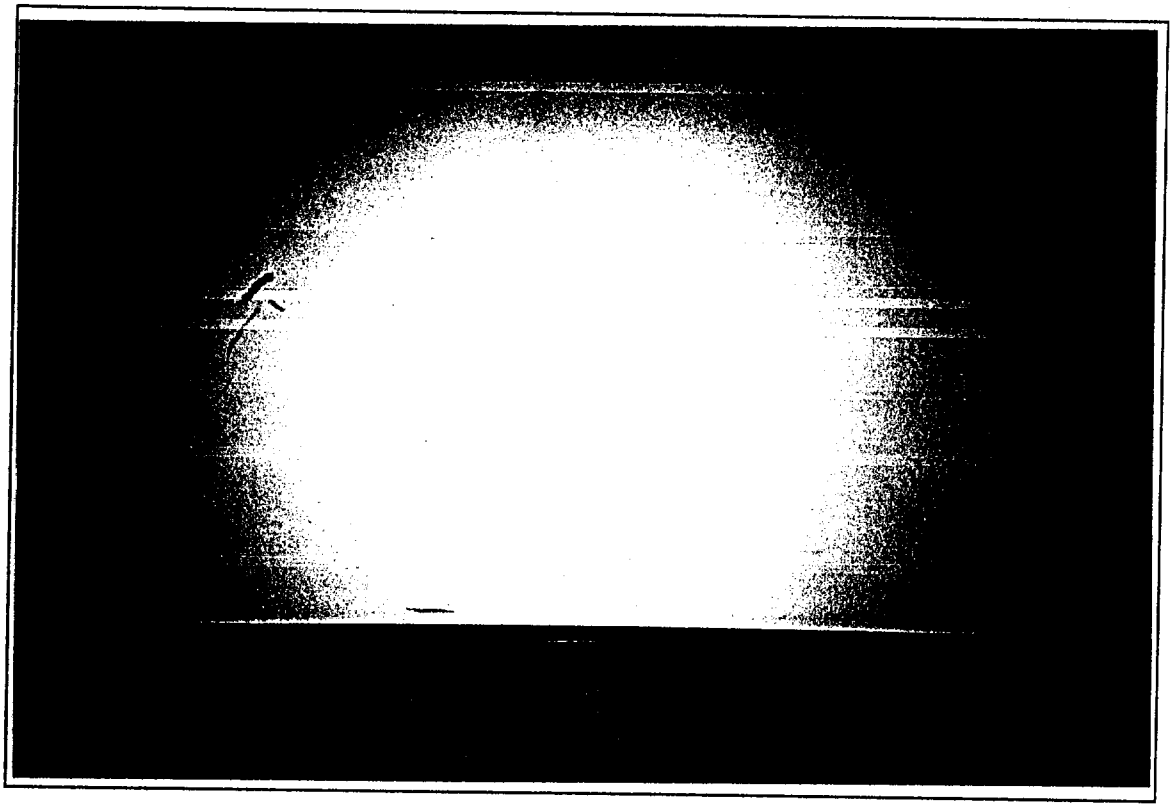
4" Cove Base and Adhesive - Black



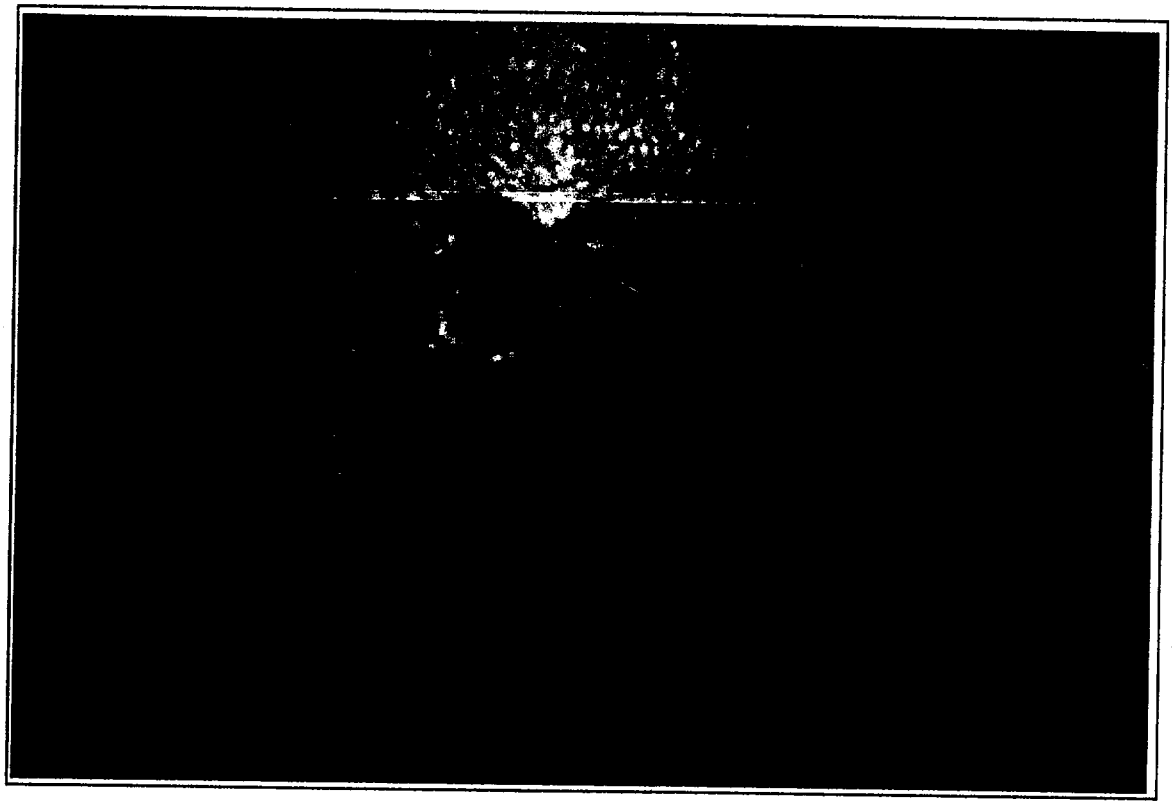
Cementitious Plaster - Troweled on CMU and Concrete Walls, 1st Fl.

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 652 - PHOTO LOG



Cementitious Plaster - Hollow Plaster and Lathe Wall System - 1st, 2nd, 3rd Fl.



Gypsum Wall Board and Joint Compound - 1st and 3rd Fl.

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

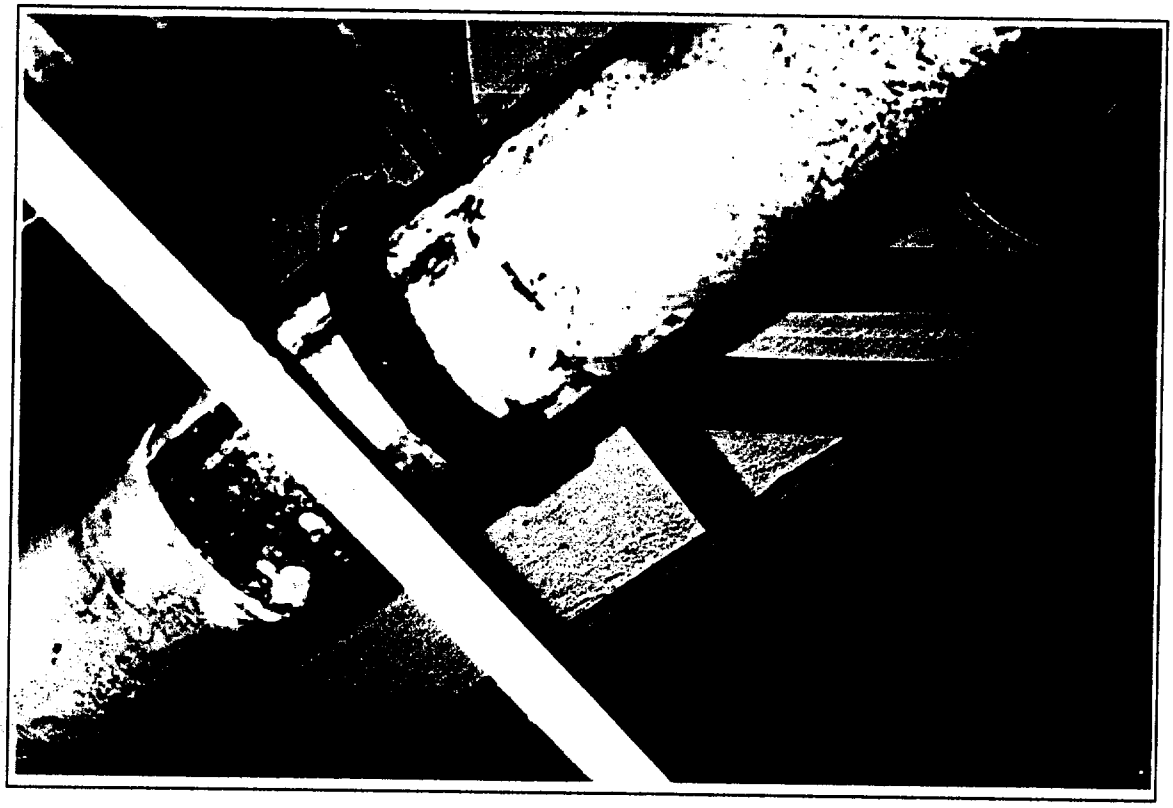
BUILDING 652 - PHOTO LOG

Wall Insulation - Grey Fluffy Material - 2nd and 3rd Fl.

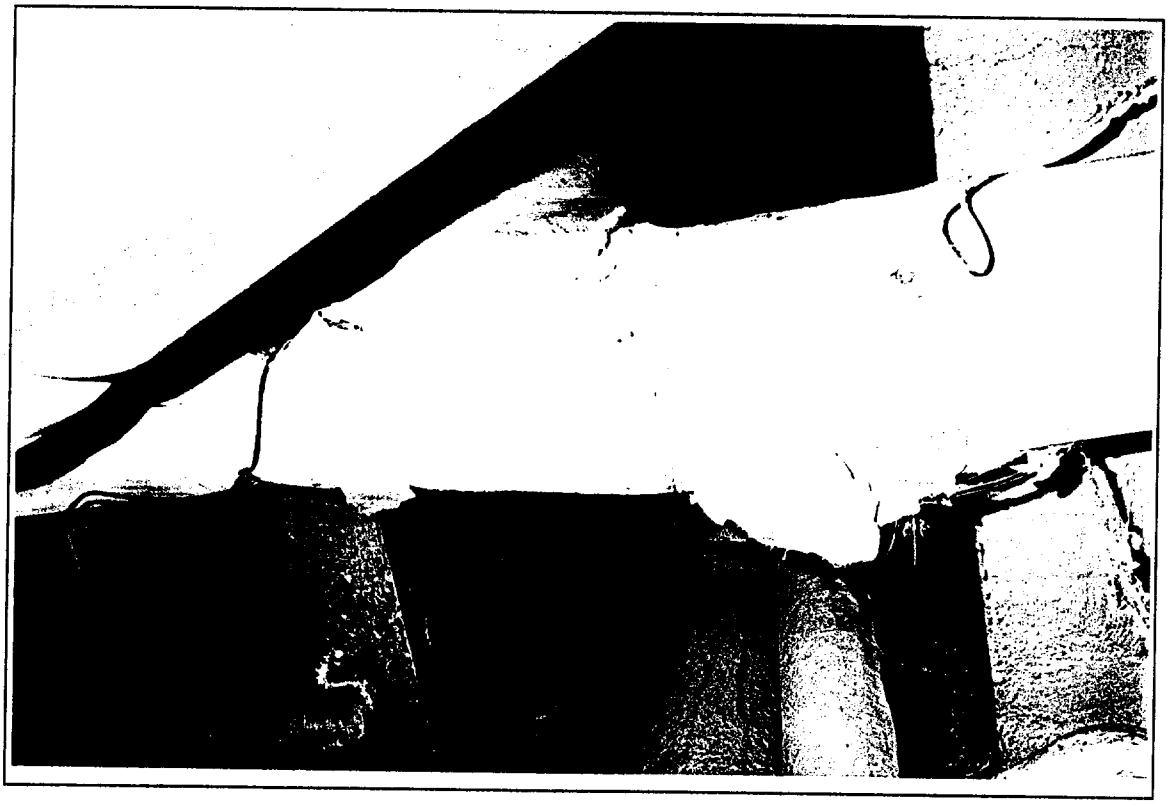
Vibration Cloth - Type II - Vinyl

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%). Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 652 - PHOTO LOG



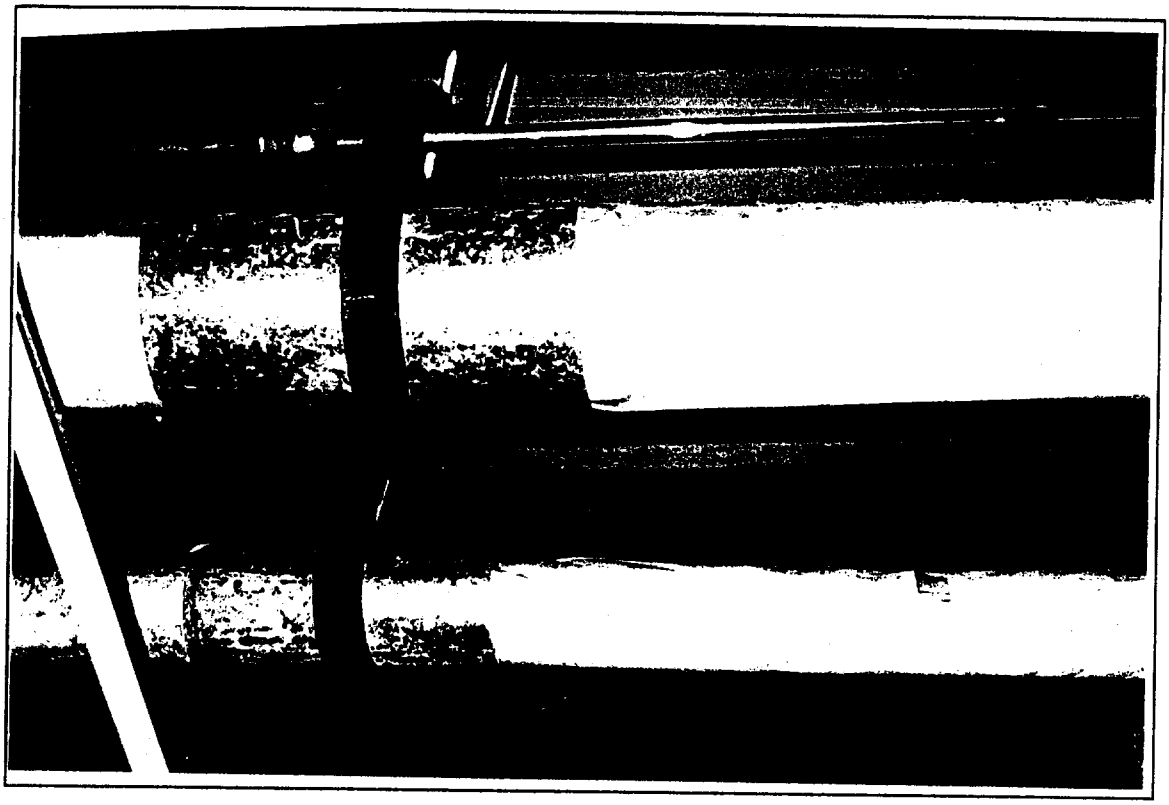
***White Plaster Pipe Insulation - 2nd Fl.**



***White Powder Pipe Insulation - 1st Fl.**

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 652 - PHOTO LOG

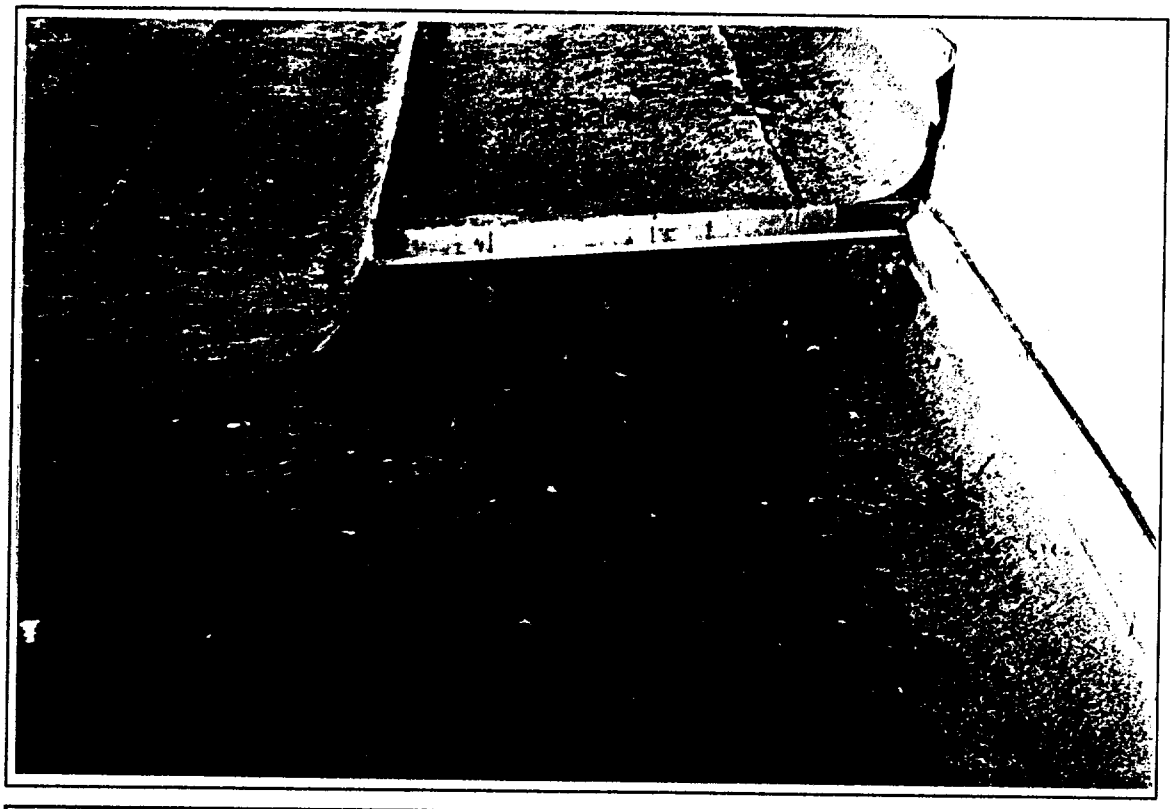


Joint Adhesive/Sealant on Fiberglass Pipe Insulation -
1st, 2nd, 3rd, Fl. and Hot Water Heater Room.
Joint Adhesive/Sealant on Fiberglass Pipe Insulation - Hangers - 2nd Fl.

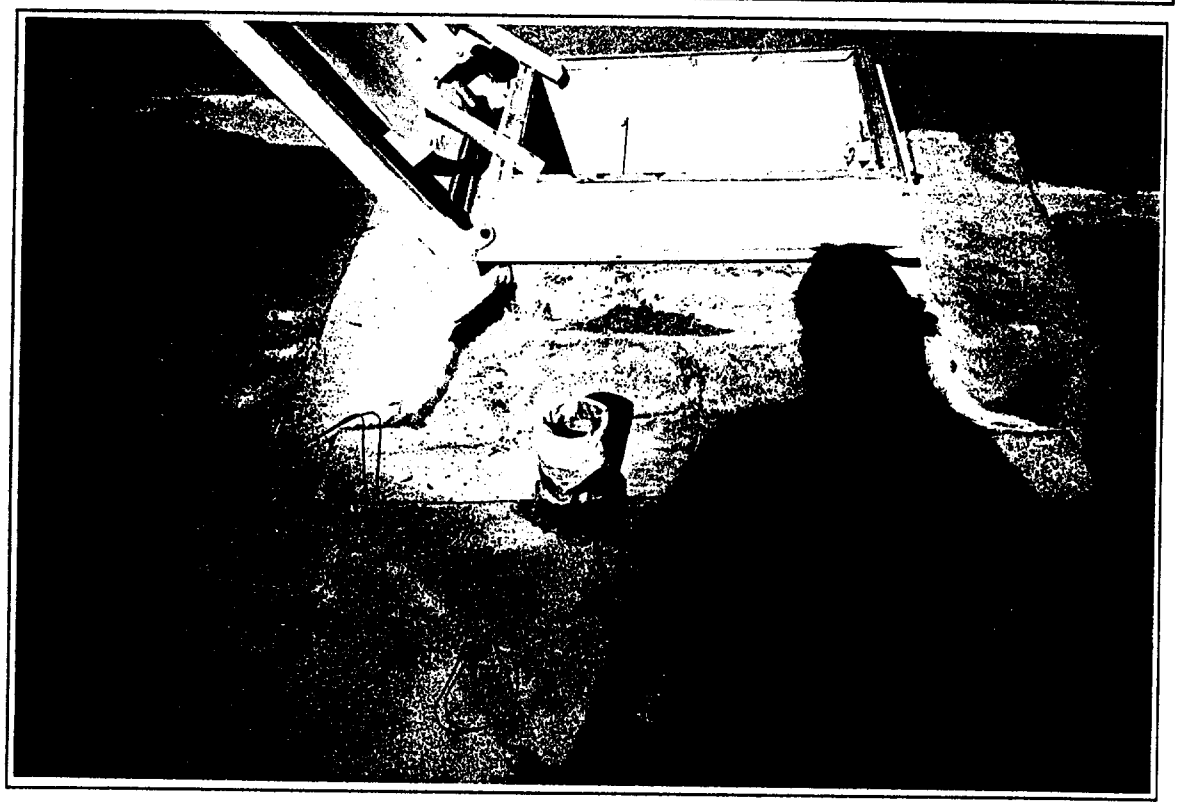
Hot Water Tank Insulation - White, Hot Water Heater Room

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 652 - PHOTO LOG



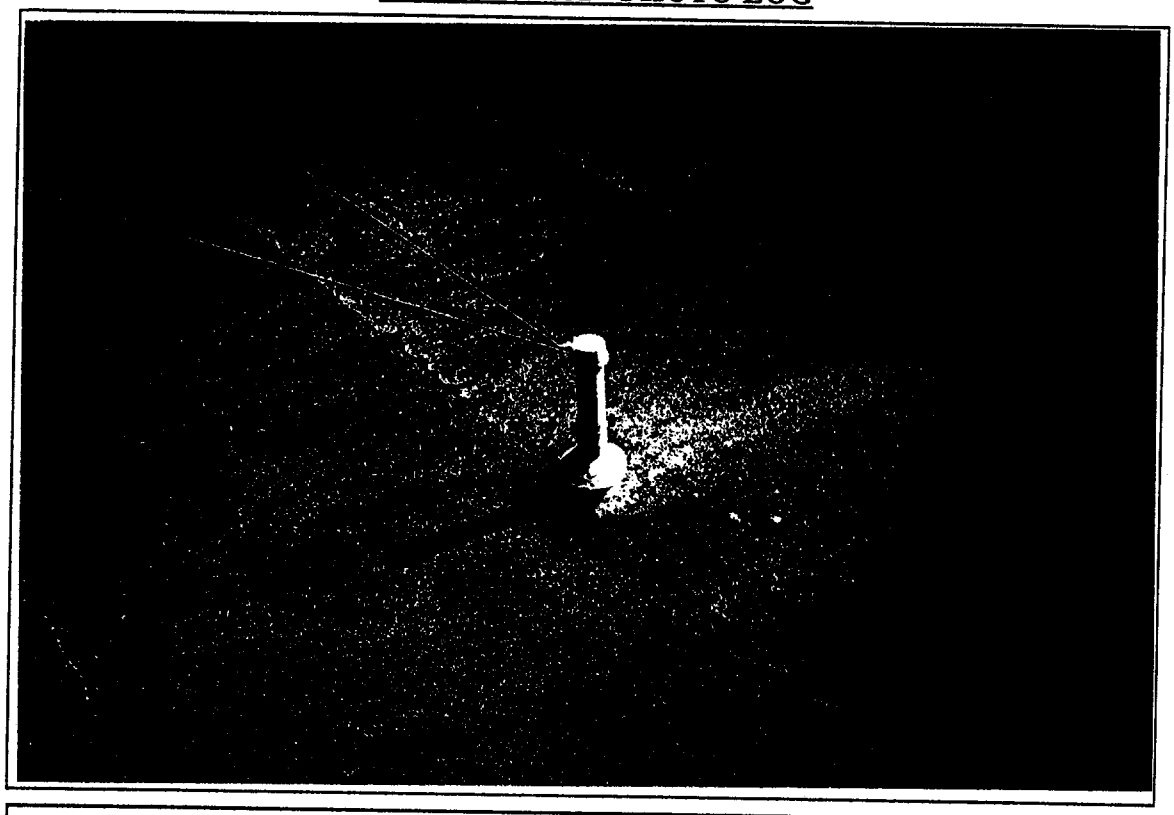
Composition Built-Up Roofing Material - Type II - Lower Roof
Composition Built-Up Roofing Material - Type II - Flashing - Lower Roof



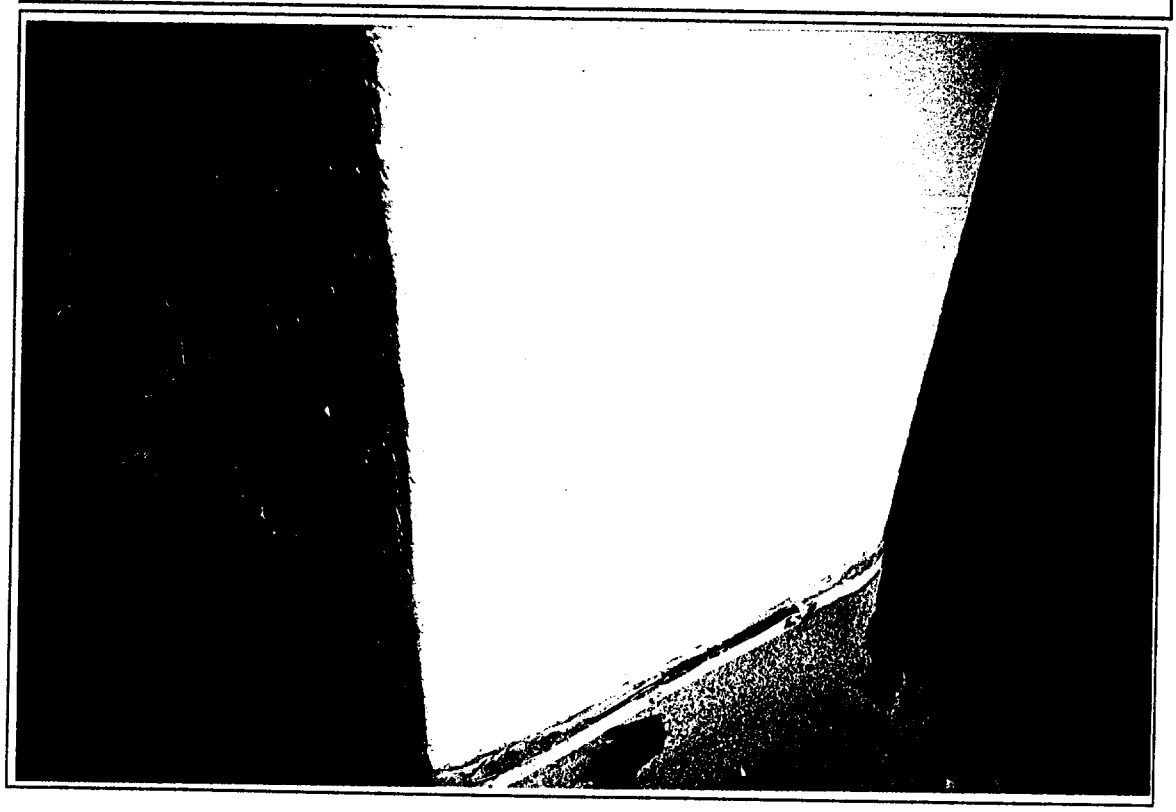
Mastic/Sealant at Main Roof Hatches - Flashing
Mastic/Sealant at 6"- 8" Dia. Vent Pipes - Flashing

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* print.

BUILDING 652 - PHOTO LOG



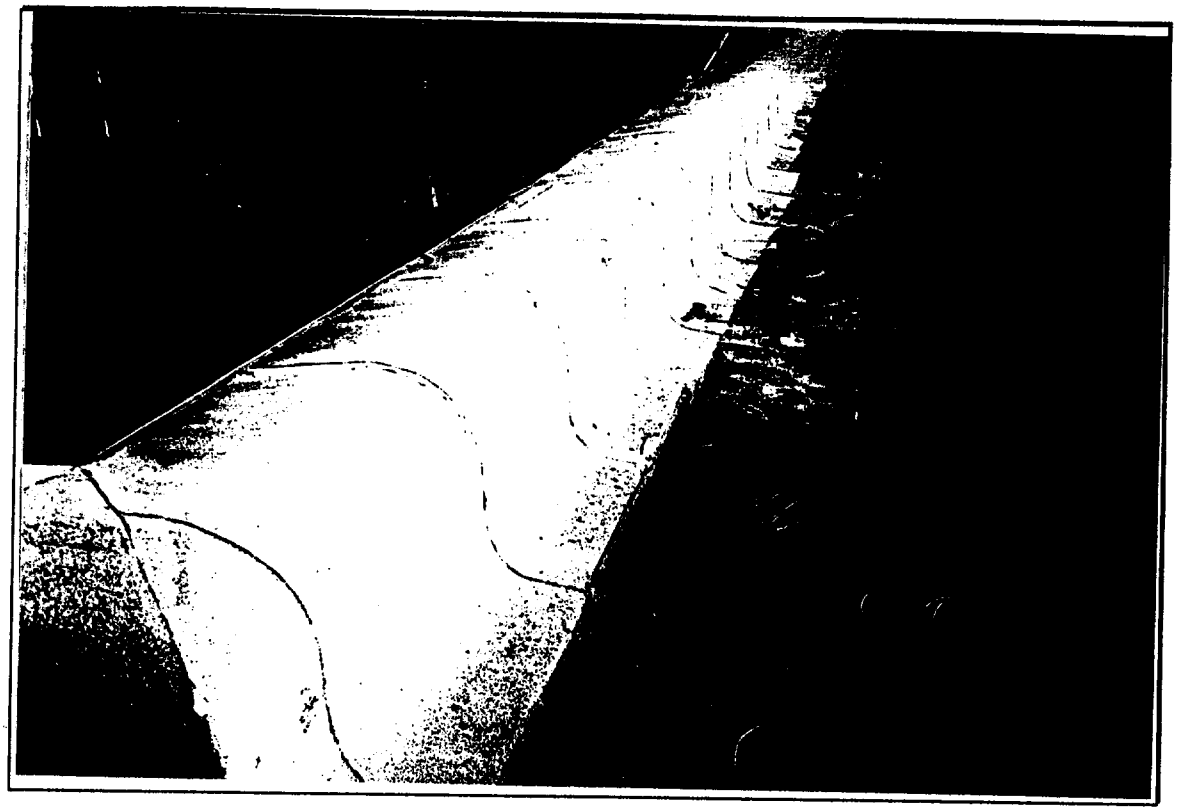
Composition Built-Up Roofing Material - Type I - Main Roof
Mastic/Sealant at 2" - 4" Pipe Mounts - Flashing



Beige Paint w/Black Asphaltic Undercoat

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* prin

BUILDING 652 - PHOTO LOG



Composition Built-Up Roofing Material - Type I - Flashing
Roof Drain Patches - Roofing Material

Bold indicates identified material contains asbestos at a concentration greater than one percent (>1%).
Materials found to contain less than one percent (<1%) asbestos are indicated in *italic* prin

Building 652

Chain of Custody Forms
and
Asbestos Bulk Analysis Forms

(15)

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21- 01143 — SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	22	2197 - 652 - 081	B	1	West Hallway	CEMENTITIOUS PLASTER-TRAVELED OVER CMU & CONCRETE WALLS-BROWN
2	23	2197 - 652 - 082	B	3	319	2'x4' CEILING TILE - FISSURE & HOLES TYPE I
3	23	2197 - 652 - 083	B	3	353	
4	24	2197 - 652 - 084	B	2	DORM	
5	24	2197 - 652 - 085	B	2	OFFICE	
6	25	2197 - 652 - 086	B	1	East Hallway	
7	25	2197 - 652 - 087	B	1	Room 129	
8	25	2197 - 652 - 088	B	1	Room 101	- 1'x' SQUARE PATTERN
9	26	2197 - 652 - 089	B	1	OFFICE	-
10	26	2197 - 652 - 090	B	1	OFFICE	

(5)

(11)

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1								
2								
3								
4								
5								
6								
7								
8								
9	2102 2096							
10	2091							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

* Samples will be forwarded when acquired or detected

48HR per mrat Rush

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5-10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 2/8/01 TIME: 1:15PM INITIALS: 16
ANALYZED BY: 2/12/01
LAB Q.C. APPROVAL:
DATE: 2/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF __

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

21-~~00~~ 01143

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION	
1	44	2197 - 652 - 151	B	1	112	12" x 12" Vinyl Floor Tile - Dark Brown & Mastic	(13)
2	46	2197 - 652 - 152	B		112	9" x 9" - Cocoa Brown + Mastic	(10)
3	47	2197 - 652 - 153	B		MECH. RM.		
4	47	2197 - 652 - 154	B		MECH. RM.	12" x 12" Vinyl Floor Tile - Brown Spot	(13)
5	48	2197 - 652 - 155	B		137	-	
6	48	2197 - 652 - 156	B		137	- Medium Brown w/ Black Streaks & Mastic	(14)
7	49	2197 - 652 - 157	B		133	-	
8	49	2197 - 652 - 158	B		133	- Dark Brown w/ Black Marbling & Mastic	(9)
9	50	2197 - 652 - 159	B		HALLWAY	12" x 12" -	
10	50	2197 - 652 - 160	B	1	104 B		

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1								
2								
3	2102 2092							
4	2093							
5								
6								
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, * Sample will be forwarded when required or desired Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

Rush

REQUESTED COMPLETION DATE: 5-10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: Thomas
DATE: 2/8/01 TIME: 1:15 INITIALS: TG
ANALYZED BY: SL
LAB Q.C. APPROVAL: NL
DATE: 2/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-01569 — SHEET 2 OF 2

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	08	2197 - 652 - 211	B	2	Comm. RR	Cementitious Plaster - Community Restroom
2		2197 - 652 -	B			
3	~~08~~	2197 - 652 -	B			
4	09	2197 - 652 - 222	B			Cemtitious Plaster - Private 1st Floor Restrooms
5	09	2197 - 652 - 223	B			↓ ↓ ↓ ↓ ↓
6	09	2197 - 652 - 224	B			
7		2197 - 652 -	B			
8		2197 - 652 -	B			
9		2197 - 652 -	B			
10		2197 - 652 -	B			

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	5402							
2	—							
3	—							
4	5403							
5	5404							
6	5405							
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: RUSH
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: David Napoleon & Douglas Tisdell
SIGNATURE:
DATE: 2/01/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 2/ 21/01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 2/23/01 TIME: 9 AM INITIALS: TR
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/28/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-01143 — SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	4	2197 - 652 - 222	B	1	Fire Room	9"x9" Medium Brown Vinyl Floor Tile w/ Mastic
2		2197 - 652 -	B			Nothing Follows
3		2197 - 652 -	B			
4		2197 - 652 -	B			
5		2197 - 652 -	B			
6		2197 - 652 -	B			
7		2197 - 652 -	B			
8		2197 - 652 -	B			
9		2197 - 652 -	B			
10		2197 - 652 -	B			

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2162 3204							
2								
3								
4								
5								
6								
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around (Rush)
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 2/8/01 TIME: 1:15PM INITIALS: TG
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00575

EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF ___

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	01	2197 - 652 - 001	B	R	Roof	COMPOSITION BUILT-UP ROOFING MATERIAL-TYPE I-(MAIN ROOF)
2		2197 - 652 - 002	B			
3		2197 - 652 - 003	B			
4		2197 - 652 - 004	B			
5		2197 - 652 - 005	B			
6		2197 - 652 - 006	B			
7		2197 - 652 - 007	B			
8	01	2197 - 652 - 008	B			-FLASHING
9	02	2197 - 652 - 009	B			-FLASHING
10	02	2197 - 652 - 010	B	R	Roof	

28

29

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4248							
2	4249							
3	4250							
4	4251							
5	4252							
6	4253							
7	4254							
8	4255							
9	4256							
10	4257							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00 AM INITIALS: HT
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00575

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION	
1	02	2197 - 652 - 011	B	R	ROOF	COMPOSITION BUILT-UP ROOFING MATERIAL - TYPE I FLASHING	22
2	02	2197 - 652 - 012	B				
3	02	2197 - 652 - 013	B			- TYPE II - ROOF	(8)
4	03	2197 - 652 - 014	B				
5	03	2197 - 652 - 015	B				
6	03	2197 - 652 - 016	B			TYPE II - FLASHING	(8)
7	04	2197 - 652 - 017	B				
8	04	2197 - 652 - 018	B				
9	05	2197 - 652 - 019	B			BEIGE PAINT W/ BLACK ASPHALTIC UNDERCOAT	30
10	05	2197 - 652 - 020	B	R	ROOF		

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4258							
2	4259							
3	4260							
4	4261							
5	4262							
6	4263							
7	4264							
8	4265							
9	4266							
10	4267							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00 AM INITIALS: HT
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00575

EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF __

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION	
1	06	2197 - 652 - 021	B	R	Roof	2" - 4" PIPE MOUNTS · FLASHING / MASTIC	31
2	06	2197 - 652 - 022	B				
3	06	2197 - 652 - 023	B				
4	06	2197 - 652 - 024	B				
5	06	2197 - 652 - 025	B			ROOF DRAIN PATCHES - ROOFING MATERIAL	32
6	07	2197 - 652 - 026	B				
7	07	2197 - 652 - 027	B				
8	07	2197 - 652 - 028	B			MAIN ROOF HATCH · FLASHING / MASTIC	34
9	08	2197 - 652 - 029	B				
10	08	2197 - 652 - 030	B	R	Roof		

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4268							
2	4269							
3	4270							
4	4271							
5	4272							
6	4273							
7	4274							
8	4275							
9	4276							
10	4277							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00 Am INITIALS:
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00575

EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF ___

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	09	2197 - 652 - 031	B	R	Roof	6"-8" DIA VENT PIPE - FLASHING/MASTIC
2	09	2197 - 652 - 032	B	↓	↓	↓
3	09	2197 - 652 - 033	B	R	Roof	↓
4	10	2197 - 652 - 034	B	1	HW Room	FIBERGLASS PIPE INSULATION - JOINT ADHESIVE/SEALANT
5	↓	2197 - 652 - 035	B	↓	↓	" " "
6		2197 - 652 - 036	B			" " "
7		2197 - 652 - 037	B			" " "
8	10	2197 - 652 - 038	B			- HANGARS/SADDLES
9	11	2197 - 652 - 039	B	↓	↓	FIBERGLASS PIPE INSULATION " "
10	11	2197 - 652 - 040	B	1	HW Room	

34

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4278							
2	4279							
3	4280							
4	4281							
5	4282							
6	4283							
7	4284							
8	4285							
9	4286							
10	4287							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00am INITIALS: VT
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00575

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — SHEET 1 OF ___

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	12	2197 - 652 - 041	B	1	HW Room	Hot Water Tank Insulation - White
2	12	2197 - 652 - 042	B	1	HW Room	↓
3	12	2197 - 652 - 043	B	1	HW Room	↓
4	13	2197 - 652 - 044	B	3	328	Gypsum Board w/ Joint Compound
5	↓	2197 - 652 - 045	B	↓	312	↓
6		2197 - 652 - 046	B		Hallway	
7		2197 - 652 - 047	B		335	
8		2197 - 652 - 048	B		342	
9	↓	2197 - 652 - 049	B	↓	354	
10	13	2197 - 652 - 050	B	3	351	

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4288							
2	4289							
3	4290							
4	4291							
5	4292							
6	4293							
7	4294							
8	4295							
9	4296							
10	4297							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00 Am INITIALS: BT
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00576

EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF __

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	14	2197 - 652 - 051	B	2	254	GYPSUM BOARD W/JOINT COMPOUND
2	↓	2197 - 652 - 052	B	↓	DORM	↓
3	↓	2197 - 652 - 053	B	↓	233	↓
4	↓	2197 - 652 - 054	B	↓	238	↓
5	↓	2197 - 652 - 055	B	↓	DORM	↓
6	↓	2197 - 652 - 056	B	↓	DORM	↓
7	14	2197 - 652 - 057	B	2	DORM	↓
8	15	2197 - 652 - 058	B	1	Room 139	↓
9	↓	2197 - 652 - 059	B	↓	Room 140 A	↓
10	↓	2197 - 652 - 060	B	1	Absentee Passe area	↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 4298							
2	4299							
3	4300							
4	4301							
5	4302							
6	4303							
7	4304							
8	4305							
9	4306							
10	4307							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:40 Am INITIALS: HT
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

21-08576

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

SHEET 1 OF ___

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

		SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION	
5	1	15	2197 - 652 - 061	B	1	Training NCO clean area	GYPSUM BOARD W/ JOINT COMPOUND	
	2	15	2197 - 652 - 062	B	1	Training NCO event area		
	3	16	2197 - 652 - 063	B	3	HALLWAY	WALL INSULATION - GREY FLUFFY MATERIAL	1
16	4	16	2197 - 652 - 064	B	↓	342		
	5	16	2197 - 652 - 065	B	3	351		9
	6	17	2197 - 652 - 066	B	2	hallway		
17	7	17	2197 - 652 - 067	B	↓	DORM		
	8	17	2197 - 652 - 068	B	2	hallway		
18	9	18	2197 - 652 - 069	B	2	LIVING QUARTERS		
19	10	19	2197 - 652 - 070	B	1	Room 101	CEMENTITIOUS PLASTER - HOLLOW PLASTER & LATHE WALL SYSTEM - GREY	

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 4308							
2	4309							
3	4310							
4	4311							
5	4312							
6	4313							
7	4314							
8	4315							
9	4316							
10	4317							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

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SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
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DATE: 1/23/01 TIME: 9:00 AM INITIALS: HP
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00576

EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF __

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	20	2197 - 652 - 071	B	2	R.R.	CEMENTITIOUS PLASTER - HOLLOW PLASTER & LATH WALL SYSTEM GREY (20)
2	20	2197 - 652 - 072	B	2	R.R.	
3	20	2197 - 652 - 073	B	2	R.R.	
4	21	2197 - 652 - 074	B	3	305 RR	
5	21	2197 - 652 - 075	B	3	R.R.	
6	21	2197 - 652 - 076	B	3	R.R.	- TROWELLED OVER CMU & CONCRETE WALLS - BROWN
7	22	2197 - 652 - 077	B	1	east Hallway	
8		2197 - 652 - 078	B	1	east Hallway	
9		2197 - 652 - 079	B	1	center Hallway	
10		2197 - 652 - 080	B	1	Room 130	

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4318							
2	4319							
3	4320							
4	4321							
5	4322							
6	4323							
7	4324							
8	4325							
9	4326							
10	4327							

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SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. E<NA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
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DATE: 1/23/01 TIME: 9:00 Am INITIALS: NT
ANALYZED BY:
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DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00576

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

SHEET 1 OF ___

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	22	2197 - 652 - 081	B	1	West Hallway	CEMENTITIOUS PLASTER-TRAWELLED OVER CMU & CONCRETE WALLS-BROWN
2	23	2197 - 652 - 082	B	3	319	2'x4' CEILING TILE - FISSURE & HOLES TYPE I (2)
3	23	2197 - 652 - 083	B	3	353	(11)
4	24	2197 - 652 - 084	B	2	DORM	
5	24	2197 - 652 - 085	B	2	OFFICE	
6	25	2197 - 652 - 086	B	1	~~West~~ East Hallway	
7	25	2197 - 652 - 087	B	1	Room 129	
8	25	2197 - 652 - 088	B	1	Room 101	
* 9	26	2197 - 652 - 089	B	1	[redacted]	- 1'x' SQUARE PATTERN
* 10	26	2197 - 652 - 090	B	1		-

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4328							
2	4329							
3	4330							
4	4331							
5	4332							
6	4333							
7	4334							
8	4335							
9	4336							
10	4337							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

* Samples will be forwarded ~~as~~ when acquired or detected

*SAMPLE TYPE CODES

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SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
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CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
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DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 1/23/01 TIME: 9:00 Am INITIALS: [illegible]
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00577

EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF ___

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	27	2197 - 652 - 091	B	2	hallWAY	2X4' CEILING TILES - DOTS - TYPE I
2	27	2197 - 652 - 092	B	2	OFFICE	
3	28	2197 - 652 - 093	B	3	Rest Room	- DOTS - TYPE II
4	28	2197 - 652 - 094	B	3	RestRoom	
5	28	2197 - 652 - 095	B	2	Rest Room	- FISSURE & HOLES (RANDOM) TYPE II
6	29	2197 - 652 - 096	B	3	305 RR	
7	29	2197 - 652 - 097	B	1		VIBRATION CLOTH TYPE I - WOVEN FABRIC - WHITE
8	30	2197 - 652 - 098	B	1	333	TYPE II - VINYL
9	31	2197 - 652 - 099	B	1	Mechanical Rm.	
10	32	2197 - 652 - 100	B	1	129	4" COVE BASE - BROWN W/ADHESIVE

36

3

(5)

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 4338							
2	4339							
3	4340							
4	4341							
5	4342							
6	4343							
7	4344							
8	4345							
9	4346							
10	4347							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

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SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00 Am INITIALS: HT
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/10/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00577

EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF __

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	32	2197 - 652 - 101	B	1	HALLWAY	4" COVEBASE - BROWN W/ADHESIVE
2		2197 - 652 - 102	B	2	242	
3		2197 - 652 - 103	B	2	231	
4		2197 - 652 - 104	B	3	342	
5	32	2197 - 652 - 105	B	3	327	- BLACK
6	33	2197 - 652 - 106	B	1	TRAINING RM	
7		2197 - 652 - 107	B	1	139	
8		2197 - 652 - 108	B	2	hallway	
9		2197 - 652 - 109	B	3	337	
10	33	2197 - 652 - 110	B	3	305	

(5)

(4)

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4348							
2	4349							
3	4350							
4	4351							
5	4352							
6	4353							
7	4354							
8	4355							
9	4356							
10	4357							

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ACCOUNTABILITY RECORD

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EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	34	2197 - 652 - 111	B	1	127	4" COVEBASE - DARK BROWN
2		2197 - 652 - 112	B	2	256	
3		2197 - 652 - 113	B	2	222	
4		2197 - 652 - 114	B	3	354	
5	34	2197 - 652 - 115	B	3	321	
6	35	2197 - 652 - 116	B	1	OFFICE AREA	COVEBASE - ADHESIVE
7		2197 - 652 - 117	B	1	OFFICE AREA	
8		2197 - 652 - 118	B	2	DORM RM.	
9	35	2197 - 652 - 119	B	2	235	
10	36	2197 - 652 - 120	B	1	113	12" x 12" VINYL FLOOR TILE - LIGHT GREEN W/GREEN MARBLE & MASTIC

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4358							
2	4359							
3	43600							
4	4361							
5	43602							
6	43603							
7	43604							
8	4365							
9	4366							
10	43607							

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LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
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DATE: 1/23/01 TIME: 9:00 AM INITIALS: KT
ANALYZED BY: SC
LAB Q.C. APPROVAL: NL
DATE: 2/10/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00577

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	36	2197 - 652 - 121	B	2	218	12" X 12" VINYL FLOOR TILE - LIGHT GREEN W/ GREEN MARBLE & MASTIC (1)
2		2197 - 652 - 122	B	2	245	
3		2197 - 652 - 123	B	3	311	
4	36	2197 - 652 - 124	B	3	305	- BROWN W/ BROWN STREAKS & MASTIC (2)
5	37	2197 - 652 - 125	B	1	HALLWAY	
6		2197 - 652 - 126	B	1	HALLWAY	
7		2197 - 652 - 127	B	2	233	
8		2197 - 652 - 128	B	3	333	
9	37	2197 - 652 - 129	B	3	324	- OLIVE GREEN W/ GREY & WHITE STREAKS & MASTIC (3)
10	38	2197 - 652 - 130	B	1	HALLWAY	

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ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4368							
2	4369							
3	4370							
4	4371							
5	4372							
6	4373							
7	4374							
8	4375							
9	4376							
10	4377							

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EDWARD K. NODA AND ASSOCIATES

SHEET 1 OF __

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	38	2197 - 652 - 131	B	2	Hallway	12"x12" Vinyl Floor Tile - Olive Green w/Grey/White Streaks & Mastic (3)
2	38	2197 - 652 - 132	B	3	Hallway	- Tan w/Brown Streaks & Mastic (4)
3	39	2197 - 652 - 133	B	1	130	
4	↓	2197 - 652 - 134	B	1	129	
5	↓	2197 - 652 - 135	B	2	Living Quarter NW	
6	39	2197 - 652 - 136	B	3	354	- Tan w/Olive Streaks & Mastic (8)
7	40	2197 - 652 - 137	B	1	Office (10)	
8	↓	2197 - 652 - 138	B	1	Office (8)	
9	↓	2197 - 652 - 139	B	2	244	
10	40	2197 - 652 - 140	B	3	344	

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101 - 4378							
2	4379							
3	4380							
4	4381							
5	4382							
6	4383							
7	4384							
8	4385							
9	4386							
10	4387							

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LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00 AM INITIALS: HT
ANALYZED BY: SZ
LAB Q.C. APPROVAL: NL
DATE: 2/10/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00578

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION	
1	41	2197 - 652 - 141	B	2	235	FLOOR TILE MASTIC - BLACK	
2	41	2197 - 652 - 142	B	2	227	↓ ↓ ↓ - BLACK	
3	42	2197 - 652 - 143	B	2	Living Quarter SW	12"X12" VINYL FLOOR TILE - BEIGE W/GREY STREAK & MASTIC	6
4	42	2197 - 652 - 144	B	2	Living Quarter SW	↓ ↓ ↓ ↓	
5	43	2197 - 652 - 145	B	1	104 B	- BLUE W/GREY MARBLE	7
6	43	2197 - 652 - 146	B	2	Storage Room	↓ ↓ ↓	
7	44	2197 - 652 - 147	B	1	107 OFFICE	- BLUE W/WHITE STREAKS	8
8	44	2197 - 652 - 148	B	1	107	" " "	
9	45	2197 - 652 - 149	B	1	137 STORAGE	- TAN W/BROWN STREAKS	9
10	45	2197 - 652 - 150	B	1	HALLWAY	12"X12" " " "	

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4388							
2	4389							
3	4390							
4	4391							
5	4392							
6	4393							
7	4394							
8	4395							
9	4396							
10	4397							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00 Am INITIALS: HT
ANALYZED BY: NL
LAB Q.C. APPROVAL: NL
DATE: 2/10/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00578

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

SHEET 1 OF ___

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION	
1	44	2197 - 652 - 151	B	1	112	12"x12" Vinyl Floor Tile - Dark Brown & Mastic	12
2	46	2197 - 652 - 152	B		112	9"x9" - Cocoa Brown + Mastic	10
3	47	2197 - 652 - 153	B		MECH. RM.		
4	47	2197 - 652 - 154	B		MECH. RM.		
5	48	2197 - 652 - 155	B		137	12"x12" Vinyl Floor Tile - Brown Spot	13
6	44	2197 - 652 - 156	B		137		
7	49	2197 - 652 - 157	B		133	- Medium Brown w/Black Streaks & Mastic	14
8	49	2197 - 652 - 158	B		133		
9	50	2197 - 652 - 159	B		Hallway	12"x12" - Dark Brown w/Black Marbling & Mastic	9
10	50	2197 - 652 - 160	B	1	104 B		

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4398							
2	4399							
3	4400							
4	4401							
5	4402							
6	4403							
7	4404							
8	4405							
9	4406							
10	4407							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*Sample will be forwarded when required or deleted

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00 Am INITIALS: HT
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/10/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00578

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM

SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	50	2197 - 652 - 161	B	1	~~South west Corner~~ OFFICE	12"x12" VINYL FLOOR TILE DARK BROWN w/ BLACK MARBLING & MASTIC
2	51	2197 - 652 - 162	B	1	Room 102	Fiberglass Pipe ins. / Joint Adhesive / Sealant
3		2197 - 652 - 163	B	1	outside Hallway	" " " " " "
4		2197 - 652 - 164	B	1	Room 110	" " " " " "
5		2197 - 652 - 165	B	1	outside Hallway	" " " " " "
6		2197 - 652 - 166	B	1	Room 137	" " " " " "
7		2197 - 652 - 167	B	1	Room 137	" " " " " "
8		2197 - 652 - 168	B	1	East Hallway	" " " " " "
9	52	2197 - 652 - 169	B	1	Room 110	Fiberglass Pipe ins. Hangers / Saddles
10		2197 - 652 - 170	B	1	Outside Hallway	" " " " "

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4408							
2	4409							
3	4410							
4	4411							
5	4412							
6	4413							
7	4414							
8	4415							
9	4416							
10	4417							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
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ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/10/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00578

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	52	2197 - 652 - 171	B	1	Outside Hallway	Fiberglass Pipe ins. Hanger / Saddles
2		2197 - 652 - 172	B	1	Training UCO Clock	" " " " "
3		2197 - 652 - 173	B	1	east Hallway	
4	53	2197 - 652 - 174	B	1	HW Tank Room	white power pipe insulation
5		2197 - 652 - 175	B	1	HW Tank Room	" " " "
6	54	2197 - 652 - 176	B	2	HALLWAY	Fiberglass Pipe Insulation w/joint Sealant
7		2197 - 652 - 177	B	2	213	" " " " " "
8		2197 - 652 - 178	B	2	226	" " " " " "
9		2197 - 652 - 179	B	2	229	" " " " " "
10		2197 - 652 - 180	B	2	243	" " " " " "

(12)

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4418							
2	4419							
3	4420							
4	4421							
5	4422							
6	4423							
7	4424							
8	4425							
9	4426							
10	4427							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00AM INITIALS:
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 2/10/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00578

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — SHEET 1 OF ___

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	54	2197 - 652 - 181	B	2	254	Fiberglass Pipe Insulation w/ joint Sealant
2		2197 - 652 - 182	B	2	262	" " " " " "
3	55	2197 - 652 - 183	B	2	HALLWAY	Fiberglass Pipe Insulation Hangers / Saddles
4		2197 - 652 - 184	B	2	213	" " " " "
5		2197 - 652 - 185	B	2	226	" " " " "
6		2197 - 652 - 186	B	2	243	" " " " "
7		2197 - 652 - 187	B	2	262	" " " " "
8	56	2197 - 652 - 188	B	3	HALLWAY	Fiberglass Pipe Insulation w/ Joint Sealant
9		2197 - 652 - 189	B	3	351	" " " " " "
10		2197 - 652 - 190	B	3	333	" " " " " "

7

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4428							
2	4429							
3	4430							
4	4431							
5	4432							
6	4433							
7	4434							
8	4435							
9	4436							
10	4437							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00 Am INITIALS: HT
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/10/01

APPROVAL SIGNATURE (PROJECT MANAGER):

21-00578

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — SHEET 1 OF ___

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	56	2197 - 652 - 191	B	3	HALLWAY	Fiberglass Pipe Insulation w/ Joint Sealant
2		2197 - 652 - 192	B	3	327	" " " " " "
3		2197 - 652 - 193	B	3	309	" " " " " "
4		2197 - 652 - 194	B	3	316	" " " " " "
5	57	2197 - 652 - 195	B	3	HALLWAY	Fiberglass Pipe Insulation Hangers / Saddles (7)
6		2197 - 652 - 196	B	3	351	" " " " "
7		2197 - 652 - 197	B	3	333	" " " " "
8		2197 - 652 - 198	B	3	327 309	" " " " "
9		2197 - 652 - 199	B	3	Room ~~309~~	" " " " "
10	58	2197 - 652 - 200	B	2	HALLWAY,	White Plaster Pipe Insulation (16)

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2101-4438							
2	4439							
3	4440							
4	4441							
5	4442							
6	4443							
7	4444							
8	4445							
9	4446							
10	4447							

ADDITIONAL COMMENTS & NOTES: **STOP ON FIRST POSITIVE FOR EACH SET,** Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5 -10 day turn around
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1/23/01 TIME: 9:00AM INITIALS:
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 2/12/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — (14) 21-01569 — SHEET 1 OF 2

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	01	2197 - 652 - 201	B	1	Hallway	Cementitious Plaster - Interior Hallway - 1st Floor
2	02	2197 - 652 - 202	B	1	Exterior	Cementitious Plaster - 1st Floor
3	03	2197 - 652 - 203	B	1	Exterior	Cementitious Plaster - 1st Floor - Under R.R. Window
4	04	2197 - 652 - 204	B	1	Exterior	Cementitious Plaster - Under Restroom Section Windows
5	04	2197 - 652 - 205	B	1	Exterior	↓ ↓ ↓ ↓ ↓ ↓
6	05	2197 - 652 - 206	B	3	Private. R.R.	Cementitious Plaster - Private Restroom - 3rd Floor
7	05	2197 - 652 - 207	B	3	Private R.R.	↓ ↓ ↓ ↓ ↓ ↓
8	06	2197 - 652 - 208	B	3	Comm. RR.	Cementitious Plaster - Community Restroom - 3rd Floor
9	07	2197 - 652 - 209	B	2	Private RR.	Cementitious Plaster - Private Restroom - 2nd Floor
10	08	2197 - 652 - 210	B	2	Comm. RR	Cementitious Plaster - Community Restroom - ↓ ↓

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2102 5392							
2	5393							
3	5394							
4	5395							
5	5396							
6	5397							
7	5398							
8	5399							
9	5400							
10	5401							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: RUSH
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: David Napoleon & Douglas Tisdell
SIGNATURE: [signature]
DATE: 2/01/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 2/21/01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: [signature]
DATE: 2/23/01 TIME: 9AM INITIALS: TC
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 2/28/01

APPROVAL SIGNATURE (PROJECT MANAGER):

EDWARD K. NODA AND ASSOCIATES

ASBESTOS BULK SAMPLE — CHAIN OF CUSTODY FORM — 21-01143 — SHEET 1 OF __

BLDG. NAME & PROJECT NAME: Quad F - Bldg - 652, Schofield Barracks, Hawaii

	SET	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM/AREA	MATERIAL DESCRIPTION
1	1	2197 - 652 - 212	B	1	Exterior Walkway	Cementitious Wall Plaster - Exterior Walkway - 1st Fl.
2		2197 - 652 - 213	B	1		
3		2197 - 652 - 214	B	1		
4	2	2197 - 652 - 215	B	2		Cementitious Wall Plaster - Exterior Walkway - 2nd Fl.
5		2197 - 652 - 216	B	2		
6		2197 - 652 - 217	B	2		
7	3	2197 - 652 - 218	B	3		Cementitious Wall Plaster - Exterior Walkway - 3rd Fl.
8		2197 - 652 - 219	B	3		
9		2197 - 652 - 220	B	3		
10	4	2197 - 652 - 221	B	1	Fire Room	9"x9" Medium Brown Vinyl Floor Tile w/ mastic

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1	2102 2094							
2	2095							
3	2096							
4	2097							
5	2098							
6	2099							
7	2100							
8	2101							
9	2102							
10	2103							

ADDITIONAL COMMENTS & NOTES: STOP ON FIRST POSITIVE FOR EACH SET, Fax daily results (808) 593-8551 Atn. Kenny Thomas

*SAMPLE TYPE CODES

B = BULK MATERIAL
D = DEBRIS SAMPLE
SD/T = SURFACE DUST - TAPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
SD/G = SURFACE DUST - GRAB SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 5-10 day turn around (Rush)
JOB NO.: 2197-01F BATCH NO. EKNA01360
CLIENT NAME: Will Chee / Corp of Engineers
SAMPLER'S NAME: K Thomas, W Harris, S Chun, D Tisdell, C Arouh
SIGNATURE:
DATE: 1/08/01 TIME COMPLETED:
DELIVERED TO LAB BY: FED-EX DATE: 1/ /01

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 2/8/01 TIME: 1:15 PM INITIALS: TG
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

Tel: 206.547.0100
Fax: 206.634.1936

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014248 **Client Sample #: 2197-652-001**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Multi-layered black asphaltic material LAYER 3: Brown foamy material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 5%, Glass fibers 15%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Calcareous matrix, Perlite
LAYER 2: Asphalt/binder
LAYER 3: Synthetic foam

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21014249 **Client Sample #: 2197-652-002**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Multi-layered black asphaltic material LAYER 3: Brown foamy material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 5%, Glass fibers 15%
LAYER 3: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Calcareous matrix, Perlite
LAYER 2: Asphalt/binder
LAYER 3: Synthetic foam

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Tel: 206.547.0100
Fax: 206.634.1936

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014250 **Client Sample #: 2197-652-003**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Multi-layered black asphaltic material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 5%, Glass fibers 15%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Calcareous matrix, Perlite
LAYER 2: Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014251 **Client Sample #: 2197-652-004**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Multi-layered black asphaltic material LAYER 3: Brown foamy material with brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 5%, Glass fibers 15%
LAYER 3: Glass fibers 25%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Calcareous matrix, Perlite
LAYER 2: Asphalt/binder
LAYER 3: Synthetic foam

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Fax: 206.634.1936

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014252 **Client Sample #: 2197-652-005**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Multi-layered black asphaltic material LAYER 3: Brown foamy material with brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 5%, Glass fibers 15%
LAYER 3: Glass fibers 25%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Calcareous matrix, Perlite
LAYER 2: Asphalt/binder
LAYER 3: Synthetic foam

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014253 **Client Sample #: 2197-652-006**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Multi-layered black asphaltic material LAYER 3: Brown foamy material with brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 5%, Glass fibers 15%
LAYER 3: Glass fibers 25%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Calcareous matrix, Perlite
LAYER 2: Asphalt/binder
LAYER 3: Synthetic foam

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Tel: 206.547.0100
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NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014254 **Client Sample #: 2197-652-007**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Multi-layered black asphaltic material LAYER 3: Brown foamy material with brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 5%, Glass fibers 15%
LAYER 3: Glass fibers 25%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Calcareous matrix, Perlite
LAYER 2: Asphalt/binder
LAYER 3: Synthetic foam

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014255 **Client Sample #: 2197-652-008**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey fibrous and porous material LAYER 2: Multi-layered black asphaltic material LAYER 3: Brown foamy material with brown fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: Cellulose 5%, Glass fibers 15%
LAYER 3: Glass fibers 25%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Calcareous matrix, Perlite
LAYER 2: Asphalt/binder
LAYER 3: Synthetic foam

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014256 **Client Sample #: 2197-652-009**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 4%

NON-FIBROUS MATERIALS:
Sands, Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014257 **Client Sample #: 2197-652-010**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains and trace bottom silver paint

OTHER FIBROUS MATERIALS:
Cellulose 4%

NON-FIBROUS MATERIALS:
Sands, Asphalt/binder, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Sample comments: Asbestos found in silver paint

Lab ID #: 21014258 **Client Sample #: 2197-652-011**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 4%

NON-FIBROUS MATERIALS:
Sands, Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014259 **Client Sample #: 2197-652-012**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 4%

NON-FIBROUS MATERIALS:
Sands, Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014260 **Client Sample #: 2197-652-013**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains and trace bottom silver paint

OTHER FIBROUS MATERIALS:
Cellulose 4%

NON-FIBROUS MATERIALS:
Sands, Asphalt/binder, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	<1%

Sample comments: Asbestos found in silver paint

Lab ID #: 21014261 **Client Sample #: 2197-652-014**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Multi-layered black asphaltic material with trace mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 4%, Glass fibers 3%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	3%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014264 **Client Sample #: 2197-652-017**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Multi-layered black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 3%, Glass fibers 35%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

Lab ID #: 21014266 **Client Sample #: 2197-652-019**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Multi-layered black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 15%, Glass fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

Sample comments: Asbestos found in lower part of the sample

Lab ID #: 21014268 **Client Sample #: 2197-652-021**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 15%, Glass fibers 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	6%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014273 **Client Sample #: 2197-652-026**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014274 **Client Sample #: 2197-652-027**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014275 **Client Sample #: 2197-652-028**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material with surface mineral grains

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 25%

NON-FIBROUS MATERIALS:
Asphalt/binder, Mineral/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014276 **Client Sample #: 2197-652-029**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material with trace grey fibrous and porous material

OTHER FIBROUS MATERIALS:
Cellulose 55%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Asphalt/binder, Fine particles, Perlite

ASBESTOS TYPE:	*PERCENT*
Chrysotile	4%

Sample comments: Asbestos found in asphaltic material

Lab ID #: 21014278 **Client Sample #: 2197-652-031**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: Black asphaltic material

OTHER FIBROUS MATERIALS:
Cellulose 15%, Glass fibers 15%

NON-FIBROUS MATERIALS:
Asphalt/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	4%

Lab ID #: 21014281 **Client Sample #: 2197-652-034**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and surface soft material LAYER 2: Grey plastic material with mastic LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%
LAYER 2: *None Detected
LAYER 3: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil
LAYER 2: Plastic/binder
LAYER 3: Fine particles

ASBESTOS TYPE:	*PERCENT*
LAYER 1: Chrysotile	2%
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

(Lab ID#: 21014281 Client Sample #: 2197-652-034 results continued from previous page)

LAYER 3:	*None Detected	ND

Sample comments: Asbestos found in soft material

Lab ID #: 21014282 Client Sample #: 2197-652-035

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and surface paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%, Glass fiber 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil
LAYER 2: Fine particles

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014283 Client Sample #: 2197-652-036

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and surface paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%, Glass fiber 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil
LAYER 2: Fine particles

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014284 **Client Sample #: 2197-652-037**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and surface paint and trace white powdery material LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%, Glass fiber 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil
LAYER 2: Fine particles

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	<1%
LAYER 2:	*None Detected	ND

Sample comments: Asbestos found in powdery material

Lab ID #: 21014285 **Client Sample #: 2197-652-038**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and surface paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%, Glass fiber 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil
LAYER 2: Fine particles

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014286 **Client Sample #: 2197-652-039**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and surface paint LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%, Glass fiber 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil
LAYER 2: Fine particles

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014287 **Client Sample #: 2197-652-040**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White fibrous material with silver metal foil and surface paint and trace black asphaltic mastic LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%, Glass fiber 15%
LAYER 2: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Fine particles, Metal foil, Asphalt/binder
LAYER 2: Fine particles

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014288 **Client Sample #: 2197-652-041**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White compacted powdery material with surface paint LAYER 2: Grey fibrous and porous material LAYER 3: Yellow fibrous material with surface white woven fiber and silver metal foil

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 15%, Glass fibers 35%
LAYER 3: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Paint
LAYER 2: Fine particles
LAYER 3: Fine particles, Metal foil

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

Lab ID #: 21014289 **Client Sample #: 2197-652-042**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White compacted powdery material with surface paint LAYER 2: Grey fibrous and porous material LAYER 3: Yellow fibrous material with surface white woven fiber and silver metal foil

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 15%, Glass fibers 35%
LAYER 3: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Paint
LAYER 2: Fine particles
LAYER 3: Fine particles, Metal foil

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21014290 **Client Sample #: 2197-652-043**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White compacted powdery material with surface paint LAYER 2: Grey fibrous and porous material LAYER 3: Yellow fibrous material with surface white woven fiber and silver metal foil

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 15%, Glass fibers 35%
LAYER 3: Glass fibers 75%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Paint
LAYER 2: Fine particles
LAYER 3: Fine particles, Metal foil

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014291 **Client Sample #: 2197-652-044**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Glass fibers 35%, Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014292 **Client Sample #: 2197-652-045**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 35%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014293 **Client Sample #: 2197-652-046**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Glass fibers25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Calcareous matrix

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014294 **Client Sample #: 2197-652-047**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue/tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Calcareous matrix

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014295 **Client Sample #: 2197-652-048**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 35%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Calcareous matrix

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00575.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014296 **Client Sample #: 2197-652-049**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue/tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21014297 **Client Sample #: 2197-652-050**

Sample Location: Quad F Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue/tan paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected
LAYER 3: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21014298 **Client Sample #: 2197-652-051**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	<1%
LAYER 3:	*None Detected	ND

Lab ID #: 21014299 **Client Sample #: 2197-652-052**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Fine particles, Calcareous matrix

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21014300 **Client Sample #: 2197-652-053**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/green paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21014301 **Client Sample #: 2197-652-054**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/green paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21014302 **Client Sample #: 2197-652-055**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/green paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21014303 **Client Sample #: 2197-652-056**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/green paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21014304 **Client Sample #: 2197-652-057**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21014305 **Client Sample #: 2197-652-058**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21014306 **Client Sample #: 2197-652-059**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014307 **Client Sample #: 2197-652-060**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: White compacted powdery material LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Fine particles, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014308 **Client Sample #: 2197-652-061**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Blue paint LAYER 2: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Fine particles, Calcareous matrix

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014309 **Client Sample #: 2197-652-062**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Blue paint LAYER 2: White compacted powdery material LAYER 3: Brown paper with white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%
LAYER 3: Cellulose 45%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix
LAYER 3: Fine particles, Calcareous matrix

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014310 **Client Sample #: 2197-652-063**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014311 **Client Sample #: 2197-652-064**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

ASBESTOS TYPE:	PERCENT
*None Detected	ND

Lab ID #: 21014312 **Client Sample #: 2197-652-065**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	PERCENT
*None Detected	ND

Lab ID #: 21014313 **Client Sample #: 2197-652-066**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	PERCENT
*None Detected	ND

Lab ID #: 21014314 **Client Sample #: 2197-652-067**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	PERCENT
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100
Fax: 206.634.1936

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21014315 **Client Sample #: 2197-652-068**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014316 **Client Sample #: 2197-652-069**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous material with blue paint

OTHER FIBROUS MATERIALS:
Cellulose 75%

NON-FIBROUS MATERIALS:
Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014317 **Client Sample #: 2197-652-070**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21014318 **Client Sample #: 2197-652-071**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey granular/sandy material with surface paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

Lab ID #: 21014321 **Client Sample #: 2197-652-074**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/blue paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	2%

Sample comments: LAYER 1 has different texture from its counterparts in subsequent two samples.

Lab ID #: 21014322 **Client Sample #: 2197-652-075**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/blue paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

(Lab ID#: 21014322 Client Sample #: 2197-652-075 results continued from previous page)

LAYER 2:	*None Detected	ND

Lab ID #: 21014323 Client Sample #: 2197-652-076

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/blue paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014324 Client Sample #: 2197-652-077

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige/blue paint with mastic LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Paint, Mastic/binder
LAYER 2: Calcareous matrix

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	2%

Lab ID #: 21014329 Client Sample #: 2197-652-082

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Paint

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 36

Client Sample #: 2197-652-078

Lab ID #: 21014325

Sample Description: LAYER 1: Beige/blue paint LAYER 2: Grey granular/sandy material

NON-FIBROUS MATERIALS:

LAYER 1: Paint
LAYER 2: Calcareous matrix

OTHER FIBROUS MATERIALS:

LAYER 1: *None Detected
LAYER 2: *None Detected

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	2%

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 36

Client Sample #: 2197-652-079

Lab ID #: 21014326

Sample Description: LAYER 1: Beige/blue paint with white chalky material LAYER 2: Off-white granular/sandy material

NON-FIBROUS MATERIALS:

LAYER 1: Paint, Calcareous matrix
LAYER 2: Calcareous matrix

OTHER FIBROUS MATERIALS:

LAYER 1: *None Detected
LAYER 2: *None Detected

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 36

Client Sample #: 2197-652-080

Lab ID #: 21014327

Sample Description: LAYER 1: Beige/blue paint with white chalky material LAYER 2: Off-white granular/sandy material

NON-FIBROUS MATERIALS:

LAYER 1: Paint, Calcareous matrix
LAYER 2: Calcareous matrix

OTHER FIBROUS MATERIALS:

LAYER 1: *None Detected
LAYER 2: *None Detected

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 36

Client Sample #: 2197-652-081

Lab ID #: 21014328

Sample Description: LAYER 1: Beige/blue paint with white chalky material LAYER 2: Off-white granular/sandy material

NON-FIBROUS MATERIALS:

LAYER 1: Paint, Calcareous matrix
LAYER 2: Calcareous matrix

OTHER FIBROUS MATERIALS:

LAYER 1: *None Detected
LAYER 2: *None Detected

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

ASBESTOS TYPE:	PERCENT
*None Detected	ND

Lab ID #: 21014330 **Client Sample #: 2197-652-083**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Paint

ASBESTOS TYPE:	PERCENT
*None Detected	ND

Lab ID #: 21014331 **Client Sample #: 2197-652-084**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Paint

ASBESTOS TYPE:	PERCENT
*None Detected	ND

Lab ID #: 21014332 **Client Sample #: 2197-652-085**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Paint

ASBESTOS TYPE:	PERCENT
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00576.00
Client Project #: 2197-01F
Number of samples: 32

Lab ID #: 21014333 **Client Sample #: 2197-652-086**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014334 **Client Sample #: 2197-652-087**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014335 **Client Sample #: 2197-652-088**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 45%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/03/2001
Reviewed by: Nick Ly Date: 02/03/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-01143.00
Client Project #: 2197-01F
Number of samples: 15

Lab ID #: 21022090 **Client Sample #: 2197-652-089**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%, Glass fibers 15%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None detected	ND

Lab ID #: 21022091 **Client Sample #: 2197-652-090**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%, Glass fibers 15%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022092 **Client Sample #: 2197-652-153**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown mastic LAYER 2: Tan tile

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Mastic/binder
LAYER 2: Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	<1%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014338 **Client Sample #: 2197-652-091**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 55%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Paint, Calcareous matrix, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014339 **Client Sample #: 2197-652-092**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 55%, Glass fibers 5%

NON-FIBROUS MATERIALS:
Paint, Calcareous matrix, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014340 **Client Sample #: 2197-652-093**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 55%

NON-FIBROUS MATERIALS:
Paint, Calcareous matrix, Perlite, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014341 **Client Sample #: 2197-652-094**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 55%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014342 **Client Sample #: 2197-652-095**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 55%

NON-FIBROUS MATERIALS:
Paint, Calcareous matrix, Perlite, Glass beads

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014343 **Client Sample #: 2197-652-096**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 55%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Tel: 206.547.0100
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NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP
#102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014344 **Client Sample #: 2197-652-097**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 5%, Glass fibers 55%

NON-FIBROUS MATERIALS:
Calcareous matrix, Perlite, Glass beads, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014345 **Client Sample #: 2197-652-098**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: White fibrous material

OTHER FIBROUS MATERIALS:
Cellulose 10%

NON-FIBROUS MATERIALS:
Fine particles

ASBESTOS TYPE:	*PERCENT*
Chrysotile	75%

Lab ID #: 21014346 **Client Sample #: 2197-652-099**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: White woven fiber with surface paint

OTHER FIBROUS MATERIALS:
Glass fibers 65%

NON-FIBROUS MATERIALS:
Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014347 **Client Sample #: 2197-652-100**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: Brown adhesive mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014348 **Client Sample #: 2197-652-101**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material LAYER 2: White mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014349 **Client Sample #: 2197-652-102**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material with brown mastic LAYER 2: Brown paper with white chalky material and mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 15%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder, Mastic/binder
LAYER 2: Fine particles, Calcareous matrix, Mastic/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014350 **Client Sample #: 2197-652-103**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Brown rubbery material with brown mastic and surface paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Rubber/binder, Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014351 **Client Sample #: 2197-652-104**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige rubbery material with brown mastic LAYER 2: Brown paper with white chalky material and mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 15%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder, Mastic/binder
LAYER 2: Fine particles, Calcareous matrix, Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014352 **Client Sample #: 2197-652-105**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Brown rubbery material with brown mastic and surface paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Rubber/binder, Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014353 **Client Sample #: 2197-652-106**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey rubbery material LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014354 **Client Sample #: 2197-652-107**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey rubbery material LAYER 2: Brown mastic with paint and white chalky material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder
LAYER 2: Mastic/binder, Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

(Lab ID#: 21014354 Client Sample #: 2197-652-107 results continued from previous page)

LAYER 2:	*None Detected	ND

Lab ID #: 21014355 **Client Sample #: 2197-652-108**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material with brown mastic LAYER 2: Brown paper with white chalky material and mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 15%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder, Mastic/binder
LAYER 2: Fine particles, Calcareous matrix, Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014356 **Client Sample #: 2197-652-109**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material with brown mastic LAYER 2: Brown paper with white chalky material, mastic and paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 15%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder, Mastic/binder
LAYER 2: Fine particles, Calcareous matrix, Mastic/binder, Paint

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014357 **Client Sample #: 2197-652-110**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Brown rubbery material with brown/white mastic and trace paint

OTHER FIBROUS MATERIALS:
Talc fibers 3%

NON-FIBROUS MATERIALS:
Rubber/binder, Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014358 **Client Sample #: 2197-652-111**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Brown rubbery material with white mastic

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Rubber/binder, Mastic/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014359 **Client Sample #: 2197-652-112**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material with white mastic LAYER 2: Brown paper with white chalky material, paint and surface mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder, Mastic/binder
LAYER 2: Fine particles, Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014360 **Client Sample #: 2197-652-113**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Brown rubbery material with brown/white mastic and trace paint

OTHER FIBROUS MATERIALS:
Talc fibers 3%

NON-FIBROUS MATERIALS:
Rubber/binder, Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014361 **Client Sample #: 2197-652-114**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material with white mastic LAYER 2: Brown paper with white chalky material, paint and surface mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder, Mastic/binder
LAYER 2: Fine particles, Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014362 **Client Sample #: 2197-652-115**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown rubbery material with white mastic LAYER 2: Brown paper with white chalky material, paint and surface mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Rubber/binder, Mastic/binder
LAYER 2: Fine particles, Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

Lab ID #: 21014363 **Client Sample #: 2197-652-116**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown mastic LAYER 2: Brown fibrous material with surface paint

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Mastic/binder
LAYER 2: Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014364 **Client Sample #: 2197-652-117**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown mastic LAYER 2: Brown fibrous material with surface paint

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 25%

NON-FIBROUS MATERIALS:
LAYER 1: Mastic/binder
LAYER 2: Fine particles, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014365 **Client Sample #: 2197-652-118**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Brown paper with white chalky material, surface paint and mastic

OTHER FIBROUS MATERIALS:
Cellulose 25%

NON-FIBROUS MATERIALS:
Fine particles, Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014366 **Client Sample #: 2197-652-119**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Brown paper with white chalky material, surface paint and mastic

OTHER FIBROUS MATERIALS:
Cellulose 25%

NON-FIBROUS MATERIALS:
Fine particles, Mastic/binder, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014367 **Client Sample #: 2197-652-120**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	3%

Lab ID #: 21014372 **Client Sample #: 2197-652-125**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

Lab ID #: 21014373 **Client Sample #: 2197-652-126**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21014374 **Client Sample #: 2197-652-127**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Beige tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	3%

Lab ID #: 21014377 **Client Sample #: 2197-652-130**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
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Bulk Asbestos Fiber Analysis

NVLAP #102063

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	3%

Lab ID #: 21014380 **Client Sample #: 2197-652-133**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: White tile with brown mastic

OTHER FIBROUS MATERIALS:
Cellulose 2%

NON-FIBROUS MATERIALS:
Calcareous matrix, Mastic/binder

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014381 **Client Sample #: 2197-652-134**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey tile LAYER 2: Mixture of black asphaltic mastic and brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder, Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21014382 **Client Sample #: 2197-652-135**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey tile LAYER 2: Mixture of black asphaltic mastic and brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder, Mastic/binder

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

NVLAP #102063

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Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00577.00
Client Project #: 2197-01F
Number of samples: 39

LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21014383 **Client Sample #: 2197-652-136**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Grey tile LAYER 2: Mixture of black asphaltic mastic and brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder, Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21014384 **Client Sample #: 2197-652-137**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Cream tile LAYER 2: Black asphaltic mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Asphalt/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	3%

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/05/2001
Reviewed by: Nick Ly Date: 02/05/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014388 **Client Sample #: 2197-652-141**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: Black mastic

OTHER FIBROUS MATERIALS:
Cellulose 7%

NON-FIBROUS MATERIALS:
Mastic/binder

ASBESTOS TYPE:	*PERCENT*
Chrysotile	3%

Lab ID #: 21014390 **Client Sample #: 2197-652-143**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Yellow/black mastic, LAYER 2: Beige vinyl tile, LAYER 3: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 1%
LAYER 3: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Mastic/binder
LAYER 2: Vinyl/binder
LAYER 3:

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	Chrysotile	2%
LAYER 3:	Chrysotile	3%

Lab ID #: 21014392 **Client Sample #: 2197-652-145**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Blue vinyl tile with white/gray streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE: *PERCENT*

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014393 **Client Sample #: 2197-652-146**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Blue vinyl tile with white/gray streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014394 **Client Sample #: 2197-652-147**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Blue vinyl tile with white streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014395 **Client Sample #: 2197-652-148**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Blue vinyl tile with white streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014396 **Client Sample #: 2197-652-149**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white vinyl tile with brown streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014397 **Client Sample #: 2197-652-150**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white vinyl tile with brown streaks, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 1%
LAYER 2: Cellulose 4%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014398 **Client Sample #: 2197-652-151**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown vinyl tile, LAYER 2: Yellow/black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014399 **Client Sample #: 2197-652-152**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown vinyl tile, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 2%
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014400 **Client Sample #: 2197-652-153**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: Sample not received.

OTHER FIBROUS MATERIALS:
Sample not received

NON-FIBROUS MATERIALS:
Sample not received

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: **Edward K. Noda & Associates**
Address: **615 Pikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F-Bldg-652, Schofield Barracks, Hawaii**

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

ASBESTOS TYPE:	*PERCENT*
Sample not received	ND

Lab ID #: 21014401 **Client Sample #: 2197-652-154**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: Sample not received.

OTHER FIBROUS MATERIALS:
Sample not received

NON-FIBROUS MATERIALS:
Sample not received

ASBESTOS TYPE:	*PERCENT*
Sample not received	ND

Lab ID #: 21014402 **Client Sample #: 2197-652-155**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown vinyl tile, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 7%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014403 **Client Sample #: 2197-652-156**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown vinyl tile, LAYER 2: Yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 7%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014404 **Client Sample #: 2197-652-157**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown vinyl tile with black streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	3%

Lab ID #: 21014405 **Client Sample #: 2197-652-158**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown vinyl tile with black streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014406 **Client Sample #: 2197-652-159**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Dark brown vinyl tile with black streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014407 **Client Sample #: 2197-652-160**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Dark brown vinyl tile with black streaks, LAYER 2: Black/yellow mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014408 **Client Sample #: 2197-652-161**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Dark brown vinyl tile with black streaks, LAYER 2: Black mastic

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 3%
LAYER 2: Cellulose 5%

NON-FIBROUS MATERIALS:
LAYER 1: Vinyl/binder, Granules
LAYER 2: Mastic/binder

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014409 **Client Sample #: 2197-652-162**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%, Glass fibers 7%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014410 **Client Sample #: 2197-652-163**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white/tan soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 45%, Glass fibers 7%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Tel: 206.547.0100
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NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014411 **Client Sample #: 2197-652-164**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: White/tan soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 45%, Glass fibers 7%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014412 **Client Sample #: 2197-652-165**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: Yellow fibrous material

OTHER FIBROUS MATERIALS:
Glass fibers 80%

NON-FIBROUS MATERIALS:
Binder & filler

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21014413 **Client Sample #: 2197-652-166**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white/tan soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 5%
LAYER 2: Cellulose 45%, Glass fibers 7%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014414 **Client Sample #: 2197-652-167**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material wiht paint, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%, Glass fibers 7%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder, Paint
LAYER 2: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014415 **Client Sample #: 2197-652-168**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: White soft material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014416 **Client Sample #: 2197-652-169**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/white soft material, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 45%, Glass fibers 10%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21014417 **Client Sample #: 2197-652-170**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/white soft material, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 45%, Glass fibers 10%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014419 **Client Sample #: 2197-652-172**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: White soft material, LAYER 2: Silver paper with tan/white fibrous material and mastic, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 45%, Glass fibers 10%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21014420 **Client Sample #: 2197-652-173**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with tan/white fibrous material and mastic, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 45%, Glass fibers 10%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014421 **Client Sample #: 2197-652-174**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: White powdery material with paint

OTHER FIBROUS MATERIALS:
Cellulose 25%

NON-FIBROUS MATERIALS:
Binder & filler, Paint

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

ASBESTOS TYPE:	PERCENT
Chrysotile	15%

Lab ID #: 21014423 **Client Sample #: 2197-652-176**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	PERCENT
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014424 **Client Sample #: 2197-652-177**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	PERCENT
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014425 Client Sample #: 2197-652-178

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014426 Client Sample #: 2197-652-179

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014427 **Client Sample #: 2197-652-180**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014428 **Client Sample #: 2197-652-181**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014429 **Client Sample #: 2197-652-182**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014430 **Client Sample #: 2197-652-183**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 17%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014431 **Client Sample #: 2197-652-184**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 17%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014432 **Client Sample #: 2197-652-185**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material, LAYER 3: Black soft material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 17%
LAYER 2: Glass fibers 80%
LAYER 3: Cellulose 1%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler
LAYER 3: Binder & filler, Synthetic foam

ASBESTOS TYPE:	PERCENT
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

Lab ID #: 21014433 **Client Sample #: 2197-652-186**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:	PERCENT
LAYER 1: Chrysotile	2%
LAYER 2: *None Detected	ND
LAYER 3: *None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

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NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014434 **Client Sample #: 2197-652-187**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014435 **Client Sample #: 2197-652-188**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014436 **Client Sample #: 2197-652-189**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014437 **Client Sample #: 2197-652-190**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014438 **Client Sample #: 2197-652-191**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014439 **Client Sample #: 2197-652-192**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014440 **Client Sample #: 2197-652-193**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

Lab ID #: 21014441 **Client Sample #: 2197-652-194**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Off-white soft material, LAYER 2: Silver paper with mastic and tan/white fibrous material, LAYER 3: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 4%
LAYER 2: Cellulose 40%, Glass fibers 17%
LAYER 3: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler
LAYER 2: Binder & filler, Mastic/binder
LAYER 3: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND
LAYER 3:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

Lab ID #: 21014442 **Client Sample #: 2197-652-195**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 17%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014443 **Client Sample #: 2197-652-196**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 17%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21014444 **Client Sample #: 2197-652-197**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 17%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Client: Edward K. Noda & Associates
Address: 615 Pikoi Street, Suite 300
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Attn.: Mr. William Harris
Project: Quad F-Bldg-652, Schofield Barracks, Hawaii

NVL Batch Number: 21-00578.00
Client Project #: 2197-01F
Number of samples: 57

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014445 **Client Sample #: 2197-652-198**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 17%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014446 **Client Sample #: 2197-652-199**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: LAYER 1: Silver paper with mastic and tan/white fibrous material, LAYER 2: Yellow fibrous material

OTHER FIBROUS MATERIALS:
LAYER 1: Cellulose 40%, Glass fibers 17%
LAYER 2: Glass fibers 80%

NON-FIBROUS MATERIALS:
LAYER 1: Binder & filler, Mastic/binder
LAYER 2: Binder & filler

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21014447 **Client Sample #: 2197-652-200**

Sample Location: Quad F-Bldg-652, Schofield Barracks, Hawaii
Description: White soft material

OTHER FIBROUS MATERIALS:
Cellulose 7%, Glass fibers 4%

NON-FIBROUS MATERIALS:
Binder & filler

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Wei Long Tai Date: 02/06/2001
Reviewed by: Nick Ly Date: 02/06/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofiled Barracks, Hawaii

NVL Batch Number: 21-01569.00
Client Project #: 2197-01F
Number of samples: 14

Lab ID #: 21025392 **Client Sample #: 2197-652-201**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

Lab ID #: 21025393 **Client Sample #: 2197-652-202**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21025394 **Client Sample #: 2197-652-203**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/26/2001
Reviewed by: Nick Ly Date: 02/26/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofiled Barracks, Hawaii

NVL Batch Number: 21-01569.00
Client Project #: 2197-01F
Number of samples: 14

Lab ID #: 21025395 **Client Sample #: 2197-652-204**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

Lab ID #: 21025396 **Client Sample #: 2197-652-205**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: LAYER 1: Grey brittle material with paint LAYER 2: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: *None Detected

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix, Paint
LAYER 2: Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	2%

Lab ID #: 21025397 **Client Sample #: 2197-652-206**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/26/2001
Reviewed by: Nick Ly Date: 02/26/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofiled Barracks, Hawaii

NVL Batch Number: 21-01569.00
Client Project #: 2197-01F
Number of samples: 14

Lab ID #: 21025398 **Client Sample #: 2197-652-207**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	3%

Lab ID #: 21025399 **Client Sample #: 2197-652-208**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21025400 **Client Sample #: 2197-652-209**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/26/2001
Reviewed by: Nick Ly Date: 02/26/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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Bulk Asbestos Fiber Analysis

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Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofiled Barracks, Hawaii

NVL Batch Number: 21-01569.00
Client Project #: 2197-01F
Number of samples: 14

Lab ID #: 21025401 **Client Sample #: 2197-652-210**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey/white granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21025402 **Client Sample #: 2197-652-211**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey/white granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21025403 **Client Sample #: 2197-652-222**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Grey/white granular/sandy material with paint

OTHER FIBROUS MATERIALS:
*None Detected

NON-FIBROUS MATERIALS:
Calcareous matrix, Sands, Paint

ASBESTOS TYPE:	*PERCENT*
Chrysotile	2%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/26/2001
Reviewed by: Nick Ly Date: 02/26/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Tel: 206.547.0100
Fax: 206.634.1936

NVL Laboratories, Inc.

4708 Aurora Ave. N., Seattle, WA 98103

NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: **Edward K. Noda and Associates**
Address: **615 Piikoi Street, Suite 300**
Honolulu, HI 96814
Attn.: **Mr. William Harris**
Project: **Quad F - Bldg - 652, Schofield Barracks, Hawaii**

NVL Batch Number: 21-01143.00
Client Project #: 2197-01F
Number of samples: 15

Lab ID #: 21022090 **Client Sample #: 2197-652-089**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%, Glass fibers 15%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None detected	ND

Lab ID #: 21022091 **Client Sample #: 2197-652-090**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: Grey fibrous and porous material with surface paint

OTHER FIBROUS MATERIALS:
Cellulose 65%, Glass fibers 15%

NON-FIBROUS MATERIALS:
Calcareous matrix, Paint, Perlite

ASBESTOS TYPE:	*PERCENT*
*None Detected	ND

Lab ID #: 21022092 **Client Sample #: 2197-652-153**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown mastic LAYER 2: Tan tile

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Mastic/binder
LAYER 2: Calcareous matrix

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: Chrysotile	<1%

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-01143.00
Client Project #: 2197-01F
Number of samples: 15

Lab ID #: 21022093 **Client Sample #: 2197-652-154**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Brown mastic with surface black paint LAYER 2: Tan tile

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 3%

NON-FIBROUS MATERIALS:
LAYER 1: Mastic/binder
LAYER 2: Calcareous matrix

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	2%

Lab ID #: 21022094 **Client Sample #: 2197-652-212**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21022095 **Client Sample #: 2197-652-213**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE: *PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-01143.00
Client Project #: 2197-01F
Number of samples: 15

LAYER 1:	*None Detected	ND
LAYER 2:	Chrysotile	2%

Sample comments: Sample has slightly different texture from rest of the samples in group

Lab ID #: 21022096 **Client Sample #: 2197-652-214**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21022097 **Client Sample #: 2197-652-215**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-01143.00
Client Project #: 2197-01F
Number of samples: 15

Lab ID #: 21022098 **Client Sample #: 2197-652-216**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/green paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21022099 **Client Sample #: 2197-652-217**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/brown paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*
LAYER 1: *None Detected	ND
LAYER 2: *None Detected	ND

Lab ID #: 21022100 **Client Sample #: 2197-652-218**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/green paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

ASBESTOS TYPE:	*PERCENT*

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-01143.00
Client Project #: 2197-01F
Number of samples: 15

LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21022101 **Client Sample #: 2197-652-219**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/brown paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

Lab ID #: 21022102 **Client Sample #: 2197-652-220**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan/green paint LAYER 2: Grey granular/sandy material

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Paint
LAYER 2: Calcareous matrix, Sands

	ASBESTOS TYPE:	*PERCENT*
LAYER 1:	*None Detected	ND
LAYER 2:	*None Detected	ND

(Sample results are continued on the next page.)

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofield Barracks, Hawaii

NVL Batch Number: 21-01143.00
Client Project #: 2197-01F
Number of samples: 15

Lab ID #: 21022103 **Client Sample #: 2197-652-221**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan tile LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND

Lab ID #: 21022104 **Client Sample #: 2197-652-222**

Sample Location: Quad F - Bldg - 652, Schofield Barracks, Hawaii
Description: LAYER 1: Tan tile LAYER 2: Brown mastic

OTHER FIBROUS MATERIALS:
LAYER 1: *None Detected
LAYER 2: Cellulose 2%

NON-FIBROUS MATERIALS:
LAYER 1: Calcareous matrix
LAYER 2: Mastic/binder

ASBESTOS TYPE:		*PERCENT*
LAYER 1:	Chrysotile	2%
LAYER 2:	*None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/12/2001
Reviewed by: Nick Ly Date: 02/12/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

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NVLAP #102063

Bulk Asbestos Fiber Analysis

Client: Edward K. Noda and Associates
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814
Attn.: Mr. William Harris
Project: Quad F - Bldg - 652, Schofiled Barracks, Hawaii

NVL Batch Number: 21-01569.00
Client Project #: 2197-01F
Number of samples: 14

Lab ID #: 21025404 **Client Sample #: 2197-652-223**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Sample not analyzed

OTHER FIBROUS MATERIALS:
Sample not analyzed

NON-FIBROUS MATERIALS:
Sample not analyzed

ASBESTOS TYPE:	*PERCENT*
Sample not analyzed	ND

Lab ID #: 21025405 **Client Sample #: 2197-652-224**

Sample Location: Quad F - Bldg - 652, Schofiled Barracks, Hawaii
Description: Sample not analyzed

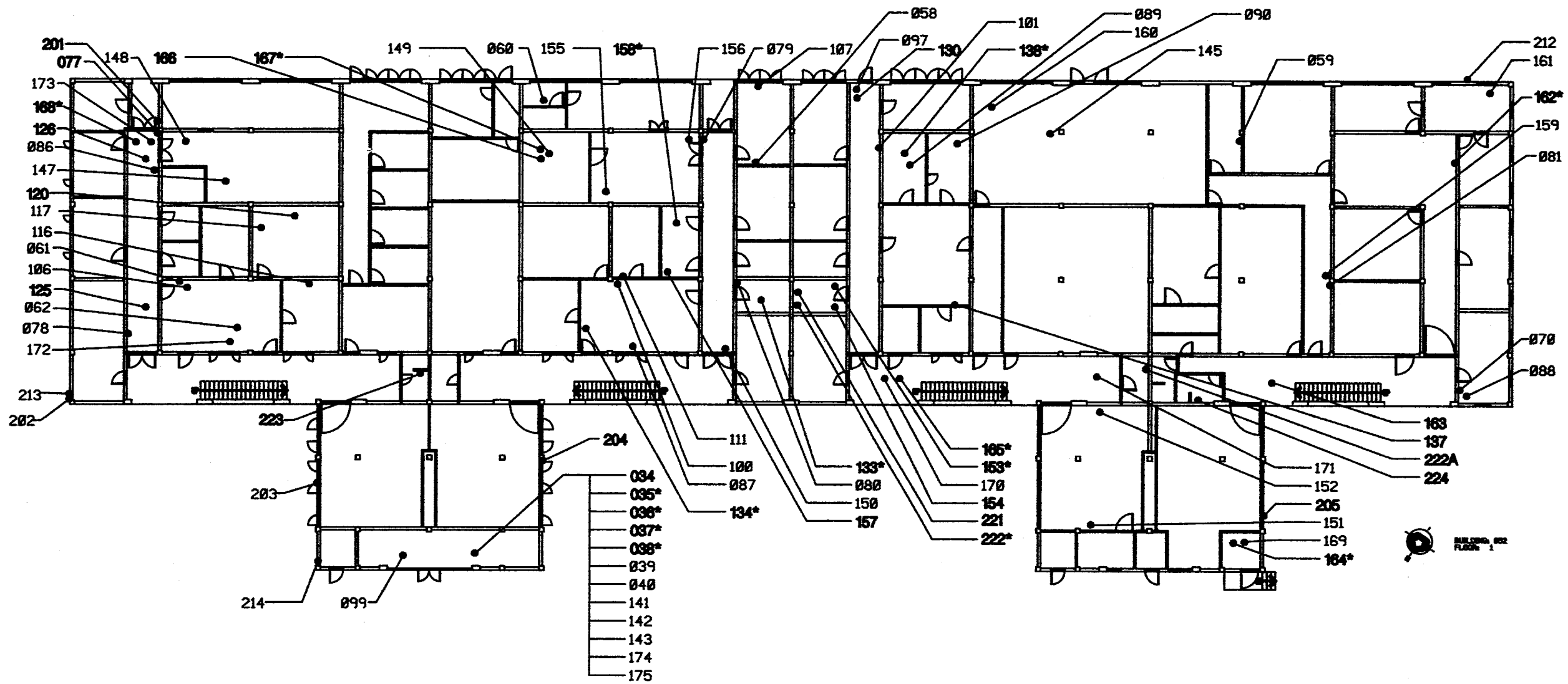
OTHER FIBROUS MATERIALS:
Sample not analyzed

NON-FIBROUS MATERIALS:
Sample not analyzed

ASBESTOS TYPE:	*PERCENT*
Sample not analyzed	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 02/26/2001
Reviewed by: Nick Ly Date: 02/26/2001
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=>0-3%, 5%=>1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.



Sample * Prefix: 2179-652-XXX

LEGEND

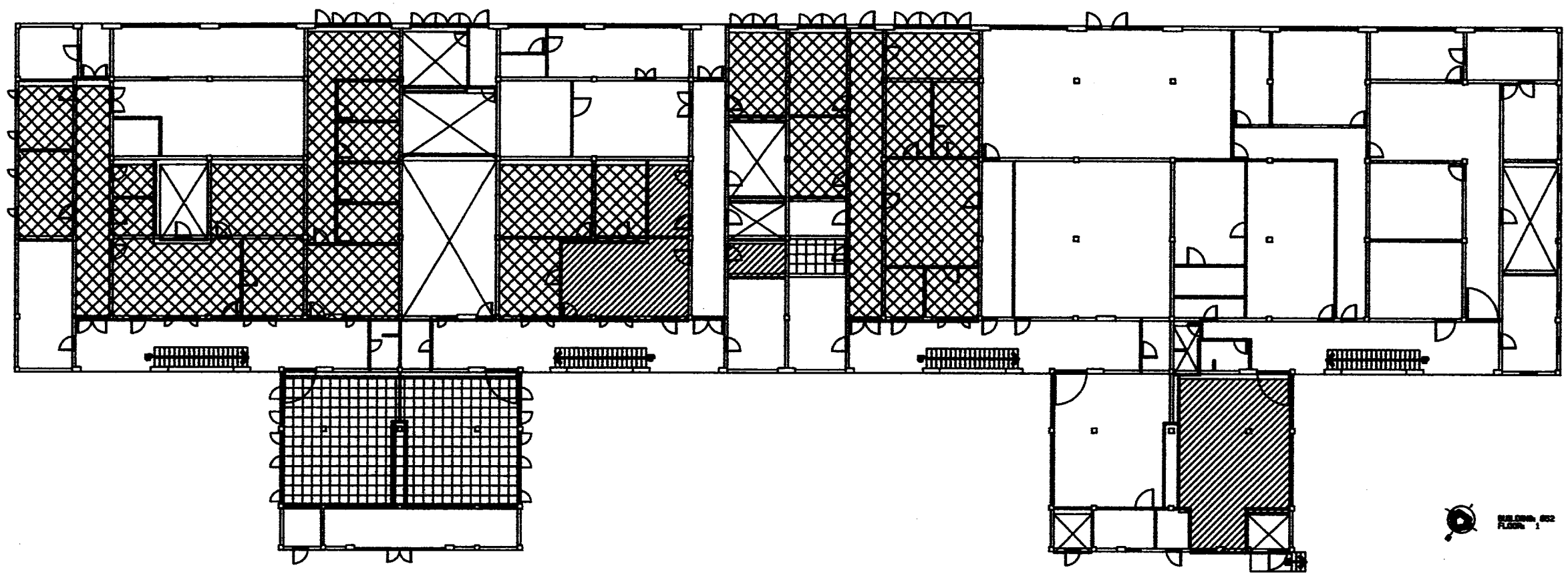
XXX Non-Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Locations

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

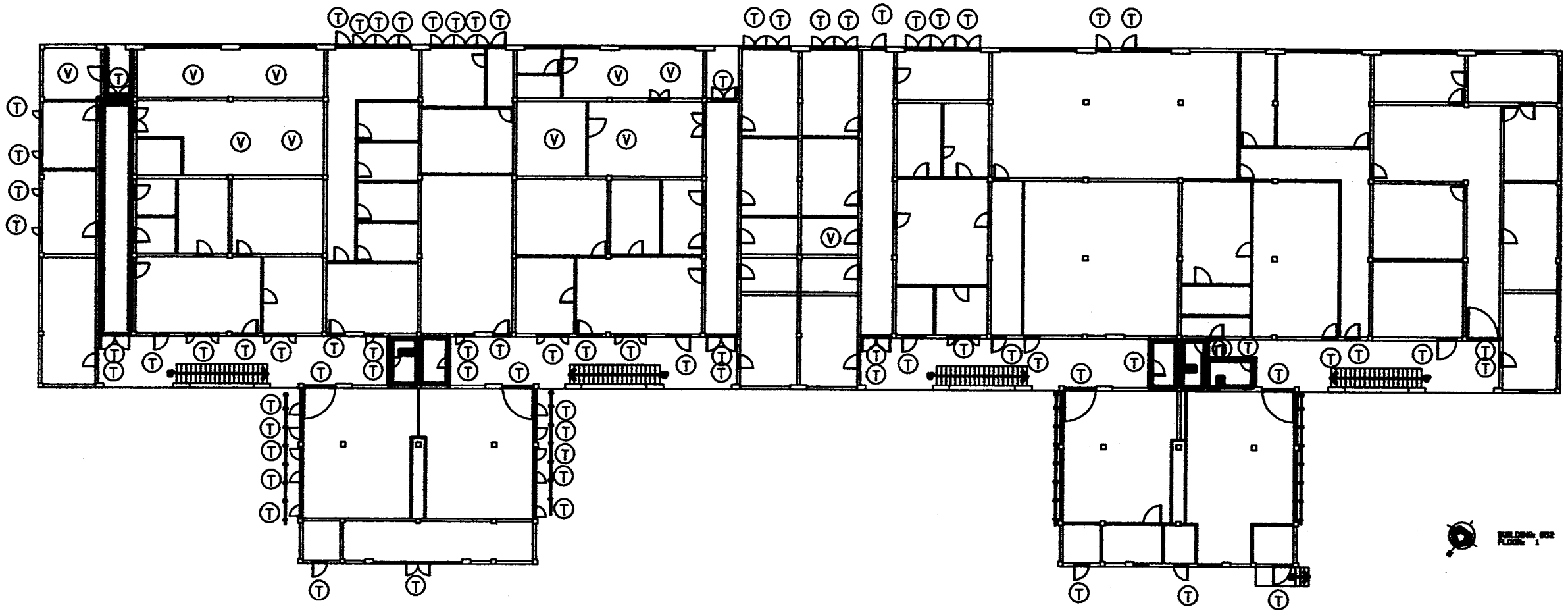
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Sample Locations First Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arauh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM First Floor	Figure 2



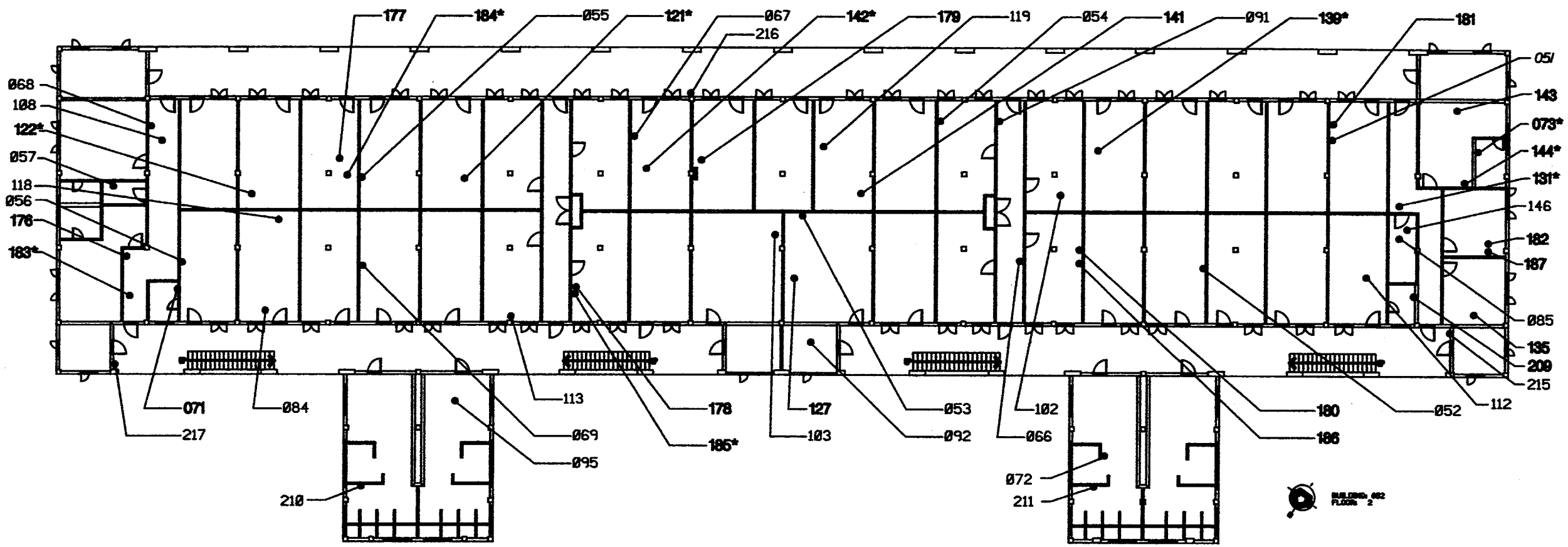
Note:

Asbestos-Containing Joint Adhesive/Sealant-(Off White/Yellow/Orange/Tan) On
Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls
- Wall Plaster-Cementitious Exterior Type II

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM First Floor	Figure 3

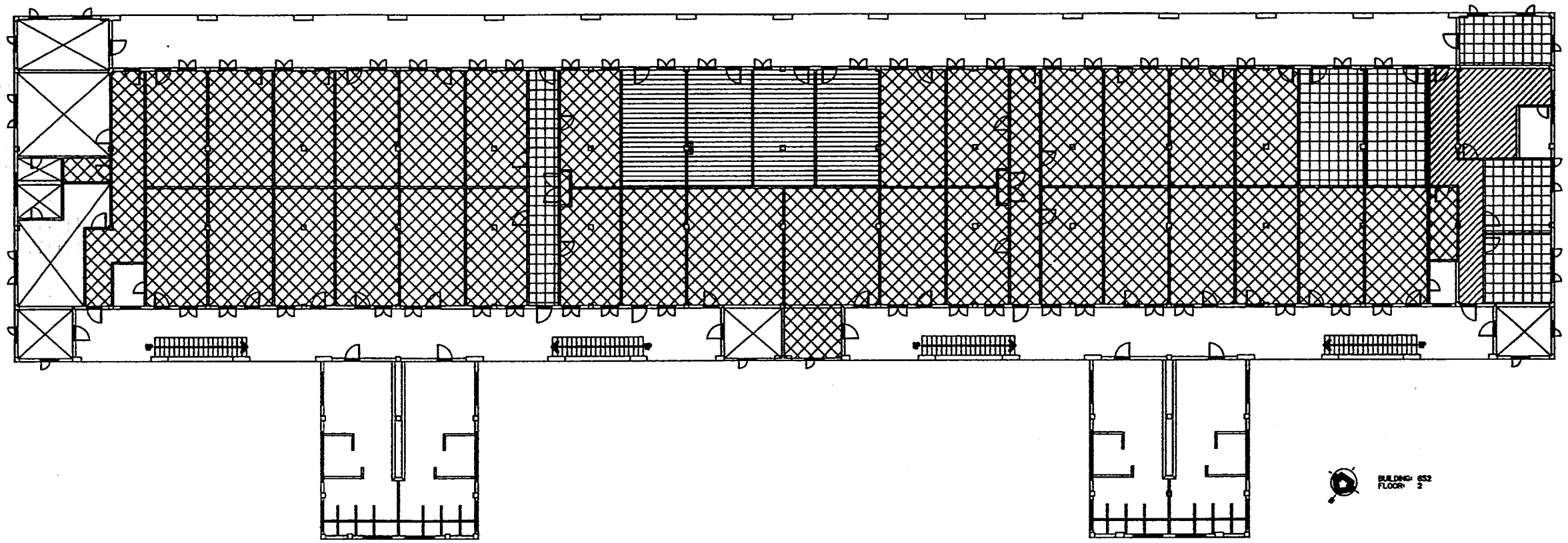


Sample * Prefix: 2179-652-XXX

LEGEND

XXX Non-Asbestos-Containing Sample Location
XXX Asbestos-Containing Sample Location
XXX* Homogeneous Asbestos-Containing Sample Locations
XXX Asbestos-Containing Sample Location Less Than 1%

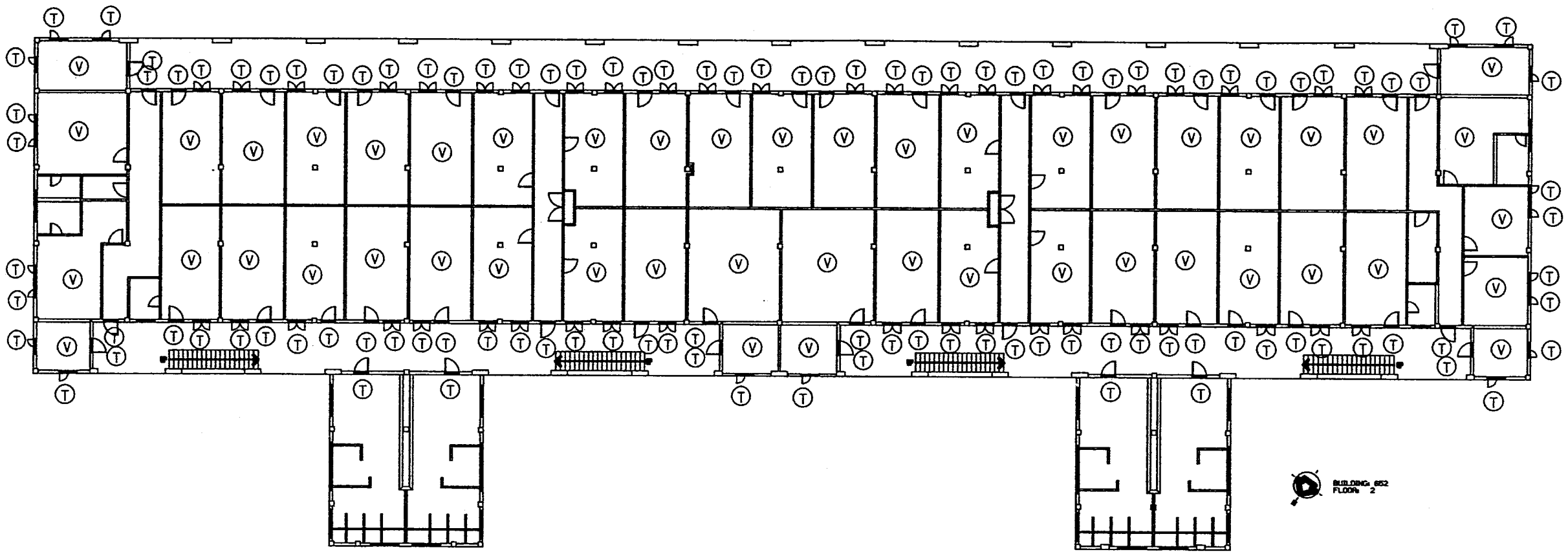
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM Second Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM Second Floor	Figure 2



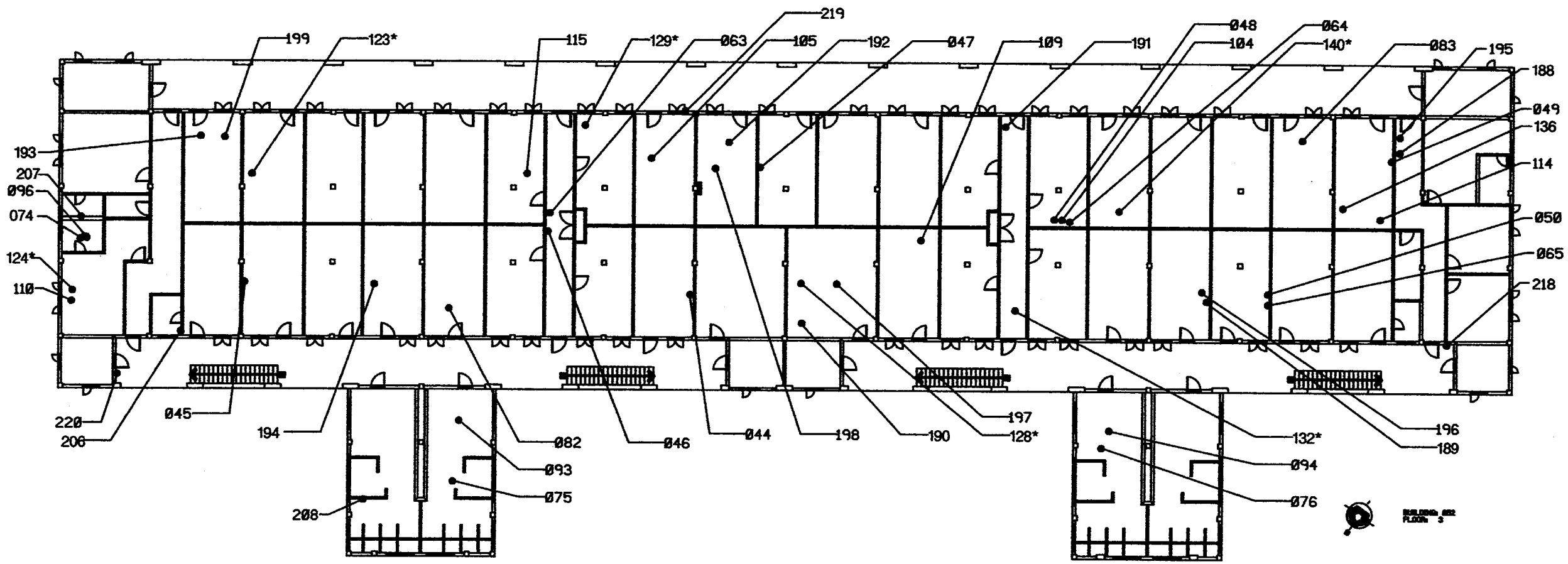
Note:

Asbestos–Containing Joint Adhesive/Sealant–(Off White/Yellow/Orange/Tan) On
Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM Second Floor	Figure 3

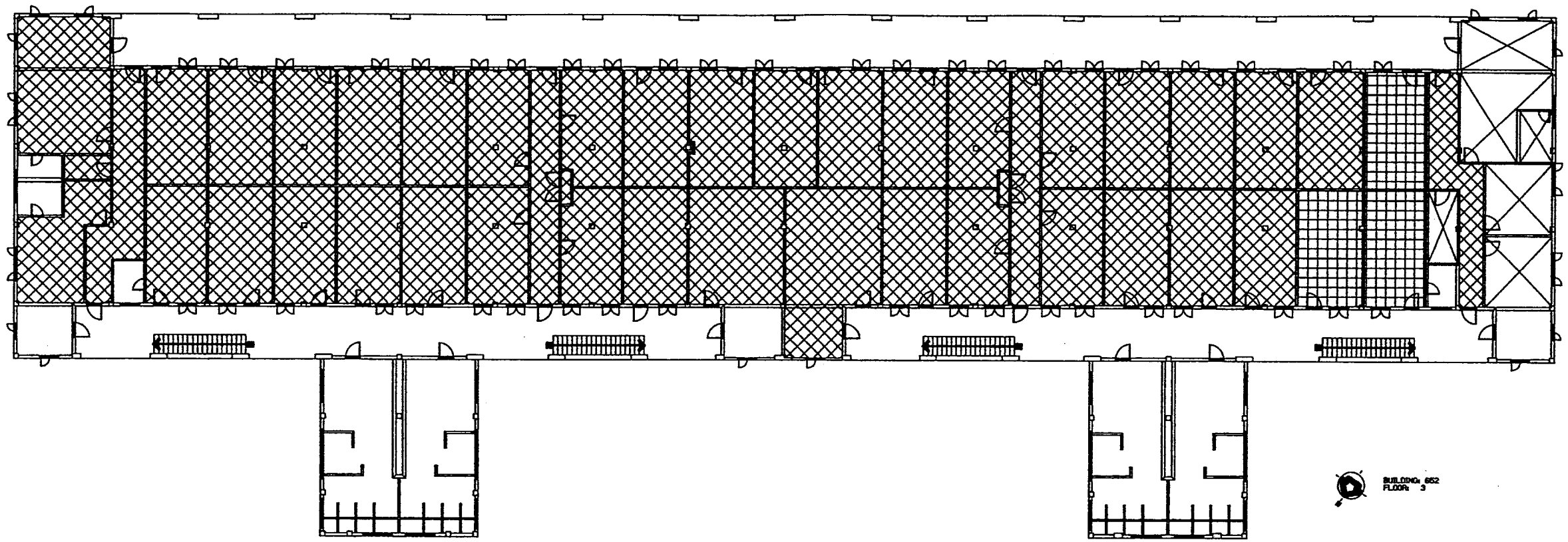


Sample * Prefix: 2179-652-XXX

LEGEND

XXX Non-Asbestos-Containing Sample Locations
XXX Asbestos-Containing Sample Location
XXX* Homogeneous Asbestos-Containing Sample Locations
XXX Asbestos-Containing Sample Location Less Than 1%

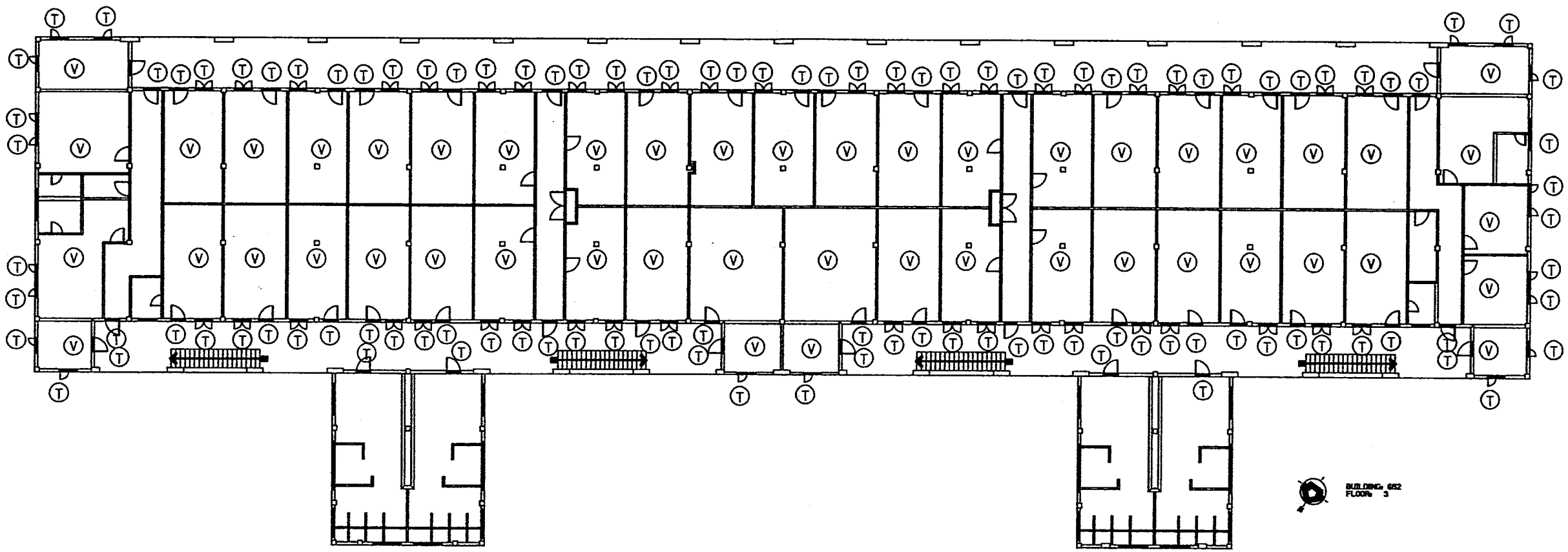
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Sample Locations Third Floor	Figure 1



LEGEND

- Asbestos-Containing Mastic and Associated NON-Asbestos Floor Tile
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic
- Asbestos-Containing Mastic Only
- Asbestos-Containing Floor Tile Only
- Asbestos-Containing Floor Tile and Asbestos-Containing Mastic (Multi-Layer Floor Tile System)
- Rooms Unaccessable

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM Third Floor	Figure 2



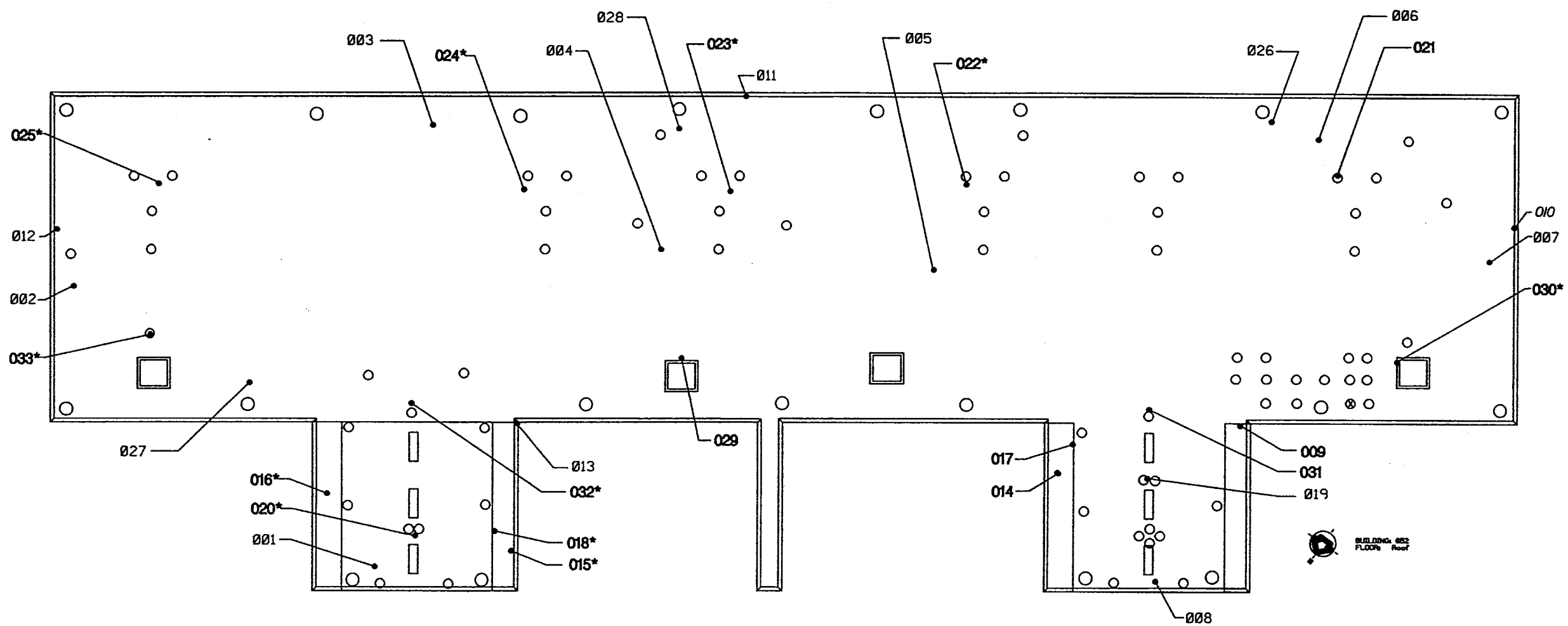
Note:

Asbestos–Containing Joint Adhesive/Sealant–(Off White/Yellow/Orange/Tan) On
Fiberglass Pipe Insulation (Runs, Elbows, Tees, Fittings, Hangers and Saddles, etc ... Exists Throughout Floor.)

LEGEND

- (T) Asbestos-Containing Cementitious Panel
- (V) Asbestos-Containing Vibration Cloth
- Asbestos-Containing Plaster Walls

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM Third Floor	Figure 3



Sample * Prefix: 2179-652-XXX

LEGEND

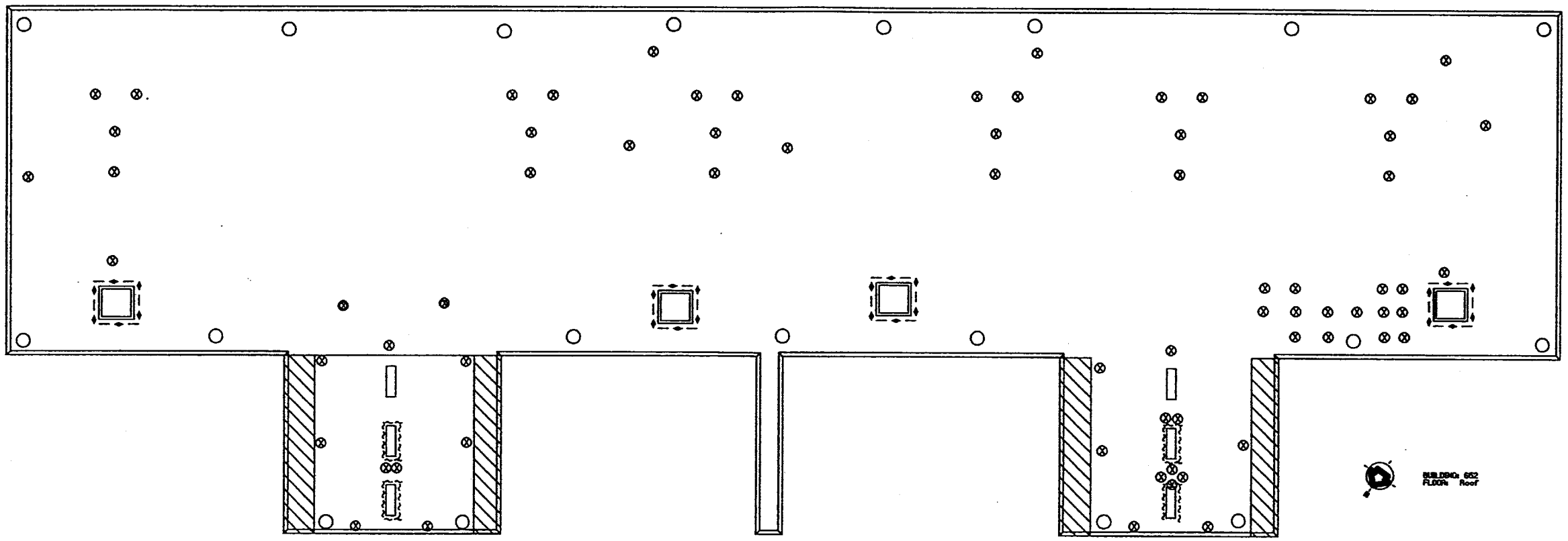
XXX Non-Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Locations

XXX* Homogeneous Asbestos-Containing Sample Locations

XXX Asbestos-Containing Sample Location Less Than 1%

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Sample Locations Roof	Figure 1



LEGEND

- ⊗ Asbestos-Containing Flashing/Sealant, Gas Vents and Mount Points
- Asbestos-Containing Access Hatch Flashing
- ~~~ Asbestos-Containing Asphaltic Undercoat
- ••• Asbestos-Containing Flashing/Sealant , Large Air Vents
- Asbestos-Containing Built-Up Roofing Material & Flashing

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814 Drawn by: C. Arouh Date: 02-07-01	U. S. Army Corps of Engineers, Pacific Ocean Division Fort Shafter, Oahu, Hawaii Contract No: DACA83-00-D-0012, Task Order No: 0012	Asbestos Survey, Analysis and Report for Quad F, Building 652	Extent of Identified ACBM Roof	Figure 2

APPENDIX E

INSPECTOR CERTIFICATES

Globeteck Group Inc.

544 Ohohia Street, Suite 2, Honolulu, Hawaii 96819, (808) 833-5787, Fax: (808) 833-5787

is pleased to announce that

Christina Arouh

312-86-4211

has attended and successfully completed, in accordance with the Asbestos Hazard Emergency Response Act (40 CFR 763), Asbestos Building Inspector Initial Training Course as prescribed by the United States Environmental Protection Agency (EPA) under Title II of the Toxic Substances Control Act (TSCA) and has passed an examination in that course with at least a minimum score of 70%. This training course is accredited by the State of South Dakota Environmental and Natural Resources Division.

AHERA Asbestos Building Inspector
Initial Training Certificate

Certificate Number: GGI-ABII1206-01A
Place of Training: Honolulu, Hawaii
Date of Course: December 4-6, 2000
Date of Examination: December 6, 2000
Date of Expiration: December 6, 2001

MOHAMMAD ROUF, MPH, CHMM
Training Director
Honolulu, Hawaii

Brewer Environmental Services

Training Certificate

This is to certify that

STEVEN K. CHUN

has attended the

AHERA Inspector Refresher Course
Accredited Under TSCA Title II

Certificate number: *IAVII-MEC-AIR-101095-15*

August 4, 2000
Date of Attendance

August 4, 2001
Expiration Date

Training Provider:
BES IH Group
500 Ala Kawa Street, Building 220, 2nd Floor
Honolulu, Hawaii 96817
Phone: (808) 848-8866
Fax: (808) 847-5267

Mark T. Muranaka, M.S., M.P.H.
Director, IH Group

Brewer Environmental Services

Training Certificate

This is to certify that

WILLIAM HARRIS

has attended the

AHERA Inspector/Management Planner Refresher Course
Accredited Under TSCA Title II

Certificate number: *IAVII-MEC-AIMPR-080995-18*

August 4, 2000
Date of Attendance

August 4, 2001
Expiration Date

Training Provider:
BES IH Group
500 Ala Kawa Street, Building 220, 2nd Floor
Honolulu, Hawaii 96817
Phone: (808) 848-8866
Fax: (808) 847-5267

Mark T. Muranaka, M.S., M.P.H.
Director, IH Group

Globeteck Group Inc.

544 Ohohia Street, Suite 2, Honolulu, Hawaii 96819, Phone: (808) 833-5787, Fax: (808) 833-5789

is pleased to announce that

Kennyson K. Thomas

576-80-1848

has attended and successfully completed, in accordance with the Asbestos Hazard Emergency Response Act (40 CFR 763), Asbestos Building Inspector Refresher Training Course as prescribed by the United States Environmental Protection Agency (EPA) under Title II of the Toxic Substances Control Act (TSCA) and has passed an examination in that course with at least a minimum score of 70%. This training course is accredited by the State of South Dakota Environmental and Natural Resources Division.

AHERA Asbestos Building Inspector Refresher Training Certificate

Certificate Number: GGI-ABIR010102-02T
Place of Training: Honolulu, Hawaii
Date of Course: January 2, 2001
Date of Examination: January 2, 2001
Date of Expiration: January 2, 2002

MOHAMMAD ROUF, MPH, CHMM
Training Director
Honolulu, Hawaii

Brewer Environmental Services

Training Certificate

This is to certify that

DOUGLAS G. TISDELL

has attended the

AHERA Inspector/Management Planner Refresher Course
Accredited Under TSCA Title II

Certificate number: *IAVII-BES-AIR-090800-16*

September 8, 2000
Date of Attendance

September 8, 2001
Expiration Date

Training Provider:
BES IH Group
500 Ala Kawa Street, Building 220, 2nd Floor
Honolulu, Hawaii 96817
Phone: (808) 848-8866
Fax: (808) 847-5267

Mark T. Muranaka, M.S., M.P.H.
Director, IH Group

APPENDIX F

LABORATORY CERTIFICATES

National Institute of Standards and Technology

NVLAP®

National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

BULK ASBESTOS FIBER ANALYSIS

NVLAP LAB CODE 102063-0

NVL LABORATORIES, INC.
4708 Aurora Avenue N.
Seattle, WA 98103
Mr. Nghiep Vi Ly
Phone: 206-547-0100 Fax: 206-634-1936
E-Mail: munaf@nvllabs.com
URL: http://www.nvllabs.com

NVLAP Code	*Designation*
18/A01	EPA-600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples

September 30, 2001

Effective through

David F. Alderman

For the National Institute of Standards and Technology

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Certificate of Accreditation

DEPARTMENT OF COMMERCE ★ UNITED STATES OF AMERICA ★

NVL LABORATORIES, INC.
SEATTLE, WA

is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:

BULK ASBESTOS FIBER ANALYSIS

September 30, 2001
Effective through

David F. Alderman
For the National Institute of Standards and Technology

NVLAP Lab Code: 102063-0

NVLAP-01C (11-95)

The American Industrial Hygiene Association

is proud to acknowledge that

NVL Laboratories, Inc.

Seattle, WA

has fulfilled the requirements for and has been formally recognized by AIHA and is technically competent to perform the analyses listed in the following

SCOPE OF ACCREDITATION

INDUSTRIAL HYGIENE
Originally Accredited: 04/01/97

_X_ Metals
_X_ Asbestos PCM
___ Organic Solvents
___ Silica
___ Asbestos PLM
___ Diffusive Samples

ENVIRONMENTAL LEAD
Originally Accredited: 02/01/97

_X_ Paint Chips
_X_ Dust Wipes
_X_ Air
_X_ Soil

ENVIRONMENTAL MICROBIOLOGY

___ Bacteria
___ Fungi

The above named laboratory agrees to perform all analyses listed above in the scope of accreditation according to applicable policy requirements and acknowledges that continued accreditation is dependent on successful participation in the appropriate proficiency testing programs. This laboratory may be contacted to verify the current scope of accreditation, proficiency testing performance and accreditation status. Accreditation by AIHA is not a guarantee of the validity of the data generated by the laboratory.

Accreditation Expires: 02/01/03

Laboratory # 101861

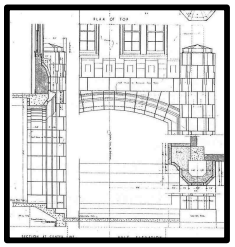
Certificate # 563

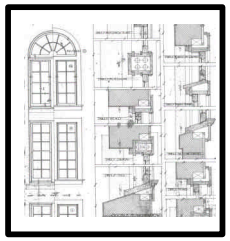
Colleen Becker
Colleen Becker
Chair, Analytical Accreditation Board

James R. Thornton
James R. Thornton, CIH, CSP
President, AIHA

ATTACHMENT 19

HISTORICAL ARCHITECTURAL SURVEY FOR SIGNIFICANT FEATURES IN QUADS B, C, D, E & F AND CONDITION ASSESSMENT OF QUAD F, SCHOFIELD BARRACKS HISTORIC DISTRICT, SCHOFIELD BARRACKS MILITARY RESERVATION, OAHU, HAWAII





SCHOFIELD BARRACKS

HISTORIC ARCHITECTURAL SURVEY
FOR SIGNIFICANT FEATURES IN QUADS B, C, D, E, & F
AND CONDITION ASSESSMENT OF QUAD F

SCHOFIELD BARRACKS HISTORIC DISTRICT
SCHOFIELD BARRACKS MILITARY RESERVATION
OAHU ISLAND, HAWAII

DRAFT REPORT

February, 2001

Submitted to:
Environmental Branch
USAED Honolulu
Building 252
Fort Shafter, Hawaii 96858-5440

Prepared by:

Fung Associates
With Mason Architects, Inc. & HL & L Corporation

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SECTION I: INTRODUCTION

SECTION I : INTRODUCTION

A.

The scope of work involved the historic architectural evaluation and assessment of five Quads that form the central core of the features of the buildings at Quads B, C, D, E, and F. Additionally the scope involved a conditional structural assessment of Quad historic significance of the structures that are proposed for renovation and will be affected by future construction projects. The 2005, and finally Quad B in 2006.

D, buildings 449, 450, 451 and 452; Quad E, buildings 549, 550, 551 and 552; and Quad F, buildings 649, 650, 651 and 652.

significant features and elements concerning exterior, interior, and details, and assessment of their potential significance with integrity of the buildings, and the architectural features and elements that contribute to the significance of the Quad buildings are

This project was conducted under contract to the U. S. Army Corps of Engineers and in compliance with the National Historic procedures and intent of HABS/HAER, and a formal HABS/HAER recordation document was included with Quad F.

The research design for the architectural survey called for archival/document research, field investigation, data analysis of recommendation. A description of the parts is as follows:

1. Archival/document research: Identification of historical references for the significant architectural styles and historical background as a first step in the process was necessary in order to create an understanding of the historical importance of these structures as well as their character defining features. Original design elements had to be examined in order to establish their historical significance. The following steps were involved in this portion of the project:

   a. Research and review of the general historical context: This involved investigation into the historical background as well as other specific references such as previous historical studies and inventory surveys of Quads B, C, D, E, and F as part of the SBHD on Schofield Barracks Military Reservation (SBMR). Written documents and historical photographic records were found at various locations, namely, the Tropic Lightning Museum, Army Museum, Public Affairs Offices, Bishop Museum and the libraries of the State Historic Preservation Office and the University of Hawaii.

   b. Research of the physical context: This involved a careful examination of original building plans in order to identify the original character defining exterior, interior, and detail features of Quad structures. Subsequent architectural drawings of major renovation projects were also utilized to identify the character changing elements. The research materials for this portion of the work were found at the Directorate of Public Works at Wheeler Army AirField or with the Corps of Engineers at Fort Shafter.

2. Field Investigation: The work tasks under this section included the following:

   a. Architectural: The fieldwork involved the visual inspection of all structures and verification of current conditions in order to understand and document the degree of architectural or structural modifications to original buildings. The work included a comparison of the original character defining exterior and interior details with the current conditions. Field activities were coordinated with the USAG-HI DPW Cultural Resource Manager and the SBMR military officials. Findings were recorded using photography as the primary tool to document the elements and their condition.

   b. Structural: The activities to ascertain structural condition at Quad F involved: field inspection to determine structural integrity at Quad F, and examination of original structural drawings. The purpose of this comparative technique was to determine the integrity of the condition of Quad F based on current code requirements regarding seismic and shear wall requirements utilizing current acceptable methods of assessment.

3. Data Analysis: Data analysis to ascertain significance of architectural building elements included the following measures: a) defining the degree of original character defining architectural features remaining; b) identifying detracting features which have resulted from past modifications, and 3) recommending measures to be taken during future construction undertakings in

order to restore certain elements of historical importance. The work tasks also involved: d) a structural conditional assessment of Quad F.

a. The significant exterior, interior and detail character defining elements of the original buildings were studied, and the relevant information regarding the historical and background materials for the Quads B, C, D, E, & F were extracted and analyzed in order to establish historical references in style and character. The original as-builds were compared to current field observations in order to determine the degree of original features remaining.

b. The architectural historic integrity of the unique elements and building features were assessed, impact of changes recorded and those detracting from original historic style and character were identified.

c. Recommendations were made to remedy significant features and detracting conditions. The impacts of modification to individual features and structures that have occurred since initial construction were recorded using photographic technique of documentation.

d. The structural conditional assessment of Quad F involved performing structural calculations in order to determine integrity and compliance with current codes; to provide a general opinion on structural adequacy; and to make recommendations.

4. Report: The primary body of the report contains the historical context; documentation of architectural history including the character defining building elements of the Quads and their historic significance; the physical history of each quad; as well as photographic references. The sections of the report are organized as follows:

a. A discussion of the historical context containing an overview of Schofield Barracks past history including the physical history of Schofield Barracks and more specifically that of the Quads.

b. An architectural and historical description relating to each Quad structure including a description of original character defining features and elements as well as an assessment of their significance. A summary discussion of character defining elements includes the following: 1) features as found in original design intent/construction; 2) features as found in current condition detracting from historical integrity; and 3) recommendation of features to be restored.

c. A physical description includes but not limited to: date of construction and original use; basic form of plan; building materials used for foundations, walls, roof, trim, and interiors (if important); basic structural system and notable construction details; and significant alterations.

d. Photographs of each structure included any or all of the following views: exterior views: general/contextual, front, right side, rear, left side, and details of unique or significant structural or decorative elements.

e. Structural condition assessment report including scope of work, basis of data, and structural analysis with supporting calculations was compiled for Quad F.

C. PROJECT TEAM

Fung associates, in collaboration with Mason Architects Inc., performed the historical architectural analysis and the main body of this report. Members of the project team included planning and architectural historians and support staff from Fung Associates and Mason Architects, Inc. Both principals, Mr. Louis Fung and Mr. Glenn Mason were active participants during the compilation of research, field investigations, analysis of findings and documentation. The background research and fieldwork to evaluate historical architectural integrity of Quad buildings was completed by Azita Pourmehr Quon of Fung Associates, and Katherine Slocumb of Mason Architects, Inc. Mr. Henry Li of HL& L Corporation performed the structural investigations and assessment for compliance with current codes for Quad F. Mr. David Franzen of Franzen Photography performed the professional photography per HABS/HAER standards.

SECTION II: BACKGROUND

A. PROJECT LOCATION

Schofield Barracks Military Reservation is located on the island of Oahu approximately 22 miles northwest of downtown Honolulu at an elevation of 800 feet above sea level. The installation is bounded by the Koolau mountain range to the east and the Waianae mountain range to the west and is located on the north central plateau in the Wahiawa district of Oahu (Figure 1). Historically the site was selected because of its strategic central location between the mountain ranges in the Leilehua or Schofield Barracks Plateau. Leilehua Ranch was a former hunting retreat of King Kalakaua. Currently, access to the installation is via Kamehameha Highway, the H-2 Freeway, Kaukonahua Road, Kunia Road, and Wilikina Drive.

Kamehameha Highway and Wheeler AAF essentially divide the military reservation into two sections: the Main Post and East Range. The installation presently encompasses a total of 13, 632.36 acres which includes 12, 715.89 acres of ceded land; 882.43 acres of fee owned land; 8.93 acres of land held by license; 22.86 acres of easements; and 2.25 acres of land held by permit (Belt Collins and Associates, 1993). Project areas are buildings in Quads B, C, D, E, and F on the Main Post of Schofield Barracks in the historic district (Figure 2).

B. HISTORICAL CONTEXT

HAWAII PRIOR TO WORLD WAR II

First expedition to the Sandwich Islands of Hawaii was conducted in 1840 by Lt. Charles Wilkes who inspected the islands and reported that Oahu had “the best and most capacious harbor in the Pacific”. The harbor, at the mouth of the Pearl River on Oahu, seemed to have strategic significance in the face of a British Empire that was expanding in the Pacific. Pearl Harbor was selected as a U.S. military base by Major General John M. Schofield Barracks, then Commander of the Army Division of the Pacific and previous Secretary of War who first visited Hawaii in 1872 to evaluate the defense potential of various Hawaiian ports. In 1876, the Hawaiian Kingdom under King Kalakaua granted the U.S. Navy permission to develop Pearl Harbor in return for allowing exportation of Hawaiian sugar to U.S. markets duty-free. In 1887, the United States was given exclusive use of Pearl Harbor, and in 1901, it was established as the Naval Base in Hawaii. After the overthrow of the Hawaiian Monarchy and the establishment of

the provisional government, the Crown Lands consisting of two million acres in all, reverted to the public domain. With the 1893 annexation of the Hawaiian Islands, the former Crown lands, now public lands became the property of the U.S. Government.

The United States growing concern over perceived threat of Japan during Russo-Japanese War instigated the build-up of naval forces in the Pacific and thus spurred an increase in Army personnel. In 1907, Fort Shafter was established by the U.S. Army to defend Pearl Harbor from the north direction. In 1908, Schofield Barracks was selected as the central base for Oahu's mobile defense troops because of its strategic location on the central Leilehua plain between the Waianae mountains and the Koolau range. Historically, Leilehua Ranch was a former hunting retreat of King Kalakaua. Thus, alternately Leilehua Barracks and Castner Village became the early names for the temporary camp. Later the post was renamed after General John M. Schofield Barracks who originally selected this site. Schofield Barracks continued to serve as the headquarters of the United States Army District of Hawaii. Construction of the cantonment began under the supervision of quartermaster Captain Joseph C. Caster and was later continued under the direction of General Macomb. The desire to keep Hawaii in American hands assured that the Hawaiian Division received top priority, thus, the expansion plan for Schofield Barracks was concurrent with the build-up of other Army facilities on Oahu over the following few decades.

Schofield Barracks maintains historic significance in military history of Hawaii. After World War I, Oahu became the key to America's Pacific defense plans, and Schofield Barracks, the center of the defense activities for the Army on the islands. Its barracks housed the Hawaiian Division, the only complete division of the U.S. Army prior to WWII, from which the 24th and 25th Divisions were formed. Schofield Barracks' athletic program became a model for the army, and its climate made it an ideal training site.

SCHOFIELD BARRACKS DURING AND AFTER WORLD WAR II

Rising tensions in the Pacific region in the late 1930s resulted in increased defense mobilization throughout the islands, and the reorganization of the Hawaiian Division in 1941, forming the 24th and 25th (later named "Tropic Lightning" Divisions). Schofield Barracks became the Army's largest single garrison and, in 1939, was the second largest city in the Territory of Hawaii, with a population of twenty thousand people. Schofield Barracks population grew in the two years before the war, to a total pre-war strength of 43,177 troops.

In the early morning of December 7, 1941, Japanese pilots flew six aircrafts carriers toward Oahu. The first wave of 183 planes struck its targets at 7:55 a.m. The 25th Division had the distinction of being the first Army unit to receive the first wave of hostile

fire from the Japanese planes (Alvarez 1982), and shot down two planes. The post received some damage mostly consisting of bullet holes in buildings, and many men received shrapnel and bullet wound injuries. Adjacent at Wheeler Field, the location of Army Air Corps fighter planes, received significantly more damage to planes and hangers, and had many casualties.

The Hawaiian Department's commander and his naval counter-part were relieved of duty following the attack on Pearl Harbor and other sites, and replaced by a unified command and the Hawaiian Department ceased to exist. The primary mission of the 24th and 25th Divisions, supported by troops from the West Coast of the United States, became the defense of Oahu. As the war progressed, Schofield Barracks became the major training, staging, and supply center for the war in the Pacific. Over one million troops were temporarily housed at Schofield Barracks in various stages during World War II, and many temporary buildings were constructed to accommodate the increase in personnel. Barracks, storage, and administration buildings were built using standard Army plans, although modifications were made to adapt the plans to Hawaii's mild climate.

Various training camps were run at Schofield Barracks during WWII, including the Ranger Combat Training School (first called the Jungle Training Center). These men were trained for combat in the Pacific areas. Following the war, Schofield Barracks' population shrank to five thousand troops. Many of the temporary buildings were removed and efforts were made to improve the appearance of the base. As was typical at Army installations of this period, additional recreation facilities were constructed at Schofield Barracks, including a swimming pool, stable, and a new golf course. On a 1946 tour of Schofield Barracks, General Dwight Eisenhower stated that " the post was the most important single base the United States has in the world" (Advertiser, 1 May 1946). New weapons and military tactics now depended upon numerous bases in distant areas, however, expenditures and numbers of military personnel in Hawaii continued to decline. In 1950, Fort Shafter and Schofield Barracks were consolidated into one unit with headquarters at Fort Shafter (Alvarez, 1984: 78).

The population at the installation remained low until the outbreak of the Korean War. In 1951, the Hawaiian Infantry Training Center at Schofield Barracks was established to train replacement troops destined for Korea. Schofield Barracks maintained an important role in the Korean War and the Vietnam War, by providing basic training for many recruits due to be sent to Asia (Rosendahl 1977:12, 20). These years saw a dramatic increase in construction of military housing, as well as schools, chapels, and other support facilities. Older buildings were renovated to conform to new Army housing standards. The use of many large areas of the post for new housing made acquiring new areas for maneuvers necessary, and various training areas on Oahu, such as at Helemano and Wahiawa, and on the island of Hawaii, were made sub installations of Schofield Barracks.

Today, Schofield Barracks remains the largest permanent installation of the U.S. Army outside of the continental United States. The post played a primary role in training troops for the Pacific Theater of Operations in WWII, and the Korean and Vietnam Conflicts. The barracks due to its location in a mild climate is regarded as one of the Army's best training areas (Rosendahl 1993).

The 25th ("Tropic Lightning") Division has remained the principal occupant of Schofield Barracks, with the exception of the four years period it served in Vietnam. They have continued to share the post with other brigades from the Hawaii National Guard and the Army Reserves.

Schofield Barracks gained notoriety and fame as a result of the James Jones novel " From Here to Eternity", which depicted life in at the base during the outbreak of WWII. The novel was further depicted by the movie filmed on the base in 1953.

PHYSICAL HISTORY OF SCHOFIELD BARRACKS

In 1908, the Schofield Barracks site was selected as the base for Oahu's mobile defense troops because of its strategic central location on the Leilehua plain between the Waianae mountains and the Koolau range. With the extension of the railroad to the north central part of the island in 1906, construction of temporary buildings began under the supervision of Captain Joseph C. Castner, the construction quartermaster. The first construction was a central shack for the officers, a clubhouse, stockade and guardhouse, and several raised tent floors on which tents were placed as sleeping rooms (Honolulu Star Bulletin, 12-26-36). Workers for the temporary camp were housed at Wahiawa due to a shortage of water at the site. The water shortage persisted until the completion of a deep well in 1938 (Addleman 1940). The temporary camp was alternately called Leilehua Barracks and Castner Village, but was later renamed after Lieutenant General John McAllister Schofield Barracks (1831-1906). The camp was located in the east portion of the post, near where the current Solomon Elementary School is located. In preparation for the troops, by mid-January of 1909, temporary buildings such as barracks, officer's quarters, an administration building, mess halls, a clubhouse, and permanent stables were completed at the camp (Alvarez 1982). The first to occupy Schofield Barracks were the 5th Cavalry, composed of 473 officers and men. By 1910 there were 248 buildings on the post, permanent and temporary, including 171 tents with wood floors (Honolulu Star Bulletin, 9-19-36). The 5th Cavalry were joined in 1910 by the 1st Field Artillery Regiment, the 2nd Infantry Regiment in 1911, and the 25th Infantry Regiment in 1913. By 1914, the post's population was about 6,000 men. The temporary post continued to expand until the construction of the permanent construction began.

The Post served as the headquarters of the United States Army District of Hawaii until 1911 when it was relocated to the Alexander Young Hotel in downtown Honolulu. That same year, the Secretary of War approved recommendations for a seven-regiment post at Schofield Barracks at an estimated cost of five million dollars. This planned expansion for Schofield Barracks was concurrent with the build-up of other Army facilities on Oahu by General Macomb.

The first plans for the permanent post were prepared in 1912 by General Macomb. The layout reflects the linear base design, with the barracks and administration buildings along a central line, the housing areas on one side, and the technical buildings along the other side. The permanent buildings were to be organized into seven contiguous sections, each one shaped in a rectangle headed by a loop. The rectangles were to contain barracks in quadrangular formation and the officer's quarters would line the loops; the main sewer and water lines ran down the center for economy (Alvarez, 1982: 32).

Construction of the permanent post began in 1913. Among the first permanent buildings at Schofield Barracks, completed in 1914, were two large masonry barracks buildings, known as Quad B (now buildings 156 and 158) and the Soldier's Chapel (Building T-590). Other buildings from this early period include the Post Library (now Carter Hall - the Tropic Lightning Museum, Building 361), the remaining buildings in Quad B, and Quad C, which was completed in 1915 and 1916. Also constructed at this time were two loops of two-story officers' houses, sited above Quads B and C. These were occupied by officers of the 3rd Engineers, of the Special Troops, and of the 35th Infantry, and were called Flagler Loop and Loftus Loop. These were demolished after WWII.

Schofield Barracks stands as an excellent example of Army base development. In 1916, the construction quartermaster developed plans for the remainder of the base. However, during World War I construction was delayed when all of Schofield Barracks's tenants were called to war (Alvarez 1982). The post became nearly deserted until the Hawaiian National Guard, in the form of the 1st and 2nd Hawaiian Infantry Regiments were called in as caretakers. Following the signing of the Armistice in November 1918, the need for training passed, and the Hawaiian Infantry regiments began work beautifying the post. This included landscaping, building roads, and planting trees, including the rows of eucalyptus along Macomb Road, Waianae Avenue, and other major post roads (Alvarez, 1982: 41). The Hawaiian Infantry regiments were demobilized in August 1919 and relieved of duty by the 17th Cavalry. The base was then sparsely occupied until the arrival of the 35th and 44th Infantry Regiments in 1920, and the 8th, 11th, 13th Field Artillery Regiments and 3rd Engineers in 1921. The increased role for the artillery troops prompted the development of separate living quarters. The first artillery barracks were completed in 1919 (Quad I), and the second in 1923 (Quad J). These quads also had the adjacent officer's housing areas (700 and 800 area housing).

In the interim between the World Wars, the 1916 construction plan continued to be carried out into the 1930's. The adjacent Wheeler Field was constructed. In 1918, the three craftsman style houses along General Loop were completed. In 1920, expansion of the railroad and the initial phase of Quartermaster warehouses were started. In 1920 and 1921, two additional masonry Quads, D and E were finished consisting of one administration and three barracks buildings. Between 1919 and 1922, the wooden officers' quarters adjacent to D and E quads were constructed in residential loops along the northeast of the quads. The historic core of the base was essentially in place by the mid-1930s. Other buildings were constructed during this period, including a post exchange, general's housing, non-commissioned officers' housing, the fire station, recreational buildings,

warehouses, and the post stockade. Additional large projects completed in the 1920's include the hospital, office's club, and the remaining quartermaster warehouses.

Quad F was constructed in 1931 for the 19th Infantry. The last group of officers' quarters at Schofield Barracks were completed in 1932. These houses are mission style, similar to houses constructed at Wheeler Field and were built for officers and non-commissioned officers of the 11th Medical Regiment and the 19th Infantry.

In the late 1930s, the United States' growing concern in the Pacific region resulted in increased defense mobilization throughout the islands. Schofield Barracks not only became the Army's largest single garrison, but in 1939, was the second largest city in the Territory of Hawaii. In the December 1941 attack, the post received some damage, mostly consisting of bullet holes in buildings.

As the war progressed, Schofield Barracks became the major training, staging, and supply center for the war in the Pacific. Over one million troops were temporarily housed at Schofield Barracks in various stages during World War II, and many temporary buildings were constructed to accommodate the increase in personnel. Barracks, storage, and administration buildings were built using standard Army plans, although modifications were made to adapt the plans to Hawaii's mild climate.

Following the war, Schofield Barracks's population once again shrank to five thousand troops. Many of the temporary buildings were removed and efforts were made to improve the neglected appearance of the base. Typical of Army construction projects of this period, additional recreation facilities were constructed at Schofield Barracks, including stables and a new golf course.

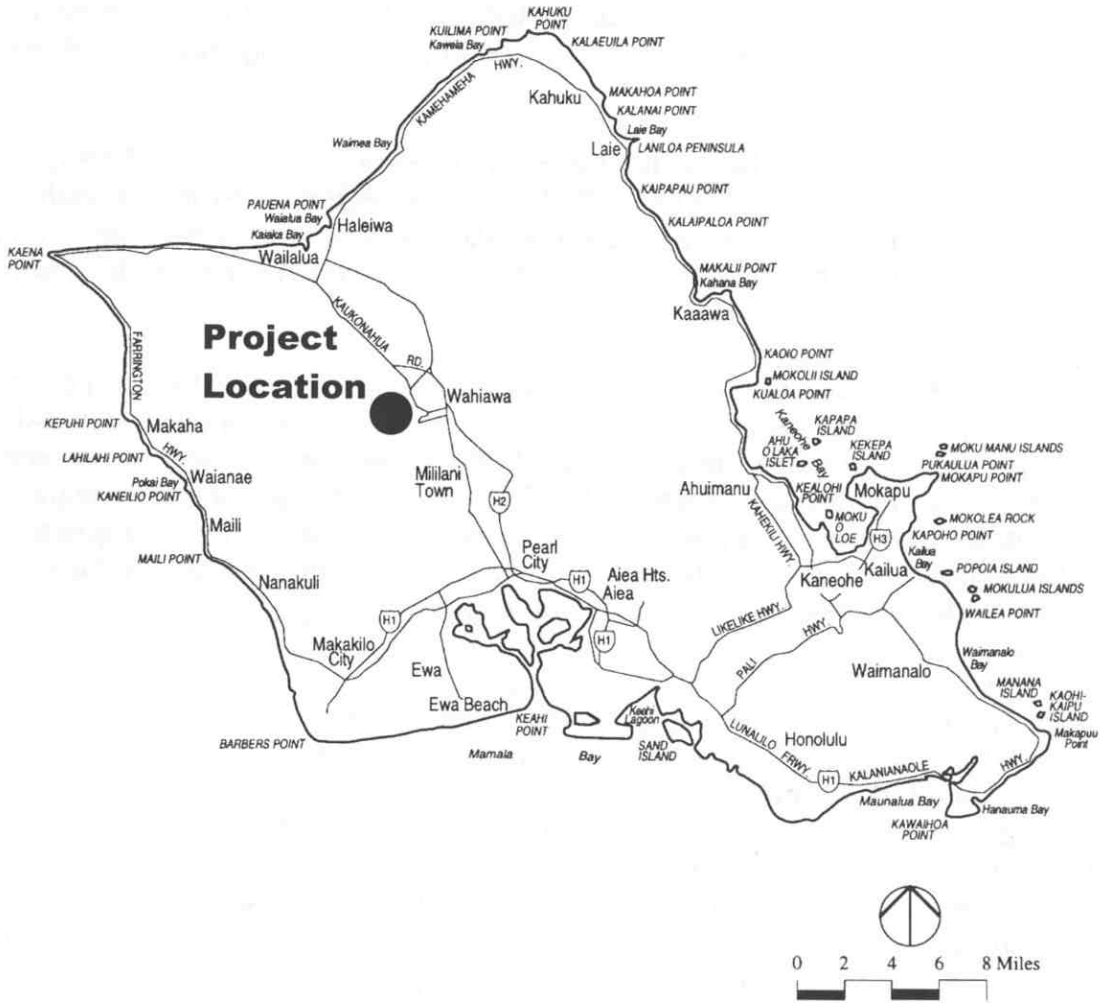
The population at the installation remained low until the outbreak of the Korean War. These years saw a dramatic increase in military housing construction, as well as schools, chapels, and other support facilities. Older buildings, such as the barracks quadrangles and early houses, were renovated to conform to new Army housing standards.

The 25th ("Tropic Lightning") Division has remained the principal occupant of Schofield Barracks, although they have continued to share the post with other brigades from the Hawaii National Guard and the Army Reserves. Today, Schofield Barracks remains the largest permanent installation of the U.S. Army outside the continental United States. The barracks occupies 18,523 acres, and due to its situation in a mild climate, is regarded as one of the Army's best training areas (Rosendahl 1993).

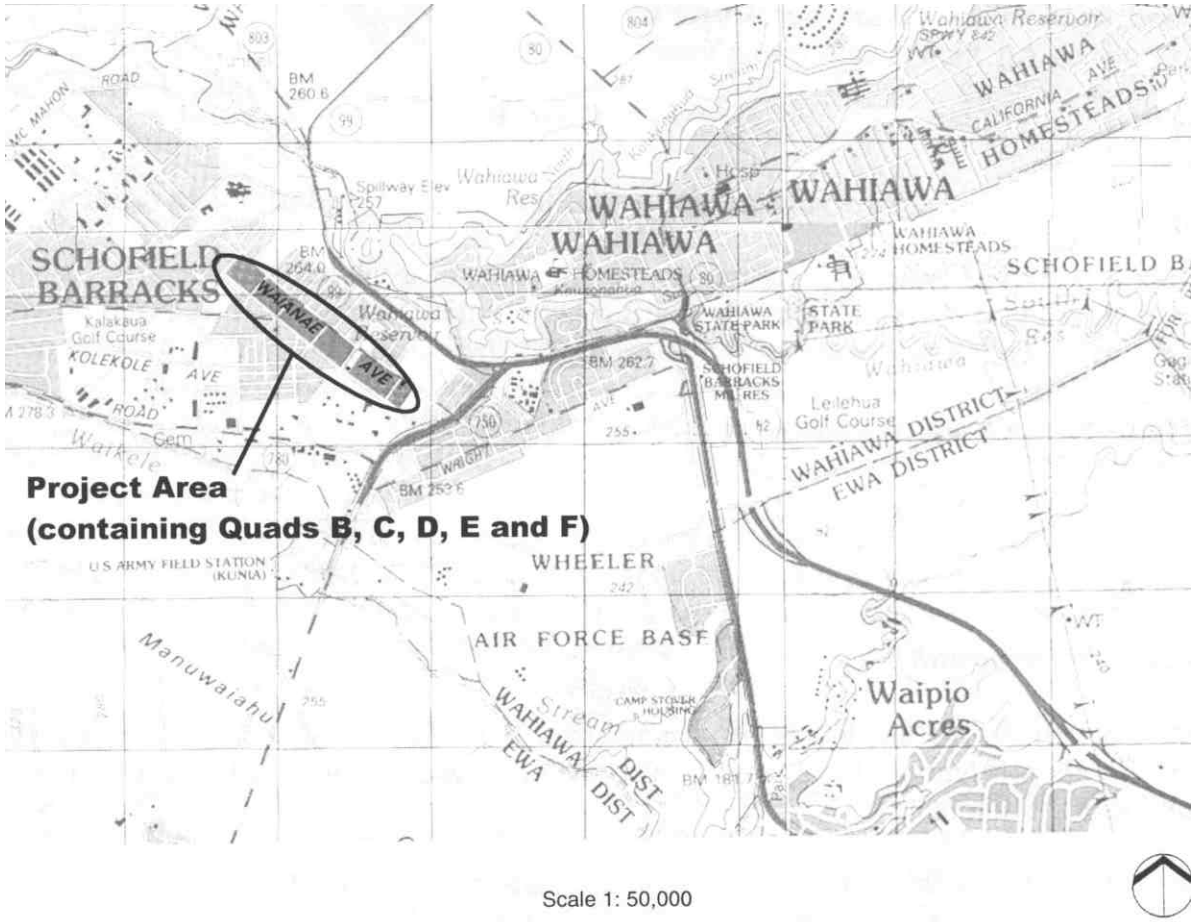
The different construction phases that occurred over a span of several decades are apparent in the plan and architectural styles represented at the base. The base plan and design reflects the typical military styles of various periods. The initial buildings all represent the Second Renaissance Revival style, the early 1920s housing is in a tropical Bungalow style, the 1930s housing areas are in the Spanish Colonial Revival style, and World War II buildings consists mostly of temporary wood structures built from

standard Army plans. The base is relatively intact, with the pre-1950s buildings generally retaining their original exterior appearance. The discussion of architectural character and significance in this report is limited to Quad buildings and it follows in the next portion of the report.

FIGURE - 1



Project Location: Schofield Barracks Military Reservation, Island of Oahu, Hawaii



Project Area: Quads B, C, D, E, & F at Schofield Barracks Military Reservation

SECTION III: QUADS B, C, D, E & F

SECTION III : QUADS B, C, D, E, & F

A. LOCATON

The Quads are located on the Main Post of the Schofield Barracks Historic District (SBHD). The historic district contains the central core of significant structures and sites that exhibit U.S. Army's development patterns and establish the overall character of Schofield Barracks Military Reservation (SBMR). Out of the eight Quads that are part of this historic district, this report concerns itself with Quads B, C, D, E, & F only.

Quads B, C, D, E, & F (Figure-3) form a linear design along a central line in the district and are located approximately in the northeast portion of the installation between Waianae and Foote Avenues. The linear progression of quads begins with Quad B at the lowest point in the east and ends with Quad F at the highest point moving west direction.

Each quad has four buildings. Typically, the administration building flanks the tree-lined Waianae Avenue and forms an anchoring edge between the housing areas and the quad facilities. The other three buildings that are referred to as barracks surround an open courtyard and together with the administration building form a quadrangular shape, hence, also referred to as 'quadrangles' (barracks and administration buildings).

B. HISTORY - QUADS AT SCHOFIELD BARRACKS

The plans for the permanent post were first prepared in 1912 by General Mcomb. The plan reflected seven contiguous sections, each one shaped in a rectangle headed by a loop (Figure-4). The rectangles, or the quads were to contain four large masonry buildings in quadrangular formation while the officers quarter's lined the loop. Two buildings in Quad B were the first permanent structures built in 1914 (Refer to Figure-8). The remainder of the quad buildings were built in accordance with the Army Quartermaster's layout of 1916 (Figure-5).

Today the quadrangle barracks are prominent and central features in the overall physical layout of Schofield Barracks. Visually, these quad barracks dominate the base and form a linear spine for the Historic District along Waianae Avenue. Between years 1914 and 1948, a total of eight quads were built at Schofield Barracks. The five Quads, B, C, D, E, and F that were built between 1914 and 1931 for the infantry regiments and engineers form a central spine in the northeastern quadrant of the base (Figure-6).

Three other quad additions, I, J, and K constructed for artillery regiments are dated between 1919 and 1948 and are situated perpendicular to this central line in northwestern quadrant of the site.

The linear progression of Quads B, C, D, E, and F form a central core for the Schofield Barracks Historic District. Each Quad was built to house an entire regiment. The infantry quads each typically comprised of four buildings: three barracks and an administration building in a quadrangle layout around a central courtyard. Quads I through K, located in the northwest part of the base, were originally built with only three buildings, each containing an administration building and two barracks buildings.

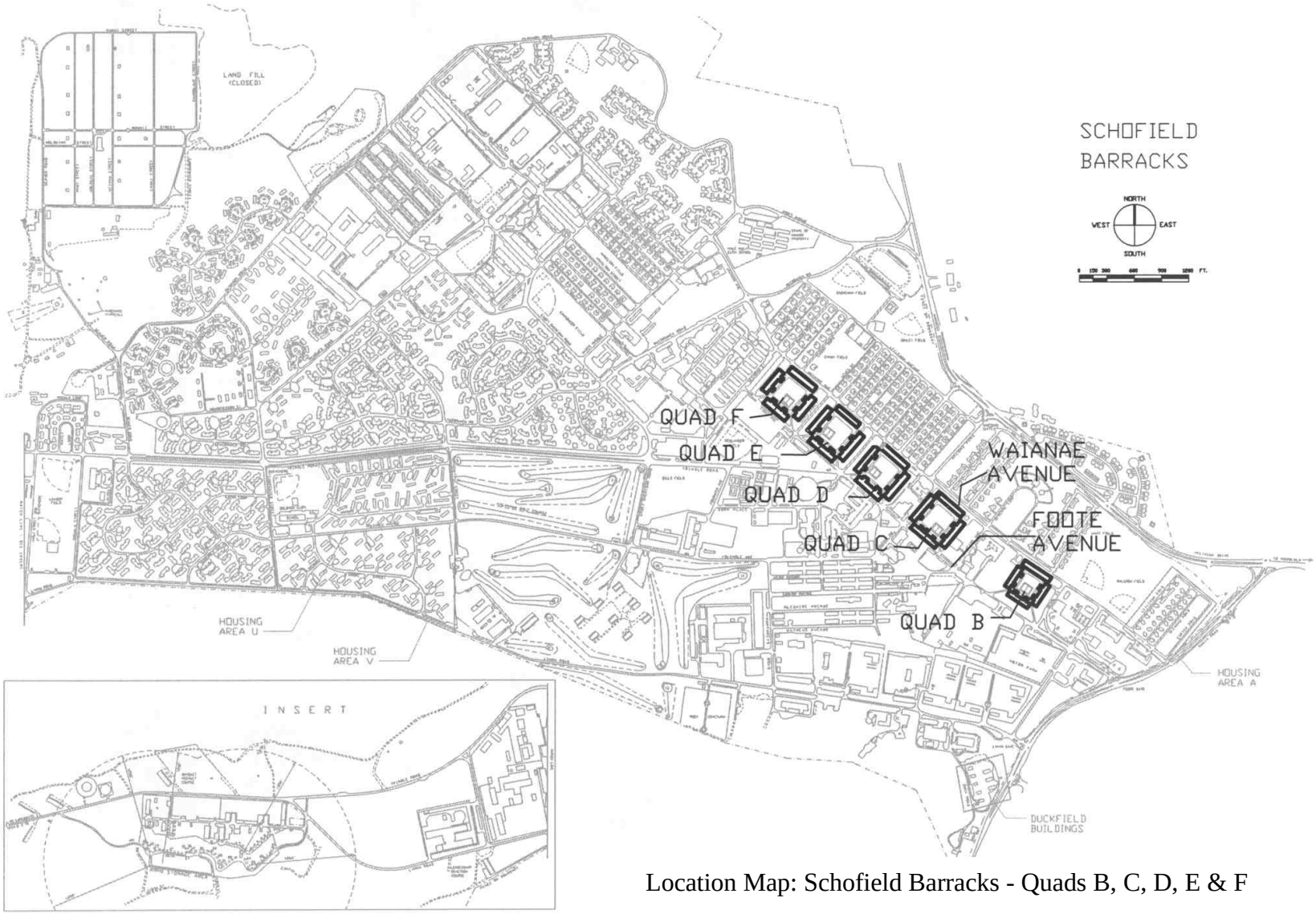
In a 1908 newspaper article, quartermaster Captain Castner reports that the quads were to be built using the tilt-up construction method, where, the framework for the walls was laid out on the ground, the concrete poured, and when the concrete was set the walls was tilted up to a standing position and locked in with the other walls (Pacific Commercial Advertiser, 12-5-08). It is unknown if this method was indeed used, but if so, this would be a very early use of this construction method, contributing to the significance of the structures.

The quads were self-contained structures (Figure-7), built according to standard Army design, in a style expressive of the post industrial and social revolution thinking. Quads B, C, D, E, I, & J constructed between 1914 and 1923 were stylized in very modest Second Renaissance Revival Architectural "Classical" elements were interpreted and simplified to represent and emphasize the function. The architectural elements that are articulated in these buildings and are representative of this period are: decorative porticos, arcades or galleries, arched openings, entablatures decorated with geometric frieze patterns topped with cornice details. The industrial and social revolution can be characterized as a period of search for new findings to replace the traditional symbolic forms. The result, utilitarian structures replaced highly elaborate "Classical" buildings and the multiplicity of new building types brought about a new approach of experimentation with forms taken from different styles. Selecting from the styles of the past to suit the function or the building type became an acceptable approach to building design. Between the two world wars, the Renaissance Revival gave way to uniform and simplified shapes lacking articulation of detail and a greater stress for functionalism, namely, the "International Style".

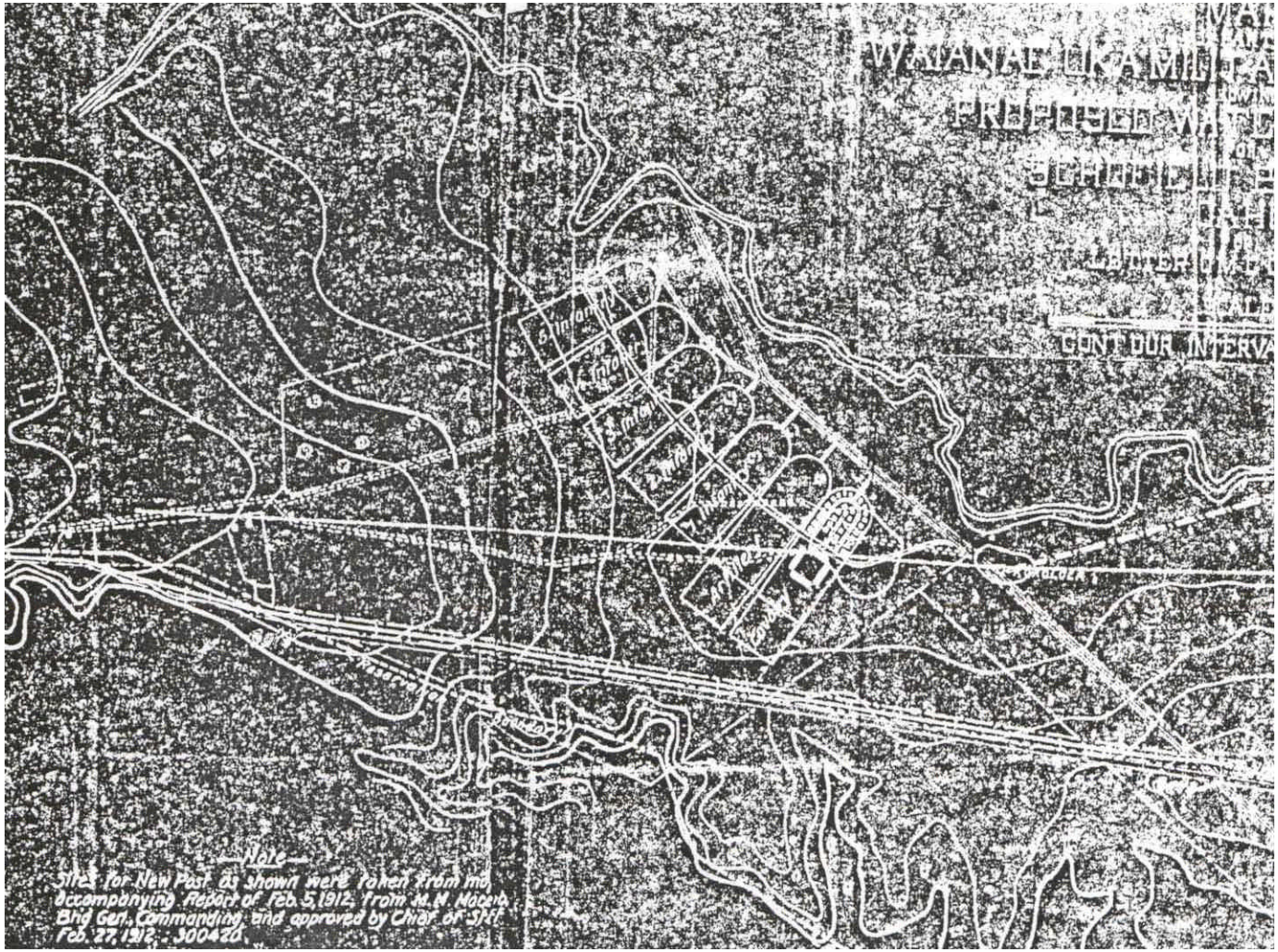
Quad buildings generally had three stories laid out in very linear horizontal fashion. Architecturally, the building mass of quad buildings were defined by means of articulation of the horizontal plane in distinct divisions, belt or string courses. Juxtaposition of the horizontal and vertical planes were emphasized in the center of the administration building. Window fenestration in bands or the rhythmic openings along the arcades further reemphasized the horizontal nature of this style. The later Quads differ stylistically, but follow the same general functional layout. All quad floor plans were laid out according to the same overall design as reflected in the original 1917 construction documents prepared by Constructing Quartermaster (Appendix A). The original building construction documents for Quad F, dating back to 1930 reflect slight variation in the degree of detail (Appendix B).

Quad F was designed in a more simple utilitarian style with a relatively flat roof and less ornate entablature and cornice detail. This departure reflects a closer tie to the “International Style”.

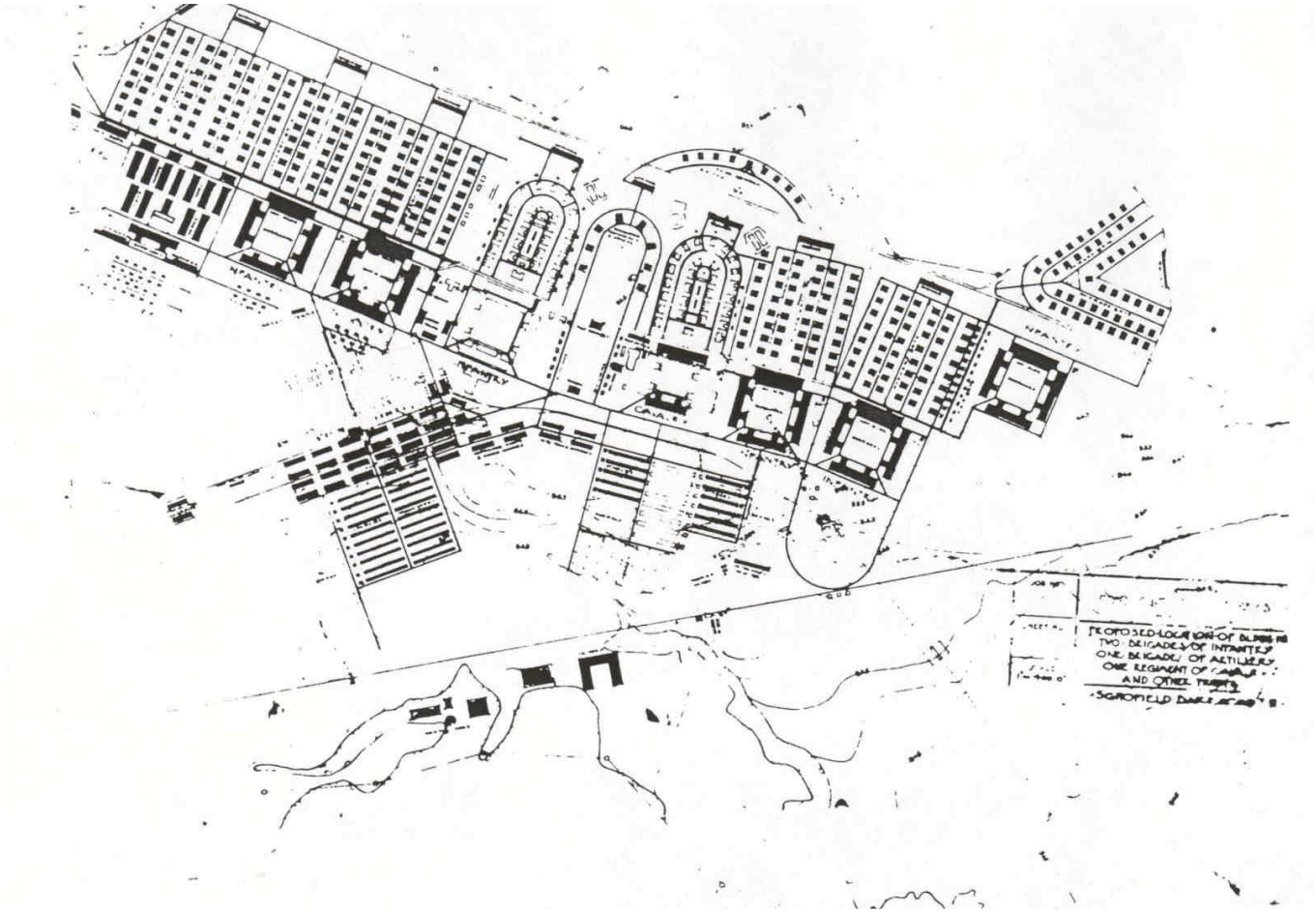
The demand for better and more private facilities led to modernization projects of the quadrangle barracks buildings in the 1970s. Typically on the exterior, the original wood divided-light casement and double-hung windows have been converted to new aluminum windows. Other major interior alterations have included re-partitioning of space to accommodate the modern usage and addition of air-conditioning. Currently Quads B, C, D, E, and E are occupied, and Quad F is to most extent vacant.



Location Map: Schofield Barracks - Quads B, C, D, E & F

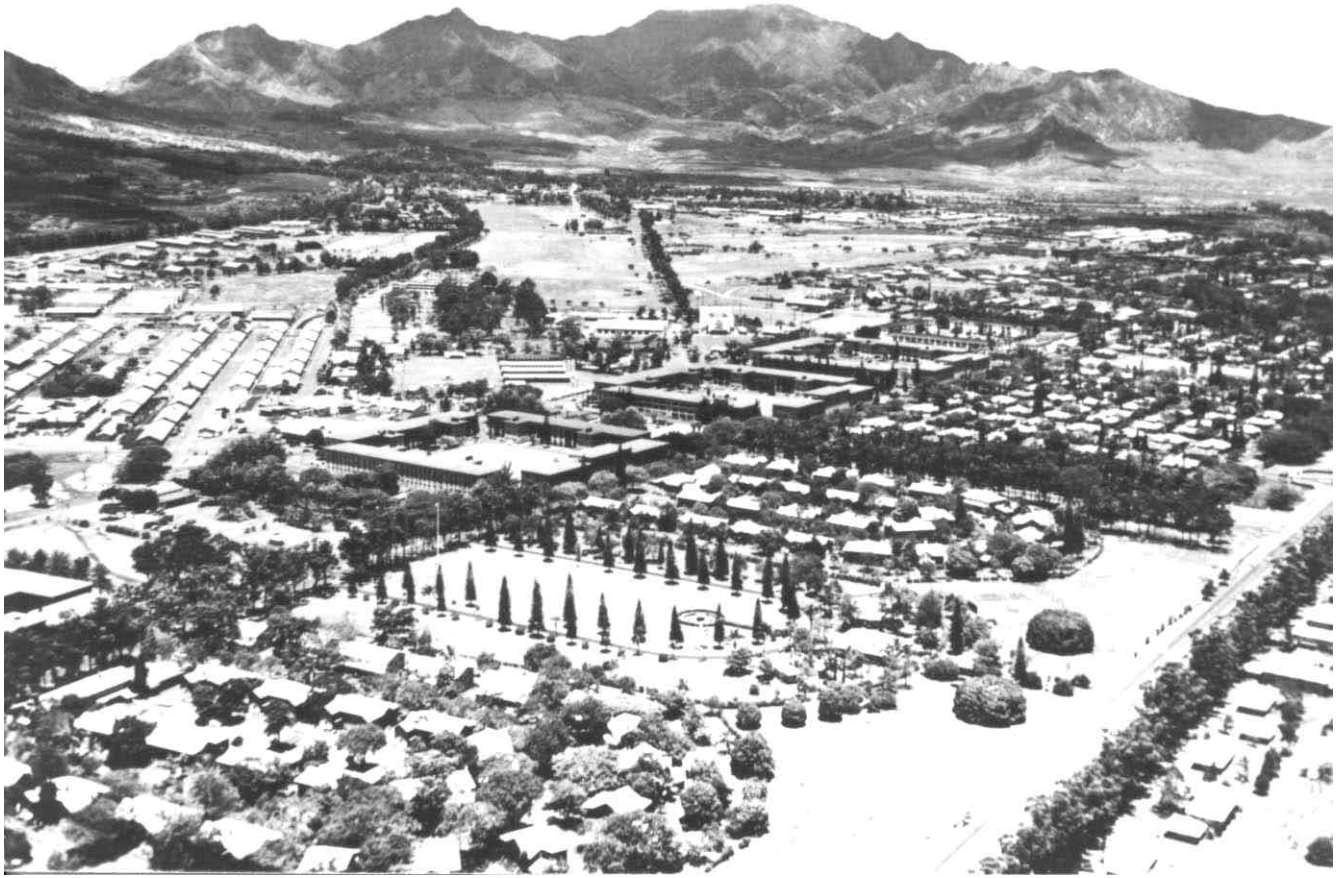


First development plan of SBMR by General McComb, February 27, 1912. Shows seven contiguous sections, each one shaped in a rectangle headed by a loop. Rectangles were to contain the barracks.



1916 Development Plan of SBMR prepared by Army Quartermaster

FIGURE-6



Early photograph of Quads forming a central spine at SBMR

Early photograph of ‘Quadrangles’ demonstrating massing and arcade details of Second Renaissance Revival

QUAD B – BUILDINGS 155, 156, 157, & 158

A. BUILDINGS SIGNIFICANCE

Quad B is significant as a substantial element in the original base layout, and is within the Schofield Barracks Historic District which is listed on the National Register of Historic Places. The historic district contains the central core of significant properties that exhibit Army's development patterns and establish the character of Schofield Barracks Military Reservation. These barracks historically provided the centralized housing, dining, and administrative space for troops.

This Quad is also significant as the first of the Quadrangles constructed, and buildings 156 and 158 were two of the first permanent buildings completed at the Post in 1914 (Figure-8), followed with buildings 155 and 157 which were completed in 1918 for the 3rd Engineers and Special Troops. Building 155 was the administration building and the headquarters for the Hawaiian Division which was formed in 1921and was the only complete division in the U.S. Army prior to WWII. Buildings 156, 157, and 158 were designed as barracks and served primarily as sleeping quarters for the brigade.

B. PHYSICAL HISTORY

Date (s) of erection: Constructed in 1914 and 1918. Contractor/builder unknown.

Architect: Drawings prepared under direction of Office of Constructing Quartermaster, Honolulu, Hawaii.

Original plans and construction: The original drawings for Quads B, C, D, & E, Administration and Barracks are dated 1917. It is not known whether an earlier set of barracks plans were available for the construction of buildings 156 and 157. The total sheet number of original set of documents is unknown. What remains of the original set is filed at the Department of Public Works, at Wheeler Army Airfield (Appendix A).

Original and subsequent owners: U. S. Army.

Applicable Land Use Plans and Policies: Quads are situated on Federal land whereby State and City land use designations are not enforceable. Nevertheless, the following land uses are designated: State land use is Urban; City and County of Honolulu

zoning is Military and Federal; and the Development Plan is Medium Density Apartments. The Quads do not lie within the City's Special Management Area.

Alterations and Additions: The demand for better and private facilities led to the modernization of the interiors of all of the quadrangle barracks buildings in the 1970's. Various alterations and renovations projects have since taken place. Some of the major alterations are included in the detailed discussion below.

C. ARCHITECTURAL HISTORY

ARCHITECTURAL CHARACTER

The architectural composition of Quad B is the distinctive quadrangle layout of four buildings: one administration and three barracks sited to enclose the four sides of the central courtyard. Architectural differences in functional layout and architectural massing are reflected in the two building types: the administration building, and the barracks.

Quad B, similar to C, D, and E is designed in a modest Second Renaissance Revival Style. Distinguishing classical elements in Quad B include: arcades or galleries with a combination of rectangular and arched openings; arched window openings dominating the central façade of the administration building; the entablature decorated with a frieze pattern centered with a diamond motif. Buildings are typically a three-story mass with a strong linear horizontal emphasis evident through use of fairly distinct horizontal divisions, belts or string courses, rhythmic banding effect of window fenestrations, and use of arcades and uniform openings. Also contributing to the horizontal effect is the eave line above the frieze terminating with a slightly sloped roof for Hawaii's rains.

A strong architectural element of the administration, Building 155, is the decorative portico or the main entry feature with a decorative concrete, brick and plaster surround at the rectangular opening to the passage leading to the central courtyard. Above the entry is a faux-balcony with decorative dentils and detail. A low concrete cheekwall extends from each side of the entry at the ground level.

The use of arcade on the courtyard side at each of the floors of the buildings is an architectural feature typical to Quads B and C The regularity of the arcade openings are broken up with small projections into the courtyard and the exterior and interior stairways connect the three levels. Despite the solidity of barrack structures, originally the buildings were designed with natural ventilation to take advantage of the Hawaiian trade winds. The use of high ceilings and deep porches kept the rooms cool year round.

Condition: Although generally the structures still retain their appearance of overall mass, plan and some of their original interior details, some significant architectural features have been altered which affect the original integrity of their historic intent and significance. The following detailed description of the Quad B buildings elaborates on these differences. The overall condition of Quad B buildings is fair. Structurally Quads appear in reasonable condition, however it is apparent that these structures have suffered aging problems, exposure to environment, and poor maintenance. To name a few, points of observation during this survey were: peeling paint, spalling concrete leaving reinforcing steel exposed (Figure-16), chipped and damaged building parts, broken glass, mold and dirt around the premises.

DESCRIPTION OF EXTERIOR

1. Original Character Defining Features:

Plan: Each quad is a quadrangular composition, with the three barracks buildings situated around an open courtyard and anchored by the administration building, generally, in the northern direction. The plan layout of the administration building is rectilinear with a directional and functional emphasis at center, utilizing the main entry as the central gateway to the barracks courtyard. The plan layout of the barracks is rectilinear with a horizontal emphasis.

Massing: Generally the quad buildings are three-story structures, very linear with a horizontal emphasis defined by the use of horizontal string courses, uniform window fenestrations and arcade openings. The horizontal scale is further achieved with the delineation of the eave line with a decorative band at the frieze, enriched cornices with decorative brackets, dentils and a slightly sloped tar and gravel roof. The central portion of the architectural mass in the administration building is emphasized with a large volume space, which is also reflected in tall window openings on the facade. The administration building has a height of approximately 53 feet at its center point and an overall length of 365 feet, while the barracks are about 38 feet high and approximately 320 feet long. The linear shape of the barracks buildings is broken up with small projections into the courtyard.

Exterior Architectural Elements: Various distinct features of the architectural façade are the following:

- Façade (Figure-9): The exterior walls are cast-in-place reinforced concrete, stucco finished with a distinct horizontal coursing between second and third floors. Façade terminates with a simplified adornment on the entablature reflected by a frieze decoration. The frieze decoration is a rectilinear design with a diamond pattern at the center of each panel that is repeated around the perimeter of the building envelope. The horizontal lines are further delineated at the very top with an

eave, originally, much more elaborate with a cornice and bracket detail. The original roof structural trusses were wood. These features are significant in that they represent the architectural character of the style.

- Windows/Doors (Figure-10): Windows on all elevations are uniformly aligned of similar character, originally, multi-mullions or divided-light in wood casement type or double-hung. The uniformity and scale of these openings give the overall mass character. The original use of heavy concrete sill lines give the windows additional horizontal emphasis, and the regularity of the window openings with heavy wood dividers give it the proportion and scale. The intricacy of construction style contributes to the overall flavor and character of the architectural style. All original exterior doors reflect similar wood multi-mullion or divided-light construction with glazing and operable transoms and therefore, possess similar importance in maintaining the overall integrity.

- Portico or main entrance (Figure-11): A central feature of the administration building is the decorative portico. Typical of most quads, two vertical pier columns connected with a horizontal header beam span a rectangular opening. The entry detail is laid with decorative brick pattern with raised concrete border on each side. The opening is further articulated with recessed indentations or lines. Infantry insignias were sometimes placed at the center of this header piece. A low concrete cheekwall extends from each side of the entry at the ground level. Historic light fixture bases still remain on each side of the entry within the brick pattern course. The entry feature significantly contributes to the overall integrity of the original plan and mass.

- Balcony/Balustrade (Figure-11): A decorative faux balcony projecting from the vertical plane forms a horizontal overhang for the opening. At the base of this a uniform pattern of dentils or stone brackets further delineate the opening. The concrete posts of the balustrade are heavy at ends and in the middle and drawings indicate a metal railing detail in between the divisions. Although old photographs reveal absence of metal railing in some of the buildings, some form of decoration on top of the portico, such as a cast insignia, contributed to its sense of scale and importance. This insignia does not appear in the early photographs of Quad B entry, but as a historic feature it is significant. The balcony feature significantly contributes to the overall character of the entry and its scale and proportion.

- Arcade galleries or walkways (Figure-12): The single arcade or gallery on the interior courtyard face is a feature of Quads B and C. All quad galleries have rectangular shape openings at the first and second floors and arched openings at the third floor (except for Quad F where the openings are all rectangular). The rhythm created through regularity of the openings give the buildings the horizontal scale and plays a significant importance in the design of the facade.

- Stairs and arcade railings (Figure-12): The open stairways and walkway railings were originally designed with a horizontal emphasis and are a visible part of the walkway. The exterior walkways in Quad B still maintain this original horizontal

emphasis. However, additional necessary horizontal bars have been added to accommodate the modern code standards. These serve as functional features of the plan and are of significance to the building character.

2. Alterations To Original Features:

Generally all Quad structures still retain the historical integrity of the original overall plan, architectural massing and scale, and other architectural elements as described above. Discussion below includes only those components of the building that have been since modified or drastically altered during the past major renovations.

- Typically all original wood windows have been replaced with new casement or double-hung aluminum, or louvered windows that no longer carry the divided mullion style of the era. This alteration is the most intrusive, or character-changing of the alterations that have been done to the Quads.

- To most degree majority of the original building fenestrations have been retained, however, needed modifications have been made that have called for blocking whole windows reflected in plaster including the stylistic arches of the windows or partial blocking reflected in painted surface that matches the window frames (also refer to the interior alterations section). Although the overall uniformity that still remains help maintain the sense of scale and original design intent, the changes alter the original architectural proportions and the flavor of the period.

- The original wooden structural trusses have been replaced with a light-gauge metal truss and corrugated metal roofing (also refer to the interior alterations section). The original eaves with decorative detail have been reduced to a flat horizontal projection with none of the original cornice or bracket detailing (Figure-13). The current eave line no longer delineates the weighted horizontal line of the cornice/bracket detail and affects the integrity of style.

- The balustrade and rail detail above the portico is left unadorned and is missing the original metal railing or the insignia decoration that gave it the appropriate scale and sense of importance.

- The stair rail in the administration building still reflects the original design with heavy concrete vertical divisions. The railings at the arcades through out the barracks use the original horizontal emphasis but have been added more horizontal steel bars to make them comply with modern codes (Figure-14).

- Typically all exterior doors have been replaced with new metal doors. Additionally door transoms have been covered or filled-in. These changes impact the overall original character of the buildings.

- Most exterior light fixtures on the façade and arcades have been widely replaced and are new.
- Visible on the exterior of many buildings are the addition of electrical conduits and boxes, mechanical and communications equipment (Figure-15).
- The original exterior facing square style downspouts in Quad B have been mostly removed.
- Visible on the exterior of the barracks buildings 156, 157 & 158 are additions of mechanical or utility structures close to the buildings.
- Some of the walkway openings on the ground floor of barracks have been partially enclosed to provide additional enclosed space, typically for mechanical rooms.

3. Detracting Features: Discussion of recommendations below includes only those components of the buildings that have resulted from the past major renovations, and that are detracting from the original integrity of the historical elements.

- New casement or double-hung aluminum windows that no longer carry the same flavor of the original divided mullion style of the era should be replaced with windows that better closely match the original flavor and character.
- The blocking of fenestration in the windows that has altered the architectural proportions of original design intent, and the flavor of the period should be replaced as much as possible.
- Unadorned eave line, absent of cornice/bracket detail, detracts from the original scale and weight of the original roof line and should be restored back to replicate the original details.
- The undecorated balustrade/rail details change the original scale and weight, it detracts from the sense of importance of the Portico. New railings should be installed to match the original.
- New modern doors represent a new visual style. Also glazing at door transoms that have been covered or in-filled changing the overall proportions should be replaced with new doors that better match the original style and flavor.

- Visible electrical, mechanical, communication equipment and conduits, boxes and pipes on the exterior walls should be as much as possible consolidated and hidden from view.

- Poorly maintained building elements and premises, peeling paint, spalling concrete, chipped or exposed concrete should be noted and repaired. Exterior lanai edges and the balcony above the entry to Building 355 have dirt, mold, moisture, and plant growth, which are all damaging the concrete. Building element corners and edges have been chipped, exposing the concrete to the damaging environment (Figure-16). Sprinklers are spraying water directly onto the building walls. The building elements should be cleaned, repainted or sealed, chipped or broken areas should be repaired, and the sprinklers should be adjusted so that the building is not getting wet.

DESCRIPTION OF INTERIOR

1. Original Character Defining Features:

Plan: The interior of the administration building was originally partitioned to accommodate functions such as kitchens, dining areas, a post exchange, and a prison with four cells on the ground floor. Offices, barber shop, a printing shop, a court martial room, medical examining rooms, dispensary, and dormitories on the second floor. Reading, music rooms, day and school rooms, additional dormitories, and a large auditorium was held on the third floor. The floors were connected through open stairs and covered arcades. The large volume central section of the third floor plan housed the auditorium originally with a stage. The dormitories contained large open space plan with adjacent supporting areas of lavatory/shower rooms.

The barracks (Figure-17) represented the more private functions of the infantry. The plan of the barracks was partitioned to serve primarily as sleeping quarters of the brigade. Each barracks contained: squad rooms, typically an open space plan measuring approximately fifty feet by ninety feet, four each on second and third floors; two common lavatory/shower rooms each on second and third floors; day rooms, kitchens, and mess halls filled the first floor. The two projections on the courtyard side housed the kitchen and the lavatory/shower sections.

Interior Architectural Elements:

- Classical elements (Figure-18): The high volume space in the interior of the auditorium is decorated with large window openings to one side and walls that are adorned with arched niches duplicating the pattern of the arched windows,

originally, shown in the drawings topped with a center piece at the high point of the arch. The door fenestrations on the opposite interior wall of the arcade gallery duplicates the same uniform and repetitive pattern of window openings and niches. Other classical elements of the interior include: horizontal base division, and decorative wainscot molding decorated with arched carving at interval divisions in white to contrast from the buff color interior wall finish. The heavy line of the wainscot molding breaks the high volume proportions. The auditoriums were originally designed with a stage flanked with columns and an orchestra pit.

- Ceiling (Figure-18): The walls terminate with a crown molding and a metal ceiling. The large wooden structural truss system is concealed from the eye above the metal ceiling.

- Floor: The auditorium was finished with wood flooring.

2. Alterations To Original:

Generally the interior space plan of all quad structures have been altered during various past renovation projects. Typically, new partitioned walls have been placed to accommodate the administrative functions as well as those of the barracks. Ceilings through out the interiors have been dropped to accommodate installation of modern conveniences such as air-conditioning both in the administration building as well as in the barracks. Quad B auditorium (Figures-19 & 20) has been converted to gymnasium usage. Another major modification to the auditorium is in the open exposed ceiling. The new light structural truss system (installed in 1967) changes the original proportions of the interior volume. The truss has been left exposed and the ceiling height has been raised to slightly below the metal decking. The light fixtures are new and the character of the original fixtures is unknown.

3. Detracting Features:

The general interior modifications to the plan layout throughout the buildings, as well as those resulting in lowered ceiling heights are significant to the overall building character. The lowered ceiling heights have resulted in loss of original scale and proportion. The interior ceilings should be soffited around the door and window openings so that the full height of the original opening can be used, and windows and doors matching the original style, and, if possible, material should be installed.

The converted auditorium has lost numerous significant details, namely, the height proportions, horizontal partitioning of walls, details such as crown moldings and carvings.

D. SUMMARY OF CHARACTER DEFINING FEATURES

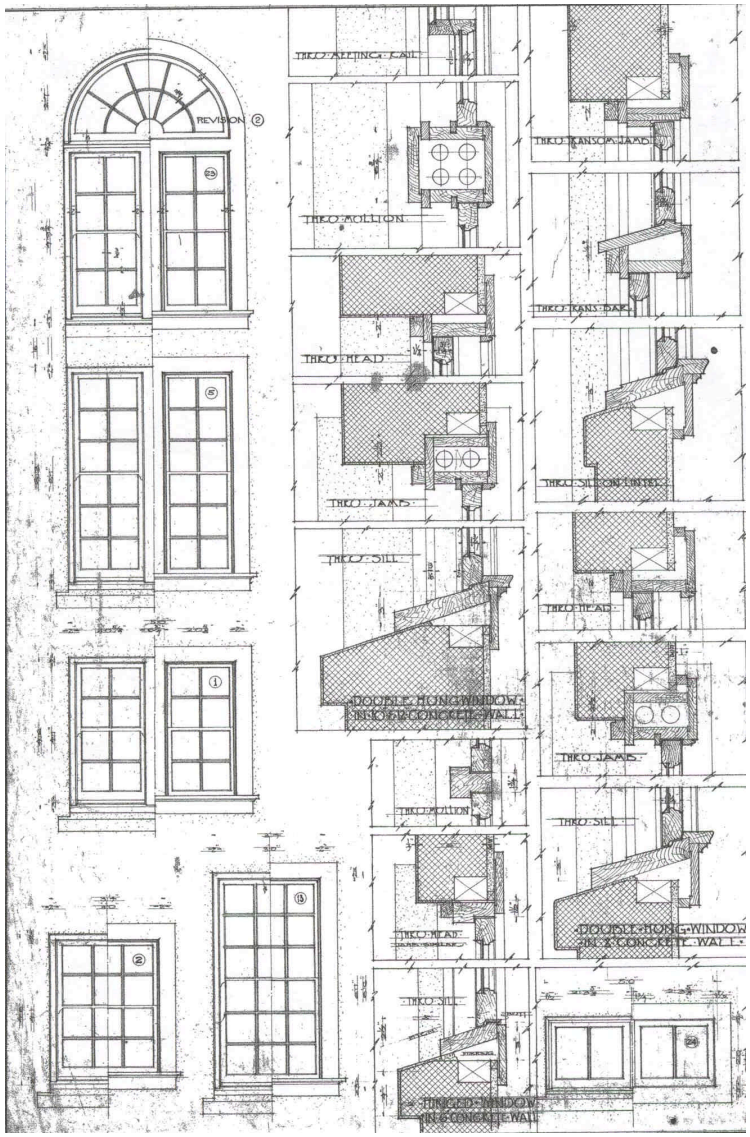
Bldg. No	Character Defining Features Remaining	Detracting Features – To Remove	Character Defining Features – To Restore
Quad B 155 Administration 156, 157 & 158 Barracks	EXTERIOR Plan: • Quadrangular relationship • Rectilinear plan layout at center of Admin. Bldg. Mass/Scale: • Three-story height • Linear and horizontal scale • High volume center section at third floor of Admin. Architectural Features: • Stucco finish/painted • Horizontal coursing between second and third floor • Slightly sloped roof with horizontal eave, overhang • Diamond motif in frieze pattern • Window/doors rhythm & uniformity • Heavy concrete sill at windows and doors • Gallery arcade openings rhythm & uniformity, rectangle and arched • Central main entrance at	EXTERIOR Architectural Features: • Loss of eave/cornice detail • Wood windows changed to a different visual style and material • Top of windows in-filled and painted • Doors changed to a modern style, different from original visual style, and transoms covered/in-filled • Doorways in-filled or converted to window openings • Modern railing as part of the balcony/balustrade over the portico • Visible exterior pipes, conduits and boxes not hidden from view • New light fixtures • Enclosed additions to barracks ground floor for mechanical and other uses– Bldg. 157, part of exterior arcades at first floor is enclosed	EXTERIOR Architectural Features: • Bring back cornice and bracket detail to eave lines • Restore original balustrade/rail detail at front portico to bring back sense of scale and importance • Restore overall size and scale of window openings • Install window types to better closely match original flavor and character with heavy divisions and multi-divisional mullions • Install doors to closely match historic-style at exteriors • Conceal and consolidate electrical conduits as much as possible within building or in a covered exterior area • Remove mechanical room at exterior arcades, locate in original interior space in building INTERIOR Interior Architectural Features:

	Admin.; rectangular brick opening, adornments, open passage way to courtyard; light fixtures on each side • Faux balcony/balustrade detail • Exterior concrete stairways with concrete railings at Admin. • Historic metal railing at exterior walkways <u>INTERIOR</u> Plan: • Plan layout Interior Architectural Features: • Classical elements at Admin.: arched wall niches, wainscot moldings and decorative carvings; horizontal base line • Ceiling crown molding & proportions • Small wood stairway from former ticket office at third floor to former operator's room, and small hopper wood windows in operator's room • Building 157 – historic metal doors at first floor former kitchen heater room	<u>INTERIOR</u> Plan: • Altered interior floor plans Interior Architectural Features: • Modern plumbing fixtures • Removal of historical lights • Dropped ceilings impacting the proportion of the interior space as well as impacting the size of original openings • Removal of original wood truss, stamped metal ceiling, removal of historic wood panel doors, and light fixtures • Raised ceiling at Admin. auditorium/gymnasium has changed original scale and height proportions <u>OTHER/LANDSCAPE</u> • Neglect-particularly at entry balcony-plant growth, mold, dirt, rust, broken corners etc. • Sprinklers spraying water onto building	• Soffit ceilings at doors and windows to restore the scale and proportion of openings • Restore back original height proportions & details of auditorium/gymnasium in Admin. • Replace gymnasium lights with ones to fit better the historical setting <u>OTHER/LANDSCAPE</u> • Remove vegetation growing within three feet of building, ensure sprinklers do not spray water on building • Clear building premises of debris

Quad B-Buildings 156 and 158: First permanent structures constructed at SBMR in 1914

Historic Photograph of Quad B:
Second Renaissance Revival Features

FIGURE 10



Typical Quad window styles

FIGURE 11

Historical Photograph of Quad B Administration Building:
Central portico and balustrade/railing detail

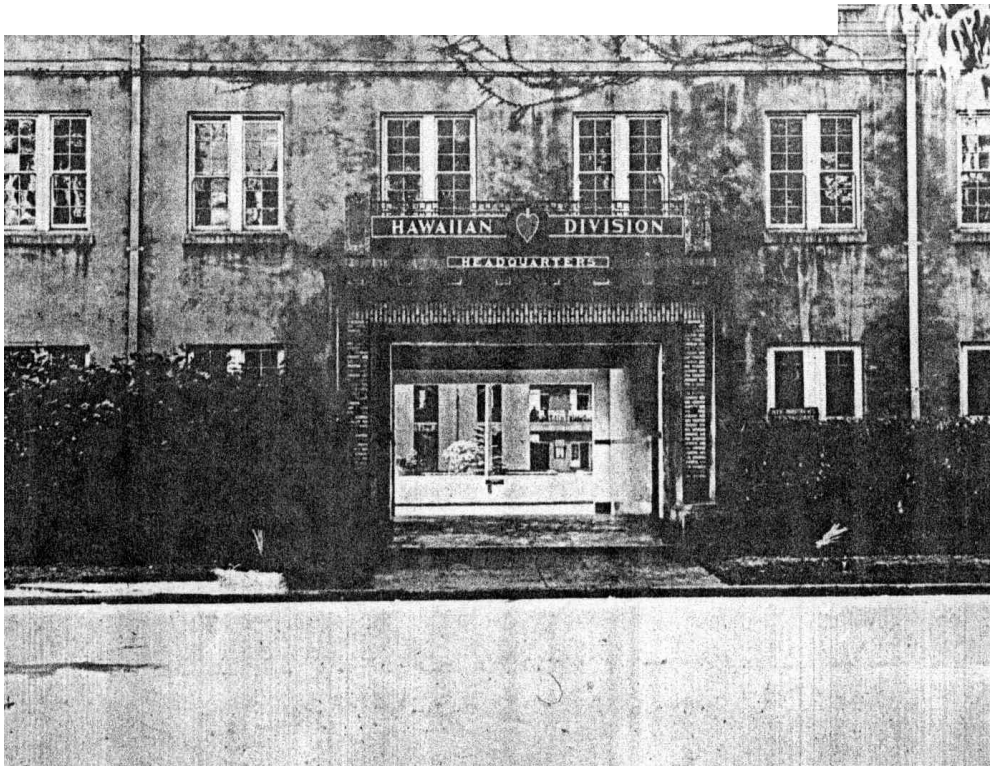


FIGURE 12

Typical Quad Barrack Buildings:
Arcade galleries and railing detail

FIGURE 13

Quad B: Facade details

FIGURE 14

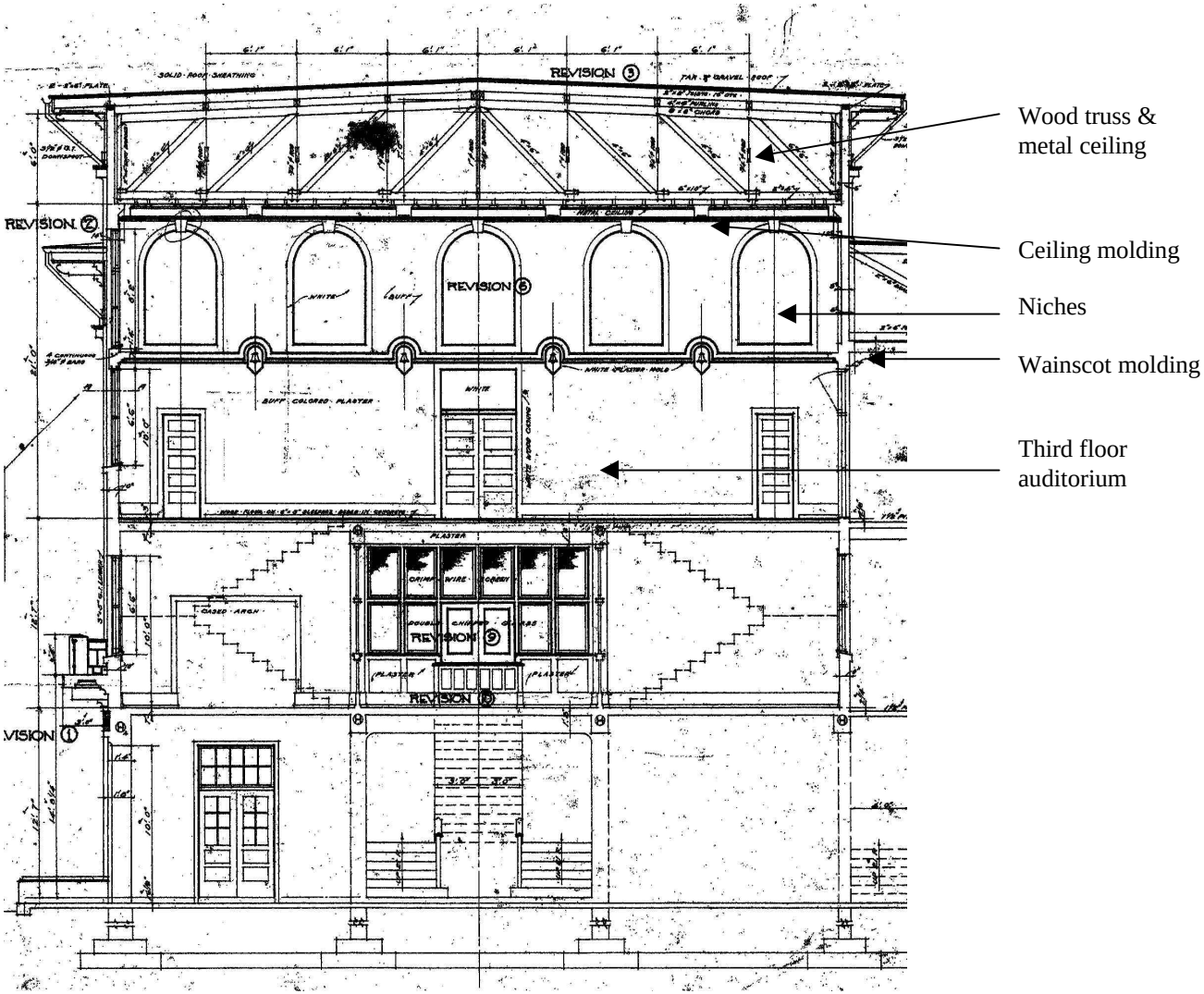
Quad B: Partially modified original railing detail

FIGURE 15

Typically found electrical boxes and conduits on exteriors (Quad B shown)

Typically found spalling concrete in reinforcement bars (Quad B shown)

Historical Photograph: Typical barracks dormitories



Original Drawing of Quads B, C, D, E, I & J:
Interior elevation details of the auditoriums

Quad B - auditorium/gymnasium

FIGURE 20

Quad B – wainscot molding & arched niches

QUAD C – BUILDINGS 355, 356, 357, & 358

A. BUILDINGS SIGNIFICANCE

Quad C is significant as a substantial element in the original base layout, and is within the Schofield Barracks Historic District that is listed on the National Register of Historic Places. The historic district contains the central core of significant properties that exhibit Army's development patterns and establish the character of Schofield Barracks Military Reservation. These barracks historically provided the centralized housing, dining, and administrative space for troops.

The four buildings of Quad C are significant as some of the earliest Quadrangles and earliest permanent buildings constructed at the Post. Buildings 356 and 358 were constructed in 1915 followed by buildings 355 and 357 which were completed in 1916 for the 35th Infantry. Building 355 was designed as the administration building and housed the functions for the headquarters of the brigade. Buildings 356, 357, and 358 were designed as barracks and served primarily as sleeping quarters for the brigade.

B. PHYSICAL HISTORY

Date (s) of erection: Constructed in 1915 and 1916. Contractor/builder unknown.

Architect: Drawings prepared under direction of Office of Constructing Quartermaster, Honolulu, Hawaii.

Original plans and construction: The original drawings for Quads B, C, D, & E, Administration and Barracks are dated 1917. It is not known whether an earlier set of barracks plans were available for the construction of buildings 156 and 157. The total sheet number of original set of documents is unknown. What remains of the original set is filed at the Department of Public Works, at Wheeler Army Airfield (Appendix A).

Original and subsequent owners: U. S. Army.

Applicable Land Use Plans and Policies: Quads are situated on Federal land whereby State and City land use designations are not enforceable. Nevertheless, the following land uses are designated: State land use is Urban; City and County of Honolulu zoning is Military and Federal; and the Development Plan is Medium Density Apartments. The Quads do not lie within the City's Special Management Area.

Alterations and Additions: The demand for better and private facilities led to the modernization of the interiors of all of the Quadrangle barracks buildings in the 1970's. Various alterations and renovations projects have since taken place. Some of the major alterations are included in the detailed discussion below.

C. ARCHITECTURAL HISTORY

ARCHITECTURAL CHARACTER

The architectural composition of Quad C is the distinctive quadrangle layout of four buildings: one administration and three barracks sited to enclose the four sides of the central courtyard. Architectural differences in functional layout and architectural massing are reflected in the two building types: the administration building, and the barracks.

Quad C, similar to B, D, and E is designed in a modest Second Renaissance Revival Style. Distinguishing classical elements in Quad C include: arcades or galleries with a combination of rectangular and arched openings; arched window openings dominating the central façade of the administration building; the entablature decorated with a frieze pattern centered with a diamond motif. Buildings are typically a three-story mass with a strong linear horizontal emphasis evident through use of fairly distinct horizontal divisions, belts or string courses, rhythmic banding effect of window fenestrations, and use of arcades and uniform openings. Also contributing to the horizontal effect is the eave line above the frieze terminating with a slightly sloped roof for Hawaii's rains.

A strong architectural element of the administration, Building 355, is the decorative portico or the main entry feature with a decorative concrete, brick and plaster surround at the rectangular opening to the passage leading to the central courtyard. Above the entry is a faux-balcony with decorative dentils and detail. A low concrete planter cheekwall extends from each side of the entry at the ground level.

The use of arcade on the courtyard side at each of the floors of the buildings is an architectural feature typical to Quads B and C The regularity of the arcade openings are broken up with small projections into the courtyard and the exterior and interior stairways connect the three levels. Despite the solidity of barrack structures, originally the buildings were designed with natural ventilation to take advantage of the Hawaiian trade winds. The use of high ceilings and deep porches kept the rooms cool year round.

Condition: Although generally the structures still retain their appearance of overall mass, plan and some of their original interior details, some significant architectural features have been altered which affect the original integrity of their historic intent and

significance. The following detailed description of the Quad B buildings elaborates on these differences. The overall condition of Quad C buildings is fair. Structurally Quads appear in reasonable condition, however it is apparent that these structures have suffered aging problems, exposure to environment, and poor maintenance. To name a few, points of observation during this survey were: peeling paint, spalling concrete leaving reinforcing steel exposed (Figure-16), chipped and damaged building parts, broken glass, mold and dirt around the premises.

DESCRIPTION OF EXTERIOR

1. Original Character Defining Features:

Plan: Each quad is a quadrangular composition, with the three barracks buildings situated around an open courtyard and anchored by the administration building, generally, in the northern direction. The plan layout of the administration building is rectilinear with a directional and functional emphasis at center, utilizing the main entry as the central gateway to the barracks courtyard. The plan layout of the barracks is rectilinear with a horizontal emphasis.

Massing: Generally the quad buildings are three-story structures, very linear with a horizontal emphasis defined by the use of horizontal string courses, uniform window fenestrations and arcade openings. The horizontal scale is further achieved with the delineation of the eave line with a decorative band at the frieze, enriched cornices with decorative brackets, dentils and a slightly sloped tar and gravel roof. The central portion of the architectural mass in the administration building is emphasized with a large volume space, which is also reflected in tall window openings on the facade. The administration building has a height of approximately 53 feet at its center point and an overall length of 365 feet, while the barracks are about 38 feet high and approximately 320 feet long. The linear shape of the barracks buildings is broken up with small projections into the courtyard.

Exterior Architectural Elements: Various distinct features of the architectural façade are the following:

- Façade (Figure-9): The exterior walls are cast-in-place reinforced concrete, stucco finished with a distinct horizontal coursing between the second and third floors. Façade terminates with an adornment on the entablature reflected by a frieze decoration. The frieze decoration is a rectilinear design with a diamond pattern at the center of each panel that is repeated around the perimeter of the building envelope. The horizontal lines are further delineated at the very top with an eave, originally, much more elaborate with a cornice and bracket detail. The original roof structural trusses were wood. These features are significant in that they represent the architectural character of the style.

- Windows/Doors (Figure-10): Windows on all elevations are uniformly aligned of similar character, originally, multi-mullions or divided-light in wood casement type or double-hung. The uniformity and scale of these openings give the overall mass character. The original use of heavy concrete sill lines give the windows additional horizontal emphasis, and the regularity of the window openings with heavy wood dividers give it the proportion and scale. The intricacy of construction style contributes to the overall flavor and character of the architectural style. All original exterior doors reflect similar wood multi-mullion or divided-light construction with glazing and operable transoms and therefore, possess similar importance in maintaining the overall integrity.

- Portico or main entrance (Figure-11 & 21): A central feature of the administration building is the decorative portico. Typical of most quads, two vertical pier columns connected with a horizontal header beam span a rectangular opening. The entry detail is laid with decorative brick pattern with raised concrete border on each side. The opening is further articulated with recessed indentations or lines. Infantry insignias were sometimes placed at the center of this header piece. A low concrete planter cheekwall extends from each side of the entry at the ground level. Historic light fixture were placed on each side of the entry within the brick pattern course. The entry feature significantly contributes to the overall integrity of the original plan and mass.

- Balcony/Balustrade (Figure-11 & 21): A decorative faux balcony projecting from the vertical plane forms a horizontal overhang for the opening. At the base of this a uniform pattern of dentils or stone brackets further delineate the opening. The concrete posts of the balustrade are heavy at ends and drawings indicate a metal railing detail in between the divisions. Although old photographs reveal absence of metal railing in some of the buildings, some form of decoration on top of the portico, such as a cast insignia which is present in Quad C, contributed to its sense of scale and importance. The balcony feature significantly contributes to the overall character of the entry and its scale and proportion.

- Arcade galleries or walkways (Figure-12): The single arcade or gallery on the interior courtyard face, is a feature of Quads B and C. All quad galleries have rectangular shape openings at the first and second floors and arched openings at the third floor (except for Quad F where the openings are all rectangular). The rhythm created through regularity of the openings give the buildings the horizontal scale and plays a significant importance in the design of the facade.

- Stairs and arcade railings (Figure-12): The open stairways and walkway railings were originally designed with a horizontal emphasis and are a visible part of the walkway. The exterior walkways in Quad C no longer carry the horizontal design pattern. These serve as functional features of the plan and are of significance to the building character.

2. Alterations To Original Features:

Generally all Quad structures still retain the historical integrity of the original overall plan, architectural massing and scale, and other architectural elements as described above. Discussion below includes only those components of the building that have been since modified or drastically altered during the past major renovations.

- Typically all original wood windows have been replaced with new casement or double-hung aluminum, or louvered windows that no longer carry the divided mullion style of the era. This alteration is the most intrusive, or character-changing of the alterations that have been done to the Quads.

- To most degree majority of the original building fenestrations have been retained, however, needed modifications have been made that have called for blocking whole windows reflected in plaster including the stylistic arches of the windows or partial blocking reflected in painted surface that matches the window frames (also refer to the interior alterations section). Although the overall uniformity that still remains help maintain the sense of scale and original design intent, the changes alter the original architectural proportions and the flavor of the period.

- The original wooden structural trusses have been replaced with a light-gauge metal truss (1967) and corrugated metal roofing. The original eaves with decorative detail have been reduced to a flat horizontal projection with none of the original cornice or bracket detailing (Figure-13). The current eave line no longer delineates the weighted horizontal line of the cornice/bracket detail and affects the integrity of style.

- The balustrade and rail detail above the portico (Figure-21) is left unadorned and is missing the original metal railing or the insignia decoration that gave it the appropriate scale and sense of importance.

- The metal railings at arcades have vertical orientation, different from the original horizontal design emphasis (Figure-22).

- At building 355, an exterior concrete stair with metal railing was constructed at each end. At all four Quad C buildings, new metal railings at the exterior lanais and stairways have been installed that have a pattern totally unlike the original railing pattern.

- At building 355, the side openings at stairway at each end of the open walkways on the courtyard side have been enclosed, and have small arched openings.

- At building 357, mechanical room structures were built extending out from the bathroom wings (Figure-23).

- Typically all exterior doors have been replaced with new metal doors (Figure-24). Additionally door transoms have been covered or filled-in. These changes impact the overall original character of the buildings.

- Historic light fixtures at entry have been removed (Figure-25). Fixtures on the walls of the galleries and exterior have been widely replaced.

- Visible on the exterior of many buildings are the addition of electrical conduits and boxes, mechanical and communications equipment (Figure-15).

- The original exterior facing square style downspouts in Quad C has been removed.

3. **Detracting Features:** Discussion below includes only those components of the building that have resulted from the past major renovations, and that are detracting from the original integrity of the historical elements.

- New casement or double-hung aluminum windows that no longer carry the same flavor of the original divided mullion style of the era should be replaced with windows that better closely match the original flavor and character.

- The blocking of fenestration in the windows that has altered the architectural proportions of original design intent and the flavor of the period should be restored as much as possible.

- Unadorned eave line, absent of cornice/bracket detail, detracts from the original scale and weight of the original roof line and should be restored back to replicate the original details.

- The undecorated balustrade/rail details change the original scale and weight and detracts from the sense of importance of the Portico. New railings should be installed to match the original.

- New modern doors represent a new visual style. Also, glazing at door transoms that have been covered or in-filled, changing the overall proportions, should be replaced with new doors that better match the original style and flavor.

- Visible electrical, mechanical, communication equipment and conduits, boxes and pipes on the exterior walls should be consolidated as much as possible and hidden from view.

- The historic light fixtures once located on each side of the entry within the brick course have been removed and should be replaced with fixtures that are historically better matching. The brickwork (Figure-25) that has been poorly repaired should also be patched better.

- Poorly maintained building elements and premises, peeling paint, spalling concrete, chipped or exposed concrete should be noted and repaired. Exterior lanai edges and the balcony above the entry to Building 355 have dirt, mold, moisture, and plant growth, which are all damaging to the concrete. Building element corners and edges have been chipped, exposing the concrete to the damaging environment (Figure-26). Sprinklers are spraying water directly onto the building walls. The building elements should be cleaned, repainted or sealed, chipped or broken areas should be repaired, and the sprinklers should be adjusted so that the building does not get wet.

- Metal railings at arcades should be restored back to the horizontal scale and original design intent.

DESCRIPTION OF INTERIOR

1. Original Character Defining Features:

Plan: The interior of the administration building was originally partitioned to accommodate functions such as kitchens, dining areas, a post exchange, and a prison with four cells on the ground floor. Offices, barber shop, a printing shop, a court martial room, medical examining rooms, dispensary, and dormitories on the second floor. Reading, music rooms, day and school rooms, additional dormitories, and a large auditorium was held on the third floor. The floors were connected through open stairs and covered arcades. The large volume central section of the third floor plan housed the auditorium originally with a stage. The dormitories contained large open space plan with adjacent supporting areas of lavatory/shower rooms.

The barracks (Figure-17) represented the more private functions of the infantry. The plan of the barracks was partitioned to serve primarily as sleeping quarters of the brigade. Each barracks contained: squad rooms, typically an open space plan measuring approximately fifty feet by ninety feet, four each on second and third floors; two common lavatory/shower rooms each on second and third floors; day rooms, kitchens, and mess halls filled the first floor. The two projections on the courtyard side housed the kitchen and the lavatory/shower sections.

Interior Architectural Elements:

- Classical elements (Figure-18): The high volume space in the interior of the auditorium is decorated with large window openings to one side and walls that are adorned with arched niches duplicating the pattern of the arched windows, originally, shown in the drawings topped with a center piece at the high point of the arch. The door fenestrations on the opposite interior wall of the arcade gallery duplicate the same uniform and repetitive pattern of window openings and niches. Other classical elements of the interior include: horizontal base division, and decorative wainscot molding decorated with arched carving at interval divisions in white to contrast from the buff color interior wall finish. The heavy line of the wainscot molding breaks the high volume proportions. The drawings show that the auditoriums were originally designed with a stage flanked with columns and an orchestra pit. Leading from a room adjacent to the auditorium to what was the light operator's room was a small wood stairway. In Quad C, this feature is still standing today and the walls have vertical wood T&G siding and a small storage room underneath with a historic wood panel door (Figure-27). The small room at the top of the stairs has what are probably the only remaining original windows, which are small hopper wood windows.

- Ceiling (Figure-18): Originally, the walls terminated with a crown molding and a metal ceiling. The large wooden structural truss system was concealed from the eye above the metal ceiling.

- Floor: The auditorium was finished with wood flooring.

2. Alterations To Original:

Generally the interior space plan of all quad structures have been altered during various past renovation projects. Typically, new partitioned walls have been placed to accommodate the administrative functions as well as those of the barracks. Ceilings through out the interiors have been dropped to accommodate installation of modern conveniences such as air-conditioning both in the administration building as well as in the barracks. The Quad C auditorium has been converted to gymnasium usage. Another major modification to the auditorium is in the open exposed ceiling. The new light structural truss system changes the original proportions of the interior volume. The truss has been left exposed and the ceiling height has been raised to slightly below the metal decking. The light fixtures are new and the character of the original fixtures is unknown.

3. Detracting Features:

The general interior modifications to the plan layout throughout the buildings, as well as those resulting in lowered ceiling heights are significant to the overall building character. The lowered ceiling heights have resulted in loss of original scale and proportion.

The converted auditorium has lost numerous significant details, namely, the height proportions, horizontal partitioning of walls, details such as crown moldings and carvings.

D. SUMMARY OF CHARACTER DEFINING FEATURES

Bldg. No	Character Defining Features Remaining	Detracting Features – To Remove	Character Defining Features – To Restore
Quad C 355 Administration 356, 357 & 358 Barracks	EXTERIOR Plan: • Quadrangular relationship • Rectilinear plan layout at center of Admin. Bldg. Mass/Scale: • Three-story height • Linear and horizontal scale • High volume center section at third floor of Admin. Bldg. Architectural Features: • Stucco finish/painted • Horizontal coursing between	EXTERIOR Architectural Features: • Loss of eave/cornice detail • Wood windows changed to a different visual style and material • Top of windows in-filled and painted with the wall color • Doors changed to a modern style, different from original visual style, and transoms covered/in-filled • Doorways in-filled or converted to window openings • Lack of metal railing as part of	EXTERIOR Architectural Features: • Restore back cornice and bracket detail to eave lines • Restore original balustrade/rail detail at front portico to bring back sense of scale and importance • Install light fixtures matching closely with the historical at entry • Restore overall size and scale of window openings • Install window types to better closely match original flavor

	second and third floors • Slightly sloped roof with horizontal eave, overhang • Diamond motif in frieze pattern • Window/doors rhythm & uniformity • Heavy concrete sill at windows and doors • Gallery arcade openings rhythm & uniformity, rectangle and arched • Central main entrance at Admin.; rectangular brick opening, adornments, open passage way to courtyard; light fixtures on each side • Faux balcony/balustrade detail & cast insignia • Exterior concrete stairways with concrete railings at Admin. • Historic metal railing at exterior walkways <u>INTERIOR</u> Plan: • Plan layout Interior Architectural Features:	the balcony/balustrade over the portico • Modern metal railing at arcades on courtyard side of buildings • Visible exterior pipes, conduits and boxes not hidden from view • Missing light fixtures at entry, and modern ones at arcades and exterior walls • Bldg. 357, mechanical room structures built extending from the bathroom wings <u>INTERIOR</u> Plan: • Altered interior floor plans Interior Architectural Features: • Modern plumbing fixtures • Removal of historical lights • Dropped ceilings impacting the proportion of the interior space as well as impacting the size of original openings • Removal of original wood truss, stamped metal ceiling, removal of historic wood panel doors, and light fixtures • Raised ceiling at Admin. auditorium/gymnasium has	and character with heavy divisions and multi-divisional mullions • Install doors to closely match historic-style at exteriors • Conceal and consolidate electrical conduits as much as possible within building or in a covered exterior area <u>INTERIOR</u> Interior Architectural Features: • Soffit ceilings at doors and windows to restore the scale and proportion of openings • Restore back original height proportions & details of auditorium/gymnasium in Admin. • Replace gymnasium lights with ones to fit better the historical setting <u>OTHER/LANDSCAPE</u> • Remove vegetation growing within three feet of building, ensure sprinklers do not spray water on building • Clear building premises of debris

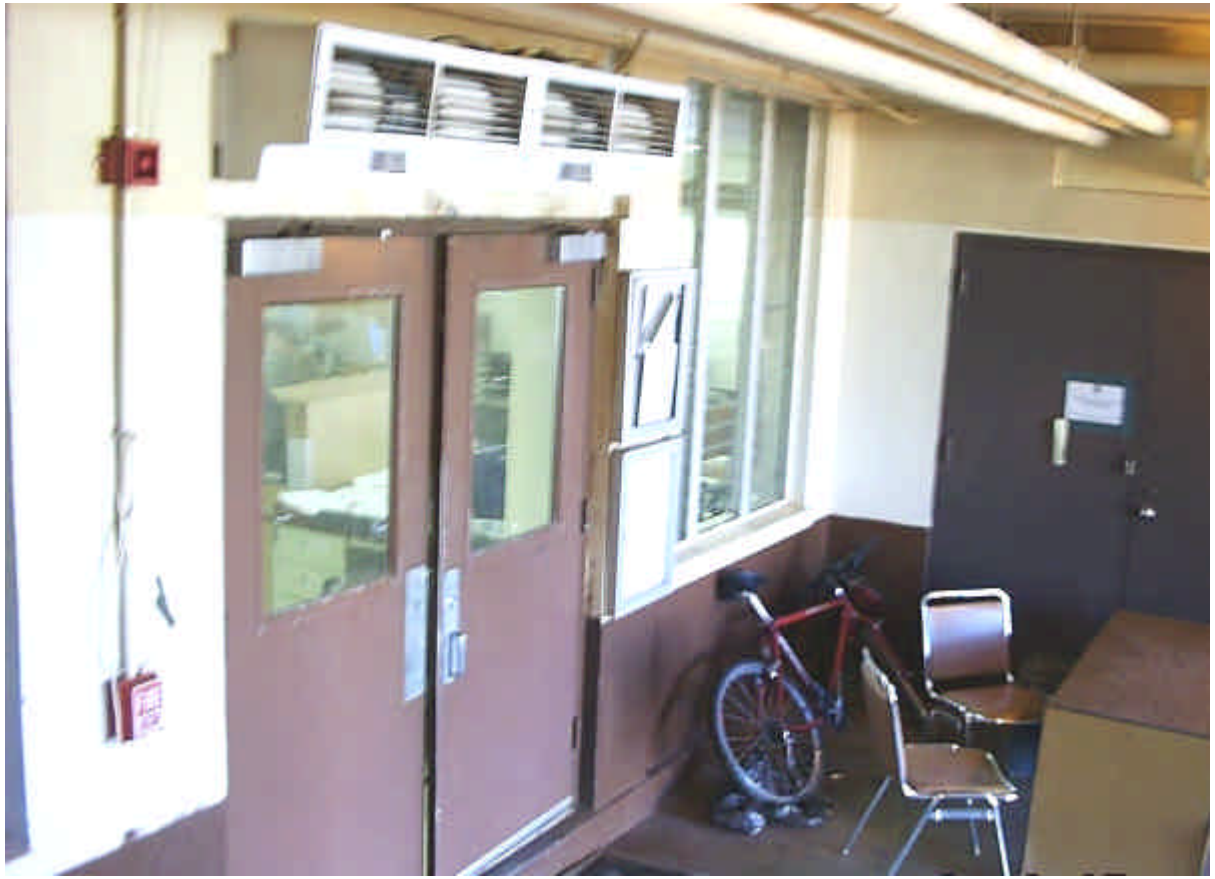
	• Classical elements at Admin.: arched wall niches, wainscot moldings and decorative carvings; horizontal base line • Ceiling crown molding & proportions • Small wood stairway from former ticket office at third floor to former operator's room, and small hopper wood windows in operator's room	changed original scale and height proportions <u>OTHER/LANDSCAPE</u> • Neglect-particularly at entry balcony-plant growth, mold, dirt, rust, broken corners, spalling concrete etc. • Sprinklers spraying water onto building	

Historic Photograph of Quad C (top):
Portico (bottom same entry)

Quad C: Railing detail at arcade galleries

FIGURE 23

Quad C: Mechanical room structure addition to the bathroom wing



Example of a modern style door

Quad C: Original brick wall at entry where light fixtures once stood

Quad C: Spalling concrete exposing reinforcement bars

Quad C: Wood Stairway to light operator room at auditorium

QUAD D – BUILDINGS 449, 450, 451, & 452

A. BUILDINGS SIGNIFICANCE

Quad D is significant as a substantial element in the original base layout, and is within the Schofield Barracks Historic District which is listed on the National Register of Historic Places. The historic district contains the central core of significant properties that exhibit Army's development patterns and establish the character of Schofield Barracks Military Reservation. These barracks historically provided the centralized housing, dining, and administrative space for troops

Quad D, buildings 449, 450, 451 and 452 were constructed in 1921 as barracks for the 27th Infantry. Quad D is shown alongside quad E in an aerial photograph of Schofield Barracks dated February 21, 1923 (Figure-28). Building 449 was designed as the administration building for Quad D and housed the functions for the headquarters of the brigade. Buildings 450, 451, and 452 were designed as barracks and served primarily as sleeping quarters for the brigade.

B. PHYSICAL HISTORY

Date (s) of erection: Constructed in 1921. Contractor/builder unknown.

Architect: Drawings prepared under direction of Office of Constructing Quartermaster, Honolulu, Hawaii.

Original plans and construction: The original drawings for Quads B, C, D, & E, Administration and Barracks are dated 1917. The total sheet number of original set of documents is unknown. What remains of the original set is filed at the Department of Public Works, at Wheeler Army Airfield (Appendix A).

Original and subsequent owners: U. S. Army.

Applicable Land Use Plans and Policies: Quads are situated on Federal land whereby State and City land use designations are not enforceable. Nevertheless, the following land uses are designated: State land use is Urban; City and County of Honolulu zoning is Military and Federal; and the Development Plan is Medium Density Apartments. The Quads do not lie within the City's Special Management Area.

Alterations and Additions: The demand for better and private facilities led to the modernization of the interiors of all of the quadrangle barracks buildings in the 1970's. Various alterations and renovations projects have since taken place. Currently some sections of Quad D are undergoing renovation.

C. ARCHITECTURAL HISTORY

ARCHITECTURAL CHARACTER

The architectural composition of Quad D is the same distinctive quadrangle layout of four buildings: one administration and three barracks surrounding an open courtyard. Architectural differences in functional layout and architectural massing are reflected in the two building types: the administration building, and the barracks.

Quad D, similar to B, C, and E is designed in a modest Second Renaissance Revival Style. Distinguishing classical elements in Quad D include: arcades or galleries with a combination of rectangular and arched openings; arched window openings dominating the central façade of the administration building; and the entablature decorated with a frieze pattern centered with a diamond motif. Buildings are typically a three-story mass with a strong linear horizontal emphasis evident through use of fairly distinct base course, rhythmic banding effect of window fenestrations, and use of arcades and uniform openings. Also contributing to the horizontal effect is the eave line above the frieze terminating with a slightly sloped roof for Hawaii's rains.

A strong architectural element of the administration, Building 449, is the decorative portico or the main entry feature with a decorative concrete, brick and plaster surround at the rectangular opening to the passage leading to the central courtyard. Above the entry is a faux-balcony with decorative dentils and detail. A low concrete cheekwall extends from each side of the entry at the ground level.

The use of a double arcade is another architectural feature typical only to Quads D, E, and F barracks buildings. The regularity of the arcade openings gives the street facades of barracks a strong horizontal sense of movement. On the other hand the courtyard elevations of barracks are more informal in nature, and the galleries are broken up with small projections into the courtyard. Despite the solidity of barrack structures, originally the buildings were designed with natural ventilation to take advantage of the Hawaiian trade winds. The use of high ceilings and deep porches kept the rooms cool year round.

Condition: Although generally the structures still retain their appearance of overall mass, plan and some of their original interior details, some significant architectural features have been altered which affect the original integrity of their historic intent and significance. The following detailed description of the Quad D buildings elaborates on these differences. The overall condition of

Quad D buildings is fair. Structurally Quads appear in reasonable condition, however it is apparent that these structures have suffered aging problems, exposure to environment, and poor maintenance. To name a few, points of observation during this survey were: peeling paint, spalling concrete leaving reinforcing steel exposed (Figure-16 & 26), chipped and damaged building parts, broken glass, mold and dirt around the premises.

DESCRIPTION OF EXTERIOR

1. Original Character Defining Features:

Plan: Each quad is a quadrangular composition, with the three barracks buildings situated around an open courtyard and anchored by the administration building, generally, in the northern direction. The plan layout of the administration building is rectilinear with a directional and functional emphasis at center, utilizing the main entry as the central gateway to the barracks courtyard. The plan layout of the barracks is rectilinear with a horizontal emphasis.

Massing: Generally the quad buildings are three-story structures, very linear with a horizontal emphasis defined by the use of horizontal base course, uniform window fenestrations and arcade openings. The horizontal scale is further achieved with the delineation of the eave line with a decorative band at the frieze, enriched cornices with decorative brackets, dentils and a slightly sloped tar and gravel roof. The central portion of the architectural mass in the administration building is emphasized with a large volume space, which is also reflected in tall window openings on the facade. The administration building has a height of approximately 53 feet at its center point and an overall length of 365 feet, while the barracks are about 38 feet high and approximately 320 feet long. The linear shape of the barracks buildings is broken up with small projections into the courtyard.

Exterior Architectural Elements: Various distinct features of the architectural façade are the following:

- Façade (Figure-9): The exterior walls are cast-in-place reinforced concrete, stucco finished with a distinct horizontal coursing between second and third floors. Façade terminates with a simplified adornment on the entablature reflected by a frieze decoration. The frieze decoration is a rectilinear design with a diamond pattern at the center of each panel that is repeated around the perimeter of the building envelope. The horizontal lines are further delineated at the very top with an eave, originally, much more elaborate with a cornice and bracket detail. The original roof structural trusses were wood. These features are significant in that they represent the architectural character of the style.

- Windows/Doors (Figure-10): Windows on all elevations are uniformly aligned of similar character, originally, multi-mullions or divided-light in wood casement type or double-hung. The uniformity and scale of these openings give the overall mass character. The original use of heavy concrete sill lines give the windows additional horizontal emphasis, and the regularity of the window openings with heavy wood dividers give it the proportion and scale. The intricacy of construction style contributes to the overall flavor and character of the architectural style. All original exterior doors reflect similar multi-mullion or divided-light construction and therefore, possess similar importance in maintaining the overall integrity.

- Portico or main entrance (Figure-11, 29 & 30): A central feature of the administration building is the decorative portico. Typical of most quads, two vertical pier columns connected with a horizontal header beam span a rectangular opening. The entry detail is laid with decorative brick pattern with raised concrete border on each side. The opening is further articulated with recessed indentations or lines. Infantry insignias were sometimes placed at the center of this header piece. A low concrete cheekwall extends from each side of the entry at the ground level. Historic light fixture bases still remain on each side of the entry within the brick pattern course. The entry feature significantly contributes to the overall integrity of the original plan and mass.

- Balcony/Balustrade (Figure-11, 29 & 30): A decorative faux balcony projecting from the vertical plane forms a horizontal overhang for the opening. At the base of this a uniform pattern of dentils or stone brackets further delineate the opening. The concrete posts of the balustrade are heavy at ends and in the middle and drawings indicate a metal railing detail in between the divisions. Although old photographs reveal absence of metal railing in some of the buildings, some form of decoration on top of the portico, such as a cast insignia, contributed to its sense of scale and importance. This element as a historic feature is significant.

- Arcade galleries or walkways (Figure-12 & 31): The double gallery formation, one on the exterior street face and one on the interior courtyard face, is a feature of Quads D, E, and F. The galleries have rectangular shaped openings at the first and second floors and arched openings at the third floor (except for Quad F where the openings are all rectangular). The rhythm created through regularity of the openings give the buildings the horizontal scale and plays a significant importance in the design of the facade.

- Stairs and arcade railings (Figure-12 & 31): The open stairways and walkway railings were originally designed with a horizontal emphasis and are a visible part of the walkway. Quad D railings no longer carry the same railing detail. These serve as functional features of the plan and are of significance to the building's character.

2. Alterations To Original Features:

Generally, all Quad structures still retain the historical integrity of the original overall plan, architectural massing and scale, and other architectural elements as described above. Discussion below includes only those components of the building that have been since modified or drastically altered during the past major renovations.

- Typically, all original wood windows have been replaced with new casement, or double-hung aluminum, or louvered windows that no longer carry the divided mullion style of the era. This alteration is the most intrusive, or character-changing of the alterations that have been done to the Quads.

- For the most part, the majority of the original building fenestrations have been retained, however, needed modifications have been made that have called for blocking whole windows reflected in plaster including the stylistic arches of the windows or partial blocking reflected in painted surfaces that matches the window frames (also refer to the interior alterations section). Although the overall uniformity that still remains helps maintain the sense of scale and original design intent, the changes alter the original architectural proportions and the flavor of the period.

- The original wooden structural trusses have been replaced with light-gauge metal trusses and corrugated metal roofing (also refer to the interior alterations section). The original eaves with decorative detail have been reduced to a flat horizontal projection with none of the original cornice or bracket detailing (Figure-32). The current eave line no longer delineates the weighted horizontal line of the cornice/bracket detail and affects the integrity of style.

- The balustrade and rail detail (Figure-30) above the portico is left unadorned and is missing the metal railing and other vertical divisions that gave it the appropriate scale and sense of importance.

- The stair rail in the administration building still reflects the original design with heavy vertical divisions. However, the railings at the balconies (Figure-33) through out the barracks no longer demonstrate the original horizontal lines and emphasis.

- Typically, all exterior doors have been replaced with new metal doors. Additionally door transoms have been covered or filled-in. These changes impact the overall original character of the buildings.

- Although a few light fixtures were noted possibly original (Figure-34) during this survey, most other exterior fixtures on the side facades are new. Fixtures on the walls of the galleries have been widely replaced.

- Visible on the exterior of many buildings are the addition of electrical conduits and boxes, and mechanical and communications equipment.

- The original exterior facing square style downspouts in Quad D have been removed.

- Visible on the exterior of the barracks buildings 451 and 452 are additions of mechanical structures in the center portions and sides of the buildings.

- Numerous structures have been added to building 450 on the courtyard elevation to house mechanical needs for kitchen facilities and other uses, as well as new covered walkway structures.

- The street-facing arcade or gallery walkway on the ground floor of building 450, have been mostly or partially enclosed with walls or windows to accommodate the conversion to administrative office uses. These modifications reflect a wide range of variation in the use of style, materials, consistency, and aesthetics.

3. **Detracting Features:** Discussion of recommendations below includes only those components of the buildings that have resulted from the past major renovations, and that are detracting from the original integrity of the historical elements.

- New casement or double-hung aluminum windows that no longer carry the same flavor of the original divided mullion style of the era should be replaced with windows that better closely match the original flavor and character.

- The blocking of fenestration in the windows that has altered the architectural proportions of original design intent and the flavor of the period should be replaced as much as possible.

- Unadorned eave line, absent of cornice/bracket detail, detracts from the original scale and weight of the original roof line and should be restored back to replicate the original details.

- The undecorated balustrade/rail details change the original scale and weight and detracts from the sense of importance of the Portico. New railings should be installed to match the original.

- New modern doors represent a new visual style. Also, glazing at door transoms that have been covered or in-filled, changing the overall proportions, should be replaced with new doors that better match the original style and flavor.

- Visible electrical, mechanical, communication equipment and conduits, boxes and pipes on the exterior walls should be consolidated as much as possible and hidden from view.

- Metal railings at arcades should be restored back to the horizontal scale and original design intent.

- Additions such as covered walkways should better match the original style and materials.

- Poorly maintained building elements and premises, peeling paint, spalling concrete, chipped or exposed concrete should be noted and repaired. Building element corners and edges have been chipped, exposing the concrete to the damaging environment The building elements should be cleaned, repainted or sealed. Chipped or broken areas should be repaired, and the sprinklers should be adjusted so that the building does not get wet.

DESCRIPTION OF INTERIOR

1. Original Character Defining Features:

Plan: The interior of the administration building was originally partitioned to accommodate functions such as kitchens, dining areas, a post exchange, and a prison with four cells on the ground floor. Offices, a barber shop, a printing shop, a court martial room, medical examining rooms, dispensary, and dormitories on the second floor. Reading, music rooms, day and school rooms, additional dormitories, and a large auditorium was held on the third floor. The floors were connected through open stairs and covered arcades. The large volume central section of the third floor plan housed the auditorium originally with a stage. The dormitories contained large open space plan with adjacent supporting areas of lavatory/shower rooms.

The barracks (Figure-17) represented the more private functions of the infantry. The plan of the barracks was partitioned to serve primarily as sleeping quarters of the brigade. Each barracks contained: squad rooms, typically an open space plan measuring approximately fifty feet by ninety feet, four each on second and third floors; two common lavatory/shower rooms each on second and third floors; day rooms, kitchens, and mess halls filled the first floor. The two projections on the courtyard side housed the kitchen and the lavatory/shower sections.

Interior Architectural Elements:

- Classical elements (Figure-18): The high volume space in the interior of the auditorium is decorated with large window openings to one side and walls that are adorned with arched niches duplicating the pattern of the arched windows, originally, shown in the drawings topped with a center piece at the high point of the arch. The door fenestrations on the opposite interior wall of the arcade gallery duplicates the same uniform and repetitive pattern of window openings and niches. Other classical elements of the interior include: horizontal base division, and decorative wainscot molding decorated with arched carving at interval divisions in white to contrast from the buff color interior wall finish. The heavy line of the wainscot molding breaks the high volume proportions. The auditoriums were originally designed with a stage flanked with columns and an orchestra pit.

- Ceiling (Figure-18): The walls terminate with a crown molding and a metal ceiling. The large wooden structural truss system is concealed from the eye above the metal ceiling.

- Floor: The auditorium was finished with wood flooring.

- Building 450, the original glazed blocks (Figure-36) used throughout the interior of the kitchen still remains.

2. Alterations To Original:

Generally, the interior space plan of all quad structures have been altered during various past renovation projects. Typically, new partitioned walls have been placed to accommodate the administrative functions as well as those of the barracks. Ceilings through out the interiors have been dropped to accommodate installation of modern conveniences such as air-conditioning both in the administration building as well as in the barracks. The Quad D auditorium (Figure-35) has been converted to gymnasium usage. Another major modification to the auditorium is in the open exposed ceiling. The new light structural truss system changes the original proportions of the interior volume. The truss has been left exposed and the ceiling height has been raised to slightly below the metal decking. The light fixtures are new and the character of the original fixtures is unknown.

3. Detracting Features:

The general interior modifications to the plan layout throughout the buildings, as well as those resulting in lowered ceiling heights are significant to the overall building character. The lowered ceiling heights have resulted in loss of original scale and

proportion. The interior ceilings should be soffited around the door and window openings so that the full height of the original opening can be used, and windows and doors matching the original style, and, if possible, material should be installed.

The converted auditorium has lost numerous significant details, namely, the height proportions, horizontal partitioning of walls, details such as crown moldings and carvings.

D. SUMMARY OF CHARACTER DEFINING FEATURES

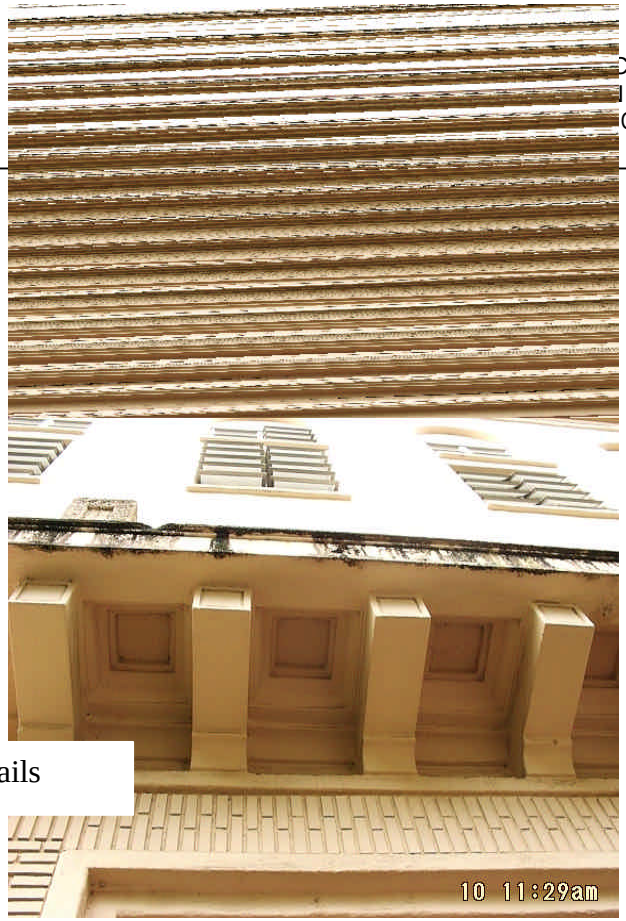
Bldg. No	**Character Defining Features Remaining**	**Detracting Features – To Remove**	**Character Defining Features – To Restore**
Quad D 449 Administration 450, 451 & 452 Barracks	EXTERIOR Plan: • Quadrangular relationship • Rectilinear plan layout at center of Admin. Bldg. Mass/Scale: • Three-story height • Linear and horizontal scale • High volume center section at third floor of Admin. Architectural Features: • Stucco finish/painted • Horizontal base course emphasis • Slightly sloped roof with horizontal eave, overhang • Diamond motif in frieze pattern	EXTERIOR Architectural Features: • Loss of eave/cornice detail • Wood windows changed to a different visual style • Top of windows in-filled and painted with either the wall color or the dark window frames • Doors changed to a modern visual style, and transoms covered/in-filled • Doorways in-filled or converted to window openings • Vertical pattern at railings not reflecting orig. horizontal lines • Visible exterior pipes, conduits and boxes not hidden from view • New light fixtures	EXTERIOR Architectural Features: • Restore cornice and bracket detail to eave lines • Restore original balustrade/rail detail at front Portico to bring back sense of scale and importance • Restore overall size and scale of window openings • Install window types to better closely match original flavor and character with heavy divisions and multi-divisional mullions • Install doors to closely match historic-style at exteriors • Conceal and consolidate electrical conduits as much as possible within building or in a

	• Window/doors rhythm & uniformity • Heavy concrete sill at windows and doors • Gallery arcade openings rhythm & uniformity • Central main entrance at Admin. Rectangular brick opening, adornments, open passage way to courtyard; light fixtures on each side • Faux balcony/balustrade detail • Exterior concrete stairways with concrete railings at Admin. <u>INTERIOR</u> Plan: • Plan layout Interior Architectural Features: • Classical elements at Admin.: arched wall niches, wainscot moldings and decorative carvings; horizontal base line • Ceiling crown molding & proportions • Original glazed blocks used in the interior of kitchen (#450)	• Mechanical free standing structure additions to barracks • Covered walkway additions • Inconsistent modifications to exterior street face of barracks ground floor, Bldg. 450 <u>INTERIOR</u> Plan: • Altered interior floor plans Interior Architectural Features: • Dropped ceilings impacting the proportion of the interior space as well as impacting the size of original openings • Raised ceiling at Admin. Auditorium/gymnasium changing original scale and height proportions	covered exterior area • Replace railing design to reflect original horizontal emphasis • Additions to building facades to match in style and materials <u>INTERIOR</u> Interior Architectural Features: • Soffit ceilings at doors and windows to restore the scale and proportion of openings • Restore back original height proportions & details of auditorium/gymnasium in Admin. • Replace gymnasium lights with ones to fit better the historical setting <u>LANDSCAPE</u> • Remove vegetation growing within three feet of building, ensure sprinklers do not spray water on building • Clear building premises of debris

Historical Photograph of Quads D and E:
27th and 21st Infantry Barracks and Officer's housing, February 21, 1923.

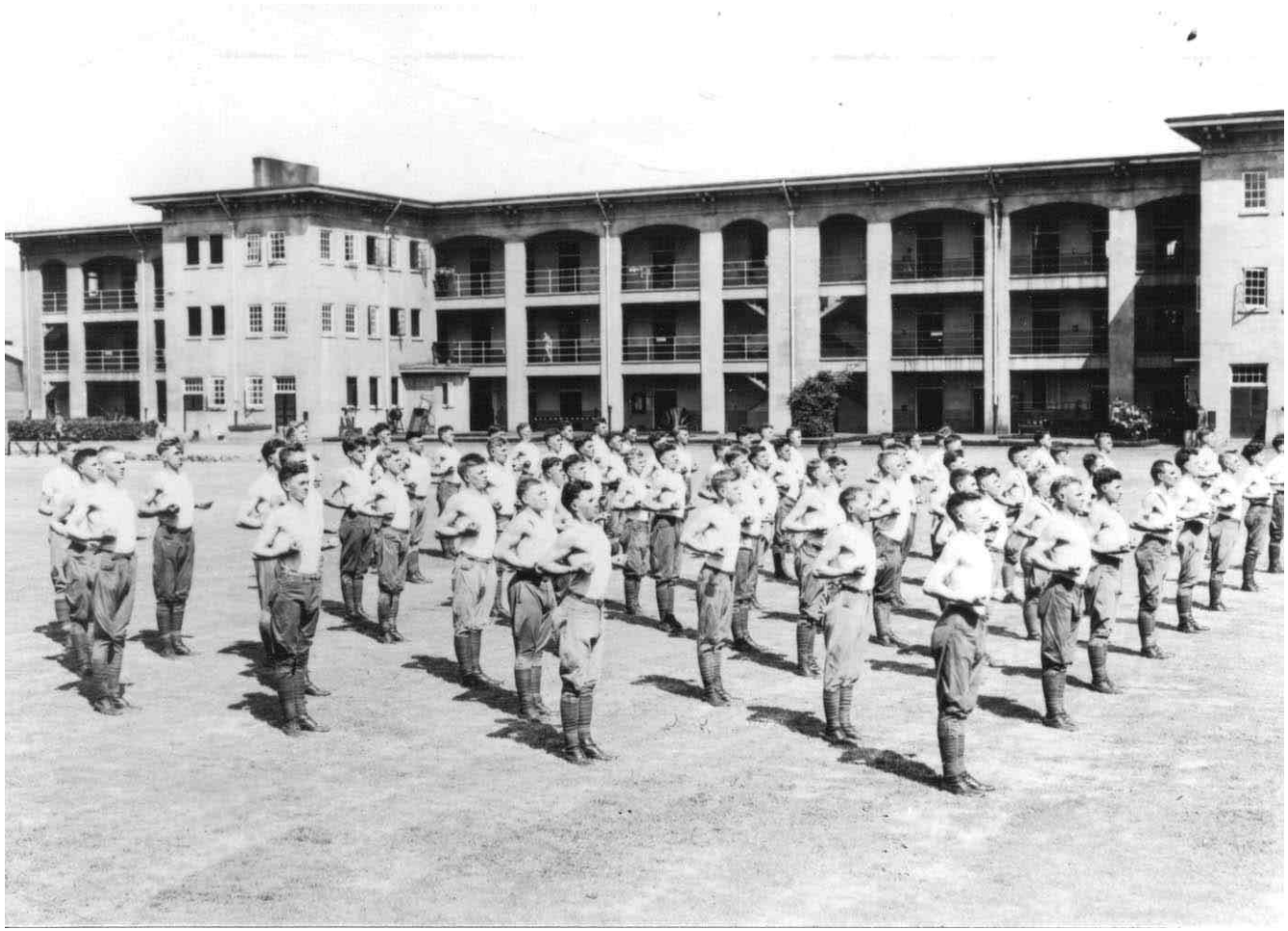
Historic Photograph - Portico of Quad D, Building 449 for the 27th Infantry

FIGURE 30



Portico of Quad D: Façade details

FIGURE 31



Historical Photograph of Quad D:
Arcade galleries at courtyard

FIGURE 32

Quad D: Street façade details

Quad D: Arcade galleries

Exterior light fixtures: possibly original (left), modern (right)

FIGURE 35

Auditorium/gymnasium details at Quad D

FIGURE 36

Original glazed CMU in kitchen at Quad D

QUAD E – BUILDINGS 549, 550, 551, & 552

A. BUILDINGS SIGNIFICANCE

Quad E is significant as a substantial element in the original base layout, and is within the Schofield Barracks Historic District which is listed on the National Register of Historic Places. The historic district contains the central core of significant properties that exhibit Army's development patterns and establish the character of Schofield Barracks Military Reservation. These barracks historically provided the centralized housing, dining, and administrative space for troops.

Quad E, buildings 549, 550, 551 and 552 were constructed in 1920 as barracks for the 21th Infantry. Quad E is shown alongside Quad D in a photograph of the Schofield Barracks dated February 21, 1923 (Figure-28). Building 549 was designed as the Administration Building for Quad E and housed the functions for the headquarters of the Buildings 550, 551, & 552 were designed as barracks and served primarily as sleeping quarters for the brigade.

B. PHYSICAL HISTORY

Date (s) of erection: Constructed in 1920. Contractor/builder unknown.

Architect: Drawings prepared under direction of Office of Constructing Quartermaster, Honolulu, Hawaii.

Original plans and construction: The original drawings for Quads B, C, D, & E, Administration and Barracks are dated 1917. The total sheet number of original set of documents is unknown. What remains of the original set is filed at the Department of Public Works, at Wheeler Army Airfield (Appendix A).

Original and subsequent owners: U. S. Army.

Applicable Land Use Plans and Policies: Quads are situated on Federal land whereby State and City land use designations are not enforceable. Nevertheless, the following land uses are designated: State land use is Urban; City and County of Honolulu zoning is Military and Federal; and the Development Plan is Medium Density Apartments. The Quads do not lie within the City's Special Management Area.

Alterations and Additions: The demand for better and private facilities led to the modernization of the interiors of all of the quadrangle barracks buildings in the 1970's. Various alterations and renovations projects have since taken place. Currently some sections of Quad D are undergoing renovation.

C. ARCHITECTURAL HISTORY

ARCHITECTURAL CHARACTER

The architectural composition of Quad E is the same distinctive quadrangle layout of four buildings: one administration and three barracks surrounding an open courtyard. Quad E, similar to B, C, and D is designed in a modest Second Renaissance Revival Style. Architectural differences in functional layout and architectural massing is reflected in the two building types: the administration building, and the barracks.

The overall architectural character of Quad E closely resembles that of Quad D description, built with very similar original distinguishing classical elements. The extent of variation is relatively small, if any, primarily resulting from the various modifications that have occurred in the past. The classical elements include: arcades or galleries with a combination of rectangular and arched openings; arched window openings dominating the central façade of the administration building; and the entablature decorated with a frieze pattern centered with a diamond motif. The three-story mass of Quad E buildings, have a strong linear horizontal emphasis evident through the use of fairly distinct base course, rhythmic banding effect of window fenestrations, and use of arcades and uniform openings. Also contributing to the horizontal effect is the eave line above the frieze terminating with a slightly sloped roof for Hawaii's rains. The strong architectural element of the quad administration building is the decorative portico or the main entry feature, typically laid in brick pattern with a rectangular opening. The use of a double arcade is an architectural feature of Quad E, which is also found in Quads D and F barracks buildings. The regularity of the arcade openings gives the street facades of barracks a strong horizontal sense of movement. On the other hand the courtyard elevations of barracks are more informal in nature, and the galleries are broken up with small projections into the courtyard. Despite the solidity of barrack structures, the buildings were designed with natural ventilation to take advantage of the Hawaiian trade winds. Original use of high ceilings and deep porches kept the rooms cool year round.

Condition: Although generally the structures still retain their appearance of overall mass, plan and some of their original interior details, some significant architectural features have been altered which affect the original integrity of their historic intent and

significance. The following detailed description of the Quad E buildings elaborates on these differences. The overall condition of Quad D buildings is fair. Structurally Quads appear in reasonable condition, however it is apparent that these structures have suffered aging problems, exposure to environment, and poor maintenance. To name a few, points of observation during this survey were: peeling paint, spalling concrete leaving reinforcing steel exposed (Figure-16 & 26), chipped and damaged building parts, broken glass, mold and dirt around the premises.

DESCRIPTION OF EXTERIOR

1. Original Character Defining Features:

Plan: Each quad is a quadrangular composition, with the three barracks buildings situated around an open courtyard and anchored by the administration building, generally, in the northern direction. The plan layout of the administration building is rectilinear with a directional and functional emphasis at center, utilizing the main entry as the central gateway to the barracks courtyard. The plan layout of the barracks is rectilinear with a horizontal emphasis.

Massing: Generally the quad buildings are three-story structures, very linear with a horizontal emphasis defined by the use of horizontal base course, uniform window fenestrations and arcade openings. The horizontal scale is further achieved with the delineation of the eave line with a decorative band at the frieze, enriched cornices with decorative brackets, dentils and a slightly sloped tar and gravel roof. The central portion of the architectural mass in the administration building is emphasized with a large volume space, which is also reflected in tall window openings on the facade. The administration building has a height of approximately 53 feet at its center point and an overall length of 365 feet, while the barracks are about 38 feet high and approximately 320 feet long. The linear shape of the barracks buildings is broken up with small projections into the courtyard.

Exterior Architectural Elements: Various distinct features of the architectural façade are the following:

- Façade (Figure-9): Walls are stucco finished with a distinct horizontal base course. Façade terminates with a simplified adornment on the entablature reflected by a frieze decoration. The frieze decoration is a rectilinear design with a diamond pattern at the center of each panel that is repeated around the perimeter of the building envelope. The horizontal lines are further delineated at the very top with an eave, originally, much more elaborate with a cornice and bracket detail. These features are significant in that they represent the architectural character of the style.

- Windows/Doors (Figure-10): Windows on all elevations are uniformly aligned of similar character, originally, multi-

mullions or divided-light in wood casement type or double-hung. The uniformity and scale of these openings give the overall mass character. The original use of heavy concrete sill lines give the windows additional horizontal emphasis, and the regularity of the window openings with heavy wood dividers give it the proportion and scale. The intricacy of construction style contributes to the overall flavor and character of the architectural style. All original exterior doors reflect similar multi-mullion or divided-light construction and therefore, possess similar importance in maintaining the overall integrity.

- Portico or main entrance (Figure-11 & 37): A central feature of the administration building is the decorative portico. Typical of most quads, two vertical pier columns connected with a horizontal header beam span a rectangular opening. The entry detail is laid with decorative brick pattern with raised concrete border on each side. The opening is further articulated with recessed indentations or lines. Infantry insignias were sometimes placed at the center of this header piece. A low concrete cheekwall extends from each side of the entry at the ground level. Historic light fixture bases still remain on each side of the entry within the brick pattern course. The entry feature significantly contributes to the overall integrity of the original plan and mass.

- Balcony/Balustrade (Figure-11 & 37): A decorative faux balcony projecting from the vertical plane forms a horizontal overhang for the opening. At the base of this a uniform pattern of dentils or stone brackets further delineate the opening. The concrete posts of the balustrade are heavy at ends and in the middle and drawings indicate a metal railing detail in between the divisions. Although old photographs reveal absence of metal railing in some of the buildings, some form of decoration on top of the portico, such as a cast insignia, contributed to its sense of scale and importance. This element as a historic feature is significant.

- Arcade galleries or walkways (Figure-12): The double gallery formation, one on the exterior street face and one on the interior courtyard face, is a feature of Quads D, E, and F. The galleries have rectangular shaped openings at the first and second floors and arched openings at the third floor (except for Quad F where the openings are all rectangular). The rhythm created through regularity of the openings give the buildings the horizontal scale and plays a significant importance in the design of the facade.

- Stairs and arcade railings (Figure-12): The open stairways and walkway railings were originally designed with a horizontal emphasis and are a visible part of the walkway. Quad E railings no longer carry the same railing detail. These serve as functional features of the plan and are of significance to the building's character.

4. Alterations To Original Features:

Generally all Quad structures still retain the historical integrity of the original overall plan, architectural massing and scale, and other architectural elements as described above. Discussion below includes only those components of the building that have been since modified or drastically altered during the past major renovations.

- Typically all original wood windows have been replaced with new casement, double-hung aluminum, or louvered windows that no longer carry the divided mullion style of the era. This alteration is the most intrusive, or character-changing of the alterations that have been done to the Quads.

- For the most part, the majority of the original building fenestrations have been retained (Figure-38), however, needed modifications have been made that have called for blocking whole windows reflected in plaster including the stylistic arches of the windows or partial blocking reflected in painted surfaces that matches the window frames (also refer to the interior alterations section). Although the overall uniformity that still remains helps maintain the sense of scale and original design intent, the changes alter the original architectural proportions and the flavor of the period.

- The original wooden structural trusses have been replaced with light-gauge metal trusses and corrugated metal roofing (also refer to the interior alterations section). The original eaves with decorative detail have been reduced to a flat horizontal projection with none of the original cornice or bracket detailing (Figure-38). The current eave line no longer delineates the weighted horizontal line of the cornice/bracket detail and affects the integrity of style. At Building 550, the roofline abruptly terminates right above the decorated frieze band and detracts from the original horizontal emphasis (Figure-39).

- The balustrade and rail detail (Figure-37) above the portico is left unadorned and is missing the metal railing and other vertical divisions that gave it the appropriate scale and sense of importance.

- The stair rail in the administration building still reflects the original design with heavy vertical divisions. However, the railings at the balconies through out the barracks no longer demonstrate the original horizontal lines and emphasis.

- Typically all exterior doors have been replaced with new metal doors. Additionally door transoms have been covered or filled-in. These changes impact the overall original character of the buildings.

- Although a few light fixtures were noted possibly original during this survey (Figure-40), most other exterior fixtures on the side facades are new. Fixtures on the walls of the galleries have been widely replaced.

- Visible on the exterior of many buildings are the addition of electrical conduits and boxes and mechanical and communications equipment (Figure-42).

- The original exterior facing square style downspouts in Quad E have been removed. The downspouts on the street-facing facade of Building 550 could possibly be the original (Figure-39).

- Utility structures have been attached or added within close proximity of the barracks. Other structures have been attached on the interior wall of the arcades (second floor of building 549 and similar attachments on the first floors of Buildings 550 and 552). The street-facing arcades on the ground floor have been mostly or partially enclosed using a wide range of variation in the style, materials, consistency, and aesthetics (Figure-41).

2. **Detracting Features:** Discussion of recommendations below includes only those components of the buildings that have resulted from the past major renovations, and that are detracting from the original integrity of the historical elements.

- New casement or double-hung aluminum windows that no longer carry the same flavor of the original divided mullion style of the era should be replaced with windows that better closely match the original flavor and character.

- The blocking of fenestration in the windows that has altered the architectural proportions of original design intent, and the flavor of the period should be replaced as much as possible.

- Unadorned eave line, absent of cornice/bracket detail, detracts from the original scale and weight of the original roof line and should be restored back to replicate the original details. Building 550 roof line should be added to match the other buildings in the quad (Figure-39).

- The undecorated balustrade/rail details change the original scale and weight and detracts from the sense of importance of the Portico. New railings should be installed to match the original.

- New modern doors represent a new visual style. Also, glazing at door transoms that have been covered or in-filled, changing the overall proportions, should be replaced with new doors that better match the original style and flavor.
- Visible electrical, mechanical, communication equipment and conduits, boxes and pipes on the exterior walls should be consolidated as much as possible and hidden from view.

- Metal railings at arcades should be restored back to the horizontal scale and original design intent.
- Additions such as covered walkways should better match the original style and materials (Figure-41).
- Poorly maintained building elements and premises, peeling paint, spalling concrete, chipped or exposed concrete should be noted and repaired. Building element corners and edges have been chipped, exposing the concrete to the damaging environment. The building elements should be cleaned, repainted or sealed. Chipped or broken areas should be repaired and the sprinklers should be adjusted so that the building does not get wet.
- Various attached structures to the interior walls of the arcades are inconsistent with original forms and intention of the walkway design.

DESCRIPTION OF INTERIOR

1. Original Character Defining Features:

The interior of the administration building was originally partitioned to accommodate functions such as kitchens, dining areas, a post exchange, and a prison with four cells on the ground floor. Offices, a barber shop, a printing shop, a court martial room, medical examining rooms, dispensary, and dormitories on the second floor. Reading, music rooms, day and school rooms, additional dormitories, and a large auditorium was held on the third floor. The floors were connected through open stairs and covered arcades. The large volume central section of the third floor plan housed the auditorium originally with a stage. The dormitories contained large open space plan with adjacent supporting areas of lavatory/shower rooms.

The barracks (Figure-17) represented the more private functions of the infantry. The plan of the barracks was partitioned to serve primarily as sleeping quarters of the brigade. Each barracks contained: squad rooms, typically an open space plan measuring approximately fifty feet by ninety feet, four each on second and third floors; two common lavatory/shower rooms each on second and third floors; day rooms, kitchens, and mess halls filled the first floor. The two projections on the courtyard side housed the kitchen and the lavatory/shower sections.

Interior Architectural Elements:

- Classical elements (Figure-18): The high volume space in the interior of the auditorium is decorated with large window openings to one side and walls that are adorned with arched niches duplicating the pattern of the arched windows, originally, shown in the drawings topped with a center piece at the high point of the arch. The door fenestrations on the opposite interior wall of the arcade gallery duplicate the same uniform and repetitive pattern of window openings and niches. Other classical elements of the interior include: horizontal base division, and decorative wainscot molding decorated with arched carving at interval divisions in white to contrast from the buff color interior wall finish. The heavy line of the wainscot molding breaks the high volume proportions. The auditoriums were originally designed with a stage flanked with columns and an orchestra pit.

- Ceiling (Figure-18): The walls terminate with a crown molding and a metal ceiling. The large wooden structural truss system is concealed from the eye above the metal ceiling.

- Floor: The auditorium was finished with wood flooring.

2. Alterations To Original:

Generally the interior space plan of all quad structures have been altered during various past renovation projects (Figure-43). Typically, new partitioned walls have been placed to accommodate the administrative functions as well as those of the barracks. Ceilings through out the interiors have been dropped to accommodate installation of modern conveniences such as air-conditioning both in the administration building as well as in the barracks. The Quad E auditorium, similar to Quads B, C, and D have been converted to gymnasium usage (Figure-44). Another major modification to the auditorium is in the open exposed ceiling. The new light structural truss system (installed in 1967) changes the original proportions of the interior volume. In Quad E, the arched niches have been painted with symbols, the wainscot molding is painted in dark contrasting color and the windows and doors are framed in dark color. The light fixtures are new and the character of the original fixtures is unknown.

3. Detracting Features:

The general interior modifications to the plan layout throughout the buildings, as well as those resulting in lowered ceiling heights are significant to the overall building character. The lowered ceiling heights have resulted in loss of original scale and proportion. The lowered ceiling heights have resulted in loss of original scale and proportion. The interior ceilings should be soffited around the door and window openings so that the full height of the original opening can be used, and windows and doors matching the original style, and, if possible, material should be installed.

The converted auditorium has lost numerous significant details, namely, the height proportions, horizontal partitioning of walls, details such as crown moldings and carvings.

D. SUMMARY OF CHARACTER DEFINING FEATURES

Bldg. No	Character Defining Features Remaining	Detracting Features – To Remove	Character Defining Features – To Restore

Quad E 549 Administration 550, 551 & 552 Barracks	EXTERIOR Plan: • Quadrangular relationship • Rectilinear plan layout at center of Admin. Bldg. Mass/Scale: • Three-story height • Linear and horizontal scale • High volume center section at third floor of Admin. Architectural Features: • Stucco finish/painted • Horizontal base course emphasis • Slightly sloped roof with horizontal eave, overhang • Diamond motif in frieze pattern • Window/doors rhythm & uniformity • Heavy concrete sill at windows and doors • Gallery arcade openings rhythm & uniformity • Central main entrance at Admin. Rectangular brick opening, adornments, open passage way to courtyard • Faux balcony/balustrade detail • Exterior concrete stairways with concrete railings at Admin.	EXTERIOR Architectural Features: • Loss of eave/cornice detail • Wood windows changed to a different visual style • Top of windows in-filled and painted with either the wall color or the dark window frames • Doors changed to a different visual style, and transoms covered/in-filled • Vertical pattern at railings not reflecting orig. horizontal lines • Visible exterior pipes, conduits and boxes • New light fixtures • Free standing or attached structure additions to barracks, inconsistent with original design • Covered walkway additions • Inconsistent modifications to exterior street face of barracks ground floor, especially, Bldg. 550 INTERIOR Plan: • Altered interior floor plans • Interior Architectural Features: • Dropped ceilings impacting the proportion of the interior	EXTERIOR Architectural Features: • Restore cornice and bracket detail to eave lines • Restore the roof line/eave line to building top in Bldg. 550 • Restore original balustrade/rail at front Portico to bring back the sense of importance and scale • Restore the overall size and scale of window openings • Install window types to better closely match the original flavor and character with heavy divisions and multi-divisional mullions • Install doors to closely match the historic-style at exteriors • Conceal and consolidate electrical conduits as much as possible within building or in a covered exterior area • Replace railing design at arcades to reflect the original horizontal emphasis • Additions to building facades should match in style and materials INTERIOR Interior Architectural Features: • Soffit ceilings at doors and windows in order to restore the

Historical Photograph on top:
Portico of Quad, Building 549 for the 21st Infantry

FIGURE 38

Changes to building fenestrations

Building 550: roof detail
& possibly original square downspouts

FIGURE 40

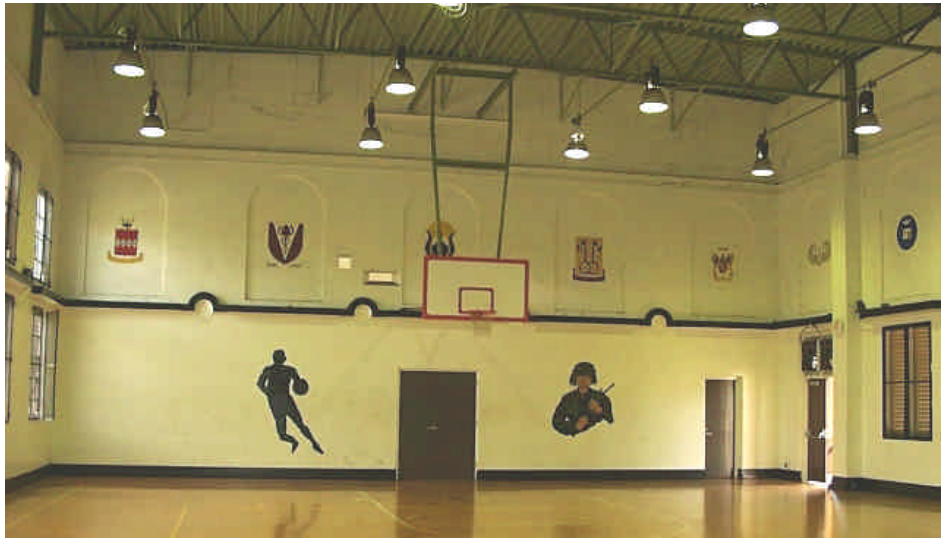
Possibly original exterior light fixture

FIGURE 41

Additions to original structures

Visible pipes on the exterior

Interior partitioning and modifications to ceiling



Auditorium/gymnasium at Quad E

SECTION IV: QUAD F – BUILDINGS 649, 650, 651, & 652

QUAD F – BUILDINGS **649**, 650, 651, & 652

A. LOCATION

Quad F is located on the Main Post of the Schofield Barracks Historic District. Quad F is the last of the five quads (Figure-45) forming a linear design along a central line in the district and it is located approximately in the northeast portion of Schofield Barracks between Waianae and Foote Avenues. Building 649 is the Administration Building for Quad F and is situated on Waianae Avenue providing an anchoring edge between the housing areas and the quad facilities.

B. HISTORICAL CONTEXT

QUADS AT SCHOFIELD BARRACKS

The plans for the permanent post were first prepared in 1912 by General Mcomb. The plan reflected seven contiguous sections, each one shaped in a rectangle headed by a loop (Section III-Figure-4). The rectangles, or the quads were to contain four large masonry buildings in quadrangular formation while the officers' quarters lined the loop. Two buildings in Quad B were the first permanent structures built in 1914. The remainder of the Quad buildings were built in accordance with the Army Quartermaster's layout of 1916 (Section III-Figure-5).

Today the quadrangle barracks are prominent and central features in the overall physical layout of Schofield Barracks. Visually, these quad barracks dominate the base and form a linear spine for the Historic District along Waianae Avenue. Between years 1914 and 1948, a total of eight quads were built at Schofield. The five Quads, B, C, D, E, and F that were built between 1914 and 1931 for the infantry regiments and engineers form a central spine in the northeastern quadrant of the base (Section III-Figure-6). Three other quad additions, I, J, and K constructed for artillery regiments are dated between 1919 and 1948 and are situated perpendicular to this central line in northwestern quadrant of the site.

The linear progression of Quads B, C, D, E, and F form a central core for the Schofield Barracks Historic District. Each Quad was built to house an entire regiment. The infantry quads each typically comprised of four buildings: three barracks and an

administration building in a quadrangle layout around a central courtyard. Quads I through K, located in the northwest part of the base, were originally built with only three buildings, each containing an administration building and two barracks buildings.

In a 1908 newspaper article, quartermaster Captain Castner reports that the quads were to be built using the tilt-up construction method, where, the framework for the walls was laid out on the ground, the concrete poured, and when the concrete was set the walls was tilted up to a standing position and locked in with the other walls (Pacific Commercial Advertiser, 12-5-08). It is unknown if this method was indeed used, but if so, this would be a very early use of this construction method, contributing to the significance of the structures.

The quads were self-contained structures, built according to standard Army design, in a style expressive of the post industrial and social revolution thinking. Quads B, C, D, E, I, & J constructed between 1914 and 1923 were stylized in very modest Second Renaissance Revival Architectural "Classical" elements were interpreted and simplified to represent and emphasize the function. The architectural elements that are articulated in these buildings and are representative of this period are: decorative porticos, arcades or galleries, arched openings, entablatures decorated with geometric frieze patterns topped with cornice details. The industrial and social revolution can be characterized as a period of search for new findings to replace the traditional symbolic forms. The result, utilitarian structures replaced highly elaborate "Classical" buildings and the multiplicity of new building types brought about a new approach of experimentation with forms taken from different styles. Selecting from the styles of the past to suit the function or the building type became an acceptable approach to building design. Between the two world wars, the Renaissance Revival gave way to uniform and simplified shapes lacking articulation of detail and a greater stress for functionalism, namely, the "International Style".

Quad buildings generally had three stories laid out in very linear horizontal fashion. Architecturally, the building mass of quad buildings were defined by means of articulation of the horizontal plane in distinct divisions, belt or string courses. Juxtaposition of the horizontal and vertical planes were emphasized in the center of the administration building. Window fenestration in bands or the rhythmic openings along the arcades further reemphasized the horizontal nature of this style. The later Quads differ stylistically, but follow the same general functional layout. All quad floor plans were laid out according to the same overall design as reflected in the original 1917 construction documents prepared by Constructing Quartermaster (Appendix A). The original building construction documents for Quad F, dating back to 1930 reflect slight variation in the degree of detail (Appendix B). Quad F was designed in a more simple utilitarian style with a relatively flat roof and less ornate entablature and cornice detail. This departure reflects a closer tie to the "International Style".

The demand for better and more private facilities led to modernization projects of the quadrangle barracks buildings in the 1970s. Typically on the exterior, the original wood divided-light casement and double-hung windows have been converted to new

aluminum windows. Other major interior alterations have included re-partitioning of space to accommodate the modern usage and addition of air-conditioning. Currently Quads B, C, D, E, and E are occupied, and Quad F is to most extent vacant.

Location Map: Schofield Barracks – Quad F

BUILDING SIGNIFICANCE

Quad F is significant as a substantial element in the original base layout, and is within the Schofield Barracks Historic District which is listed on the National Register of Historic Places. The historic district contains the central core of significant properties that exhibit Army's development patterns and establish the character of Schofield Barracks Military Reservation.

Quad F was constructed in 1931 as the 19th Infantry barracks. These barracks historically provided the centralized housing, dining, and administrative space for troops stationed at Schofield Barracks Military Reservation. Building 649 is the Administration Building for Quad F, as such it housed the functions for the headquarters of the brigade.

C. PHYSICAL HISTORY

Date (s) of erection: Constructed in 1931. Contractor/builder unknown.

Architect: Drawings prepared under direction of G.W. Armitage, Captain Q. M. C., purchasing and contracting officer for the Office of The Department Quartermaster, Fort Shafter, Hawaii.

Original plans and construction: The original drawings for Quad F, Administration Building are dated back to April 12, 1930. Of the original set of documents, twenty-two sheets are still remaining and are filed at the Department of Public Works, at Wheeler Army Airfield (Appendix B).

Original and subsequent owners: U. S. Army.

Applicable Land Use Plans and Policies: Quads are situated on Federal land whereby State and City land use designations are not enforceable. Nevertheless, the following land uses are designated: State land use is Urban; City and County of Honolulu zoning is Military and Federal; and the Development Plan is Medium Density Apartments. The Quads do not lie within the City's Special Management Area.

Alterations and Additions: The demand for better and private facilities led to the modernization of the interiors of all of the quadrangle barracks buildings in the 1970's. Various alterations and renovations projects have since taken place. Currently the Administration Building of Quad F is mostly unoccupied and is awaiting major renovations for an adaptive usage plan.

D. ARCHITECTURAL HISTORY

ARCHITECTURAL CHARACTER

The architectural composition of Quad F is the distinctive quadrangle layout of four buildings: one administration and three barracks sited to enclose the four sides of the central courtyard. Architectural differences in functional layout and architectural massing are reflected in the two building types: the administration building, and the barracks (Buildings: 650, 651 & 652).

The architecture style of Quad F buildings reflect a more simplified era and were designed and built with less adornment as compared with the original design of Quads B, C, D, E, I & J which were designed in a very modest Second Renaissance Revival Style. Despite of subtle stylistic architectural difference, Quad F buildings follow similar functional layout and architectural massing.

Classical elements in Quad F include arcades or walkways with rectangular openings instead of arches; rectangular shape windows instead of arched window in the central façade; entablature decorated with a more simplified frieze pattern or totally absent and topped with a simple cornice detail. Buildings are typically a three-story mass with a strong linear horizontal emphasis evident through use of fairly distinct horizontal courses, rhythmic banding effect of window fenestration, or use of arcades and uniform openings. Building eaves are rather short terminating with a cornice detail and a tar and gravel roof sloped slightly for Hawaii's rains.

A strong architectural element of the administration, Building 649, is the decorative portico or the main entry feature unique with an arch opening and decorative stone surround leading to the passage to the central courtyard. Above the entry is a faux-balcony with decorative brackets.

Condition: Although generally the structures still retain their appearance of overall mass, plan and some of their original interior details, some significant architectural features have been altered which affect the original integrity of their historic intent and significance. The overall condition of Quad F buildings is fair. Structurally Quads appear in reasonable condition, however it is apparent that these structures have suffered aging problems, exposure to environment, and poor maintenance. To name a few, points of observation during this survey were: peeling paint, spalling concrete leaving reinforcing steel exposed, chipped and damaged building parts, broken glass, mold and dirt around the premises. Currently it stands mostly unoccupied.

The following detailed description of the Quad F, administration building elaborates on these differences.

DESCRIPTION OF EXTERIOR

1. Original Character Defining Features:

Plan: Each quad is a quadrangular composition, with the three barracks buildings situated around an open courtyard and anchored by the administration building, generally, in the northern direction. The plan layout of the administration building is rectilinear with a directional and functional emphasis at center, utilizing the main entry as the central gateway to the barracks courtyard.

Massing: Generally the Quad buildings are three-story structures, very linear with a horizontal emphasis defined by the use of horizontal string courses, uniform window fenestrations and arcade openings. The horizontal scale is further achieved with the delineation of the eave line with a frieze band and a relatively flat tar and gravel roof. The central portion of the architectural mass in the administration building is emphasized with a large volume space, which is also reflected in tall window openings on the facade. The administration building has a height of approximately 53 feet at its center point and an overall length of 365 feet.

Exterior Architectural Elements: Various distinct features of the architectural façade in the administration building are the following:

- Façade (Figure-47): Walls are stucco, and finished with a distinct horizontal base course. Façade terminates with a simplified adornment on the entablature reflected by a frieze decoration and cornice detail. The frieze decoration is reduced to a simple linear design and the cornice is less pronounced. The frieze adornment is carried out only on three street facing elevations of the administration building and is not repeated on the courtyard elevation, nor on the other buildings in this Quad. This appears to have been an original design intention as verified with original drawings (See Quad F-Appendix). Although the Quad F classical details have been simplified to a more utilitarian design, nevertheless, the façade features and elements together are still of significance to the original architectural style of quad buildings.

- Windows/Doors (Figure-47): Windows on all elevations are uniformly aligned of similar character, originally, multi-mullions or divided-light in wood casement type or double-hung. The uniformity and scale of these openings give the overall mass character. The regularity of the window openings with heavy vertical divisions give it the proportion and scale. The intricacy of construction style contributes to the overall flavor and character of the architectural style of the era. All original exterior doors reflect similar multi-mullion or divided-light construction and therefore, posses similar importance in maintaining the overall integrity.

- Portico or main entrance (Figures-45, 48 & 49): The entry opening is flanked on each side with piers that are built in brick and surfaced in cast stone. (Original drawings indicate cast stone or Hawaiian limestone and it is not known what was actually used). The design is angular with the stone piers terminating in a pointed cap. The opening is an arch with recessed indentations. Top of the arch is decorated with a uniform pattern of dentils also in stone. The Infantry insignia was placed at the center of this arch. Although the original use of the insignia is missing today, the overall entry has maintained its original features. The entry portico significantly contributes to the overall integrity of the original plan and mass.

- Balcony/Balustrade (Figures-45, 48 & 49): A decorative faux balcony projecting from the vertical plane directly above the central main entrance emphasizes the center of the building and forms a horizontal overhang for the opening. The balcony is detailed with classical architectural brackets and a stone balustrade. The balustrade/balcony, combined with the arched portico contribute to the sense of scale and importance of the main entry and plays an important role in the overall composition. This original balcony/balustrade feature still remains.

- Arcade galleries or walkways (Figures-47 & 50): The galleries on the courtyard side of the façade have rectangular shape openings (instead of arched openings of other quads). This courtyard and exterior balcony detail is typical of all of Quad F buildings. The rhythmic openings give the buildings the horizontal scale and plays a significant importance in the design of the courtyard facade.

- Stairs and arcade railings (Figure-47): The open stairways and walkway railings were originally designed with a horizontal steel bar design emphasis and are a visible part of the walkway. These serve as functional features of the plan and are of significance to the building character.

Structure: Structural systems of Quad F buildings consist of reinforced concrete slabs, beams and columns with reinforced concrete moment and lateral resisting systems. No visual noticeable significant or moderated structural defects were found in the structure. Structurally, the buildings appeared to be fairly good condition. Refer to detailed structural analysis in Appendix C of this report.

2. Alterations To Original Features:

Generally all Quad structures still retain the historical integrity of the original overall plan, architectural massing and scale, and other architectural elements as described above. Discussion below includes only those components of the building that have been since modified or drastically altered during the past major renovations.

- Typically all original windows have been replaced with new casement or double-hung aluminum windows (Figure-51) that no longer carry the divided mullion style of the era. This alteration is the most intrusive, or character changing of the alterations that have been done to the Quad.

- For the most part, the majority of the original building fenestrations have been retained (Figure-51), however, needed modifications have been made that have called for blocking whole windows reflected in plaster or partial blocking reflected in painted surface that matches the window frames. Although the overall uniformity that still remains help maintain the sense of scale and original design intent, the changes alter the original architectural proportions and the character of the period.

- The stair rails at arcades no longer carry the original horizontal steel bar design, instead, vertical metal railing has been typically used for all the Quad buildings.

- Typically all exterior doors have been replaced with new metal doors. Additionally door transoms have been covered or filled-in. These changes impact the overall original character of the buildings.

- Although a few light fixtures were noted possibly original during this survey, most other exterior fixtures on the side facades are new. Fixtures on the walls of the galleries have been widely replaced.

- Visible on the exterior of many buildings are the addition of electrical conduits and boxes and mechanical and communications equipment.

- Downspouts have been replaced and are now on the exterior of the façade (Figure-51). Original drawings show the downspouts on the interior walls of the arcade.

3. **Detracting Features:** Discussion of recommendations below includes only those components of the buildings that have resulted from the past major renovations, and that are detracting from the original integrity of the historical elements.

- New casement or double-hung aluminum windows that no longer carry the same flavor of the original divided mullion style of the era should be replaced with windows that better closely match the original flavor and character.

- The blocking of fenestration in the windows that has altered the architectural proportions of the original design intent, and the character of the period should be replaced as much as possible.

- New modern doors represent a new visual style. Door transoms have been covered or in-filled changing the overall proportions and should be replaced with new doors that better match the original style and flavor.

- Metal railings at arcades are of vertical design pattern and should be replaced with ones matching the horizontal design of the original.

- Visible electrical conduits, boxes and pipes on the exterior walls should be consolidated as much as possible and hidden from view.

- Poorly maintained building elements and premises, peeling paint, spalling concrete, chipped or exposed concrete should be noted and repaired. Building element corners and edges have been chipped, exposing the concrete to the damaging environment. The building elements should be cleaned, repainted or sealed. Chipped or broken areas should be repaired, and the sprinklers should be adjusted so that the building does get wet.

DESCRIPTION OF INTERIOR

1. Original Character Defining Features:

Plan: The interior of the administration building was originally partitioned to accommodate: general offices, medical areas, prison and guard rooms, barber and tailor shops, stores, and kitchen/restaurant area on the ground floor; administrative section including office areas, and service company dormitories with lavatory/showers on the second floor; classrooms, headquarters and howitzer company dormitories with lavatory/showers; and a large auditorium complete with stage dominated a large section in the middle of the third floors. The dormitories contained large open space plan with adjacent supporting areas such as dayrooms, classrooms, lavatory/shower rooms.

Interior Architectural Elements:

- Classical elements (Figures-52, 53 & 54): The interior of the auditorium contain classical columns, carved medallions, wall niches and decorative wall moldings. Decorative columns doubled on one base are positioned on each side of the proscenium opening. Columns have twisted shafts terminating in Corinthian capitals. The plaster beam connecting the columns is further decorated with carved medallions. The walls are further adorned with niches, and urn moldings.

- Coffered Ceiling (Figures-53 & 54): The ceiling in the auditorium is coffered and decorated with wood panelling (Figure…). The ceiling coffer design is rectilinear in nature, with alternating solid and painted panels. The design closely matches the original drawings of square panels of painted surface, wood grill surround and center floral disc patterns.

- Floor: The original auditorium floors were wood.

2. Alterations To Original:

Generally all of the interior space plans of Quad structures have been altered during various past renovation projects. Typically, new partitioned walls have been placed to accommodate the administrative functions as well as those of the barracks (Figure-55).

The auditorium still retains many of its classical architectural features. The light fixtures in the auditorium are new and the character of the original fixtures is unknown. Ceilings through out the interiors of the building have been dropped to accommodate installation of modern conveniences such as air-conditioning both in the administration building as well as in the barracks.

3. Detracting Features:

The general interior modifications to the plan layout throughout the buildings, as well as those resulting in lowered ceiling heights are significant to the overall building character. The lowered ceiling heights have resulted in loss of original scale and proportion. The interior ceilings should be soffited around the door and window openings so that the full height of the original openings can be used, and windows and doors matching the original style, and if possible, material should be installed.

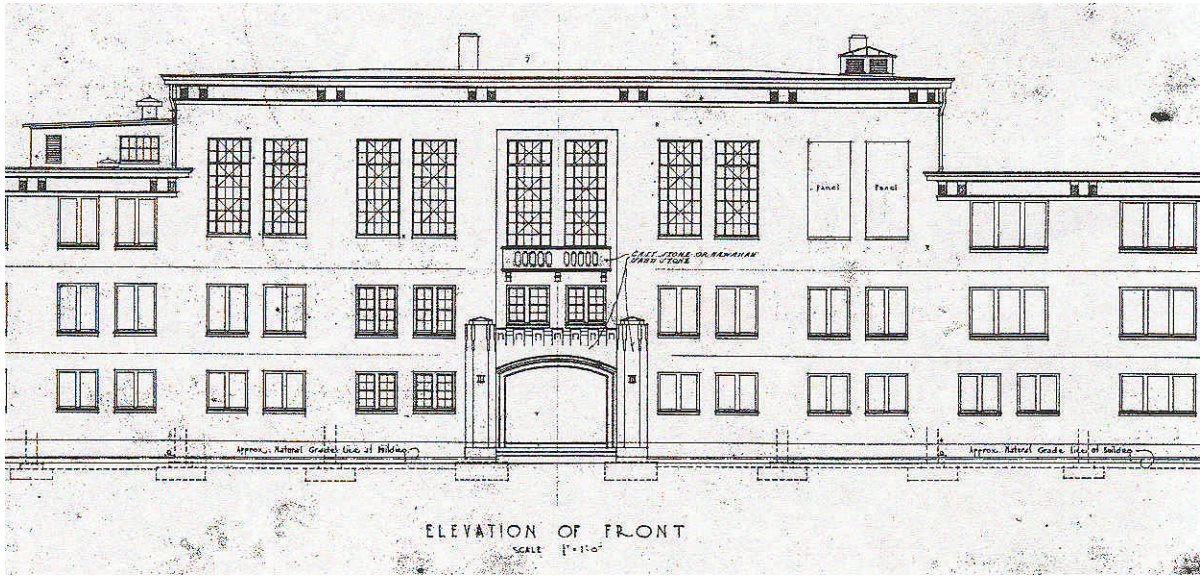
E. SUMMARY OF CHARACTER DEFINING FEATURES

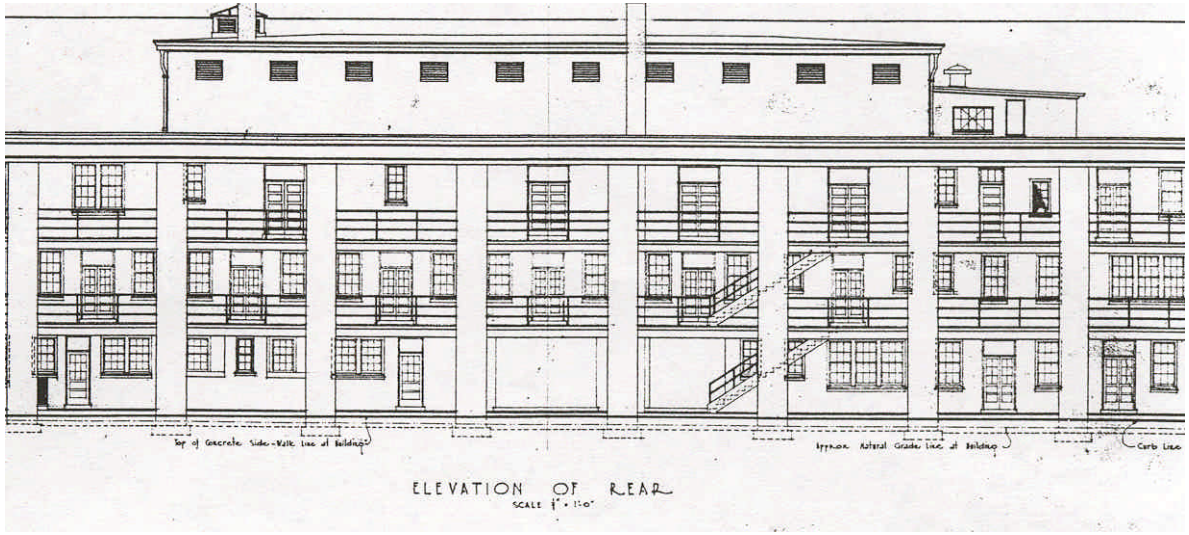
Bldg. No	Character Defining Features Remaining	Detracting Features – To Remove	Character Defining Features – To Restore
Quad F 649 Administration	EXTERIOR Plan: • Quadrangular relationship	EXTERIOR Façade: • Wood windows changed to a different visual style and	EXTERIOR Façade: • Restore the overall size and scale of window openings

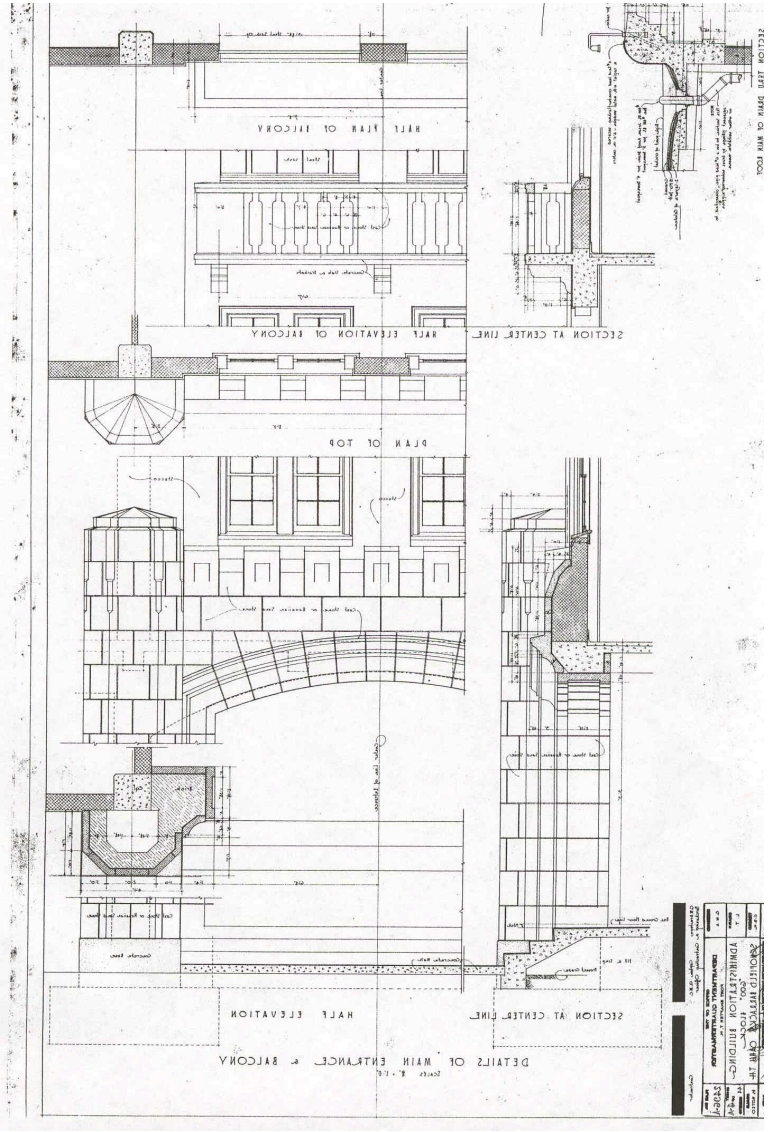
	• an emphasis at center Mass/Scale: Three-story height Linear and horizontal scale High volume center section at Architectural Features: • Stucco finish/painted • Horizontal base course emphasis Slightly sloped roof with • • on three sides of the building • Central portico with arched opening, adornments, open • • uniformity • Gallery arcade rhythm & uniformity with rectangular INTERIOR Plan:	• painted with a dark color • Doors changed to a different visual style, and transoms • reflecting orig. horizontal lines • Visible exterior pipes, conduits and boxes not hidden from • INTERIOR Plan: Altered interior floor plans • • • the proportion of the interior space as well as impacting the OTHER/LANDSCAPE • Neglect, plant growth, dirt, rust, broken materials etc.	Install window types to better flavor and character with heavy divisions and multi-divisional • the historic-style at exteriors • Conceal and consolidate electrical conduits as much as covered exterior area • Replace railing design to reflect the original horizontal emphasis _____ Interior Architectural Features: • Soffit ceilings at doors and windows in order to restore the openings • Replace gymnasium lights with ones to fit better the historical LANDSCAPE • Remove vegetation growing within three feet of building, water on building • Clear building premises of debris

	• Plan layout Interior Architectural Features: • Classical elements: columns, wall niches, carved medallions and urn moldings • Coffered Ceiling		

Historical Photograph of Building 649: Central portico


Panel
Panel
Approx. Natural Grade Line of Building
Approx. Natural Grade Line of Building
ELEVATION OF FRONT


Top of Concrete Side-Walk Line of Building
Approx. Natural Grade Line of Building
Curb Line
ELEVATION OF REAR

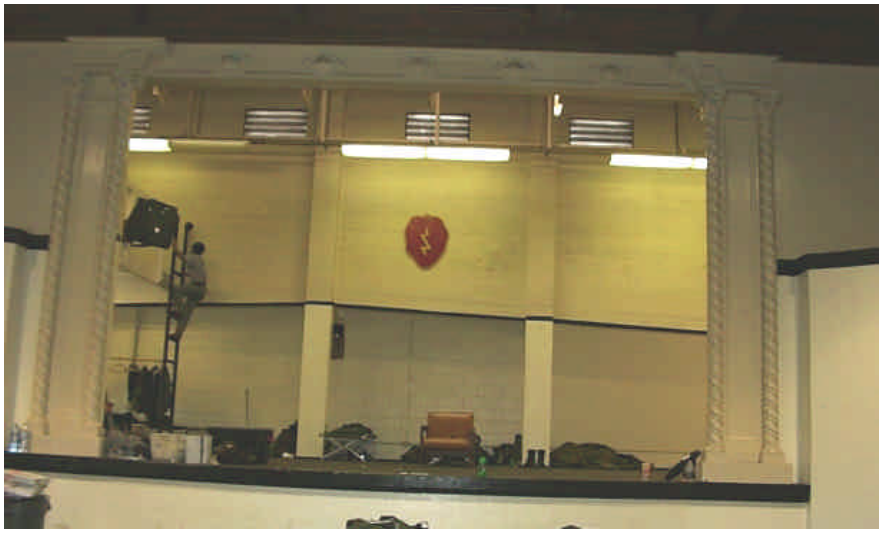


Architectural detail of Building 649: Central portico and balcony/balustrade

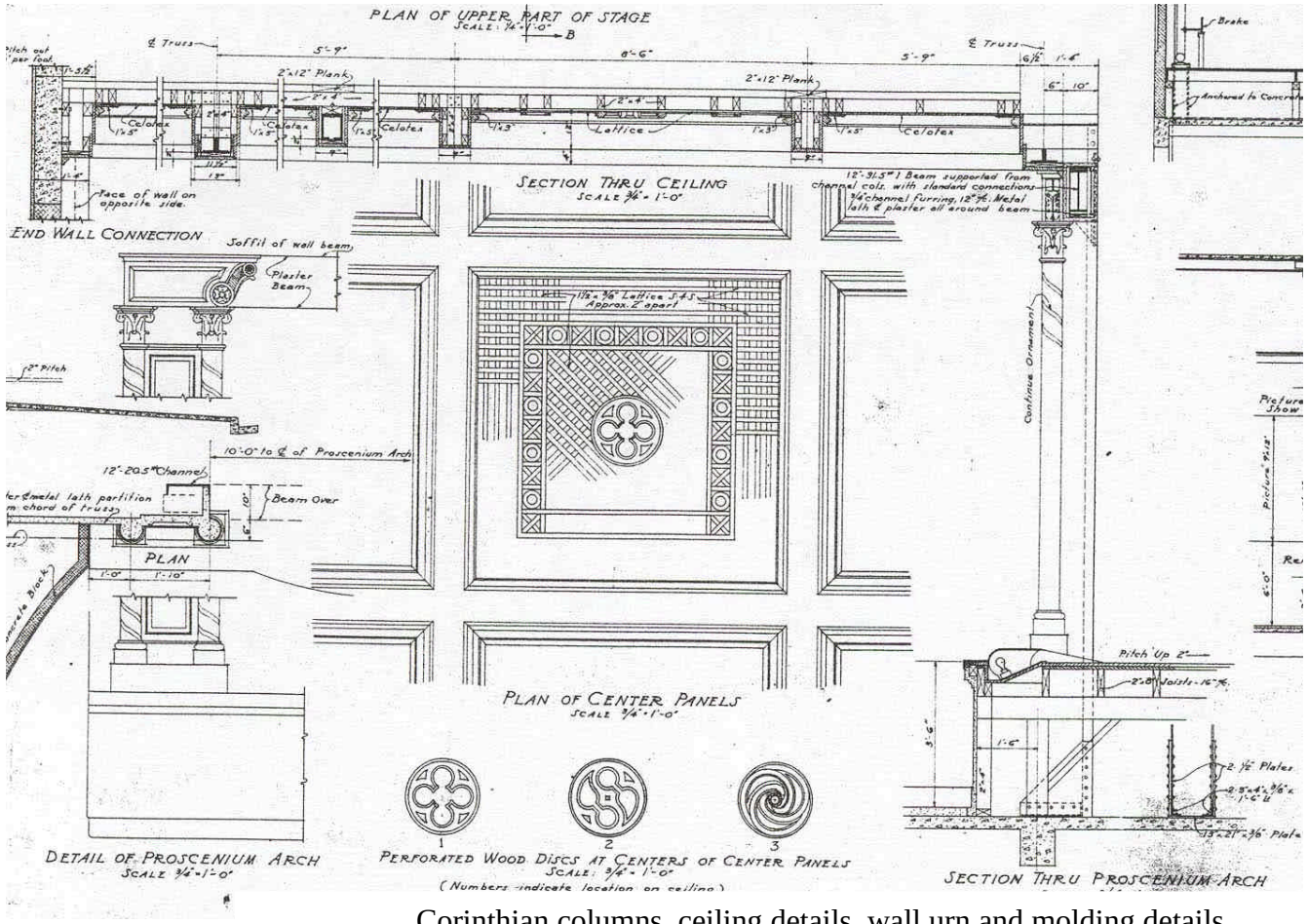
Significant details of Building 649: Central portico, balcony/balustrade, cornice and frieze band

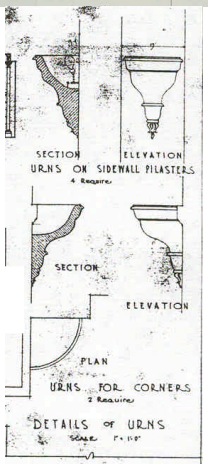
Arcade gallery

Window & door alterations

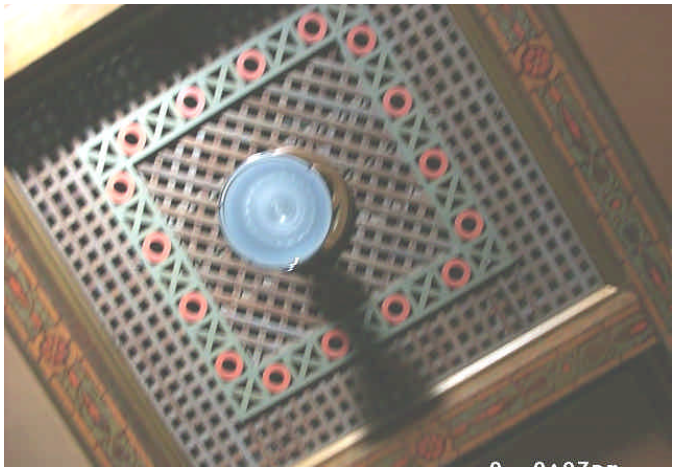


Auditorium





Corinthian columns, ceiling details, wall urn and molding details



Classical significant features of auditorium

Window and ceiling alterations to interiors

QUAD F – BUILDINGS 649**, 650**, 651, & 652

A. LOCATION

Quad F is located on the Main Post of the Schofield Barracks Historic District. Quad F is the last of the five quads (Figure-56, & Section III-Figure-6) forming a linear design along a central line in the district and it is located approximately in the northeast portion of Schofield Barracks between Waianae and Foote Avenues. Building 650 is one of three barracks buildings for Quad F and it is located directly across from the administration building.

B. HISTORICAL CONTEXT

QUADS AT SCHOFIELD BARRACKS

Refer to Building 649, Administration Building.

BUILDING SIGNIFICANCE

Quad F is significant as a substantial element in the original base layout, and is within the Schofield Barracks Historic District which is listed on the National Register of Historic Places. The historic district contains the central core of significant properties that exhibit Army's development patterns and establish the character of Schofield Barracks Military Reservation. Quad F was constructed in 1931 as the 19th Infantry barracks. These barracks historically provided the centralized housing, dining, and administrative space for troops stationed at SBMR.

Building 650 is one of three barracks buildings for Quad F. It was originally designed to serve primarily as sleeping quarters for the brigade.

Location Map: Schofield Barracks – Quad F, Building 650

C. PHYSICAL HISTORY

Date (s) of erection:

Architect: Drawings prepared under direction of G.W.
Office of The Department Quartermaster, Fort Shafter, Hawaii.

Original plans and construction:
original set of documents, twenty-two sheets are still remaining and are filed at the Department of Public Works, at Wheeler Army Airfield (Appendix B).

U. S. Army.

Applicable Land Use Plans and Policies:
not enforceable. Nevertheless, the following land uses are designated: State land use is Urban; City and County of Honolulu zoning is Military and Federal; and the Development Plan is Medium Density Apartments. The Quads do not lie within the City's

Alterations and Additions: The demand for better and private facilities led to the modernization of the interiors of all Quadrangle

mostly unoccupied and is awaiting major renovations for an adaptive usage plan. However, renovations of some parts of the ground floor are already underway for office usage.

ARCHITECTURAL HISTORY

ARCHITECTURAL CHARACTER

The architectural composition of Quad F is the distinctive quadrangle layout of four buildings: one administration and three

massing are reflected in the two building types: the administration building (Bldg. 649), and the barracks.

The architecture style of Quad F buildings reflect a more simplified era and were designed and built with less adornment as compared with the original design of Quads B, C, D, E, I & J which were designed in a very modest Second Renaissance Revival Style. Despite of subtle stylistic architectural difference, Quad F buildings follow similar functional layout and architectural massing.

The primary classical architectural element in the barracks is typically the arcades or galleries. The double arcade is an architectural feature typical of Quads D, E, and F. Quad F barracks feature rectangular openings instead of arched openings of the earlier quads; windows maintain rectangular and uniform shapes; entablature is unadorned and absent of frieze pattern and topped with a simple cornice detail. Building eaves are rather short terminating with the cornice and a relatively flat roof. Buildings are typically a three-story mass with a strong linear horizontal emphasis evident on the exterior street facing façade through the use of arcades and uniform openings. The courtyard elevations are more informal in nature. The inner arcade galleries are broken up with small projections into the courtyard containing the kitchen and lavatories. Despite the solidity of design and structure, the buildings were well ventilated by the Hawaiian trade winds. High ceilings and deep porches aided in keeping the rooms cool.

Condition: Although generally the structures still retain their appearance of overall mass, plan and some of their original interior details, some significant architectural features have been altered which affect the original integrity of their historic intent and significance. The overall condition of Quad F buildings is fair. Structurally Quads appear in reasonable condition, however it is apparent that these structures have suffered aging problems, exposure to environment, and poor maintenance. To name a few, points of observation during this survey were: peeling paint, spalling concrete leaving reinforcing steel exposed, chipped and damaged building parts, broken glass, mold and dirt around the premises. Currently it stands mostly unoccupied.

The following detailed description of the Quad F, administration building elaborates on these differences.

DESCRIPTION OF EXTERIOR

1. Original Character Defining Features

Plan: Each quad is a quadrangular composition, with the three barracks buildings situated around an open courtyard and anchored by the administration building, generally, in the northern direction. The plan layout is rectilinear with a horizontal emphasis.

Massing: Similar to other quad structures, the barracks are three-story buildings with an overall length of approximately 320 feet and height of approximately 38 feet. The overall shape maintains a strong linear and horizontal emphasis, especially

evident on the exterior street façade through the use of arcade openings, horizontal base course, and uniform window openings. The horizontal scale is further achieved with the delineation of the eave line and the cornice detail terminating with a flat roof. The building mass on the courtyard side is more informal in nature. The inner arcade galleries are broken up with small projections into the courtyard.

Exterior Architectural Elements: Various distinct features of the architectural façade for Building 650 include:

- Façade (Figure-57): Walls are of stucco finished with a distinct horizontal base course emphasizing the linear shape. The walls terminate with a plain and unadorned entablature and a simple cornice detail that further delineates the horizontal lines of the buildings. Although the Quad F architectural details have been simplified to a more utilitarian design, nevertheless, the overall façade massing and elements together are still of significance to the original architectural style of quad buildings.

- Arcades galleries or walkways (Figure-57): Typical of Quad F barracks, the galleries on the street and courtyard side of the façade have rectangular shaped openings (instead of arched openings of other quads). The consistent repetition and uniformity of the arcade openings reemphasize the horizontal nature of the façade and plays a significant importance in the overall design.

- Windows/Doors (Figure-57): Windows on all elevations are uniformly aligned of similar character; originally, multi-mullions or divided-light in wood casement type or double-hung. The uniformity and scale of these window openings with heavy wood dividers give the overall mass character, proportion and scale. The intricacy of construction style contributes to the overall flavor and character of the architectural style of the era. All original exterior doors reflect similar multi-mullion or divided-light construction and therefore, possess similar importance in maintaining the overall integrity.

- Stairs and railings: Railings at stairs and arcades were originally designed with a horizontal steel bar design emphasis and are significant to the character of the exterior façade.

Structure: Refer to detailed structural analysis in Appendix C of this report.

2. Alterations To Original Features:

Generally, all quad structures still retain the integrity of the original overall plan, architectural massing and scale, and other architectural elements as described above. Discussion below includes only those components of the building that have been since modified or drastically altered during the past major renovations.

- Typically, all original windows have been replaced with new aluminum casement or double-hung aluminum windows that no longer carry the divided mullion style of the era (Figure-59). This alteration is the most intrusive, or character changing of the alterations that have been done to the Quad.

- The majority of the original building fenestrations have been retained, however, needed modifications have been made that have called for blocking whole windows reflected in plaster or partial blocking reflected in painted surface that matches the window frames (Figure-59). Although the overall uniformity which still remains, helps to maintain the sense of scale and original design intent, the changes alter the original architectural proportions and the flavor of the period.

- The stair rails at arcades no longer carry the original horizontal steel bar design, instead, vertical metal railing has been typically used for all the Quad buildings.

- Typically, the street-facing arcade or gallery walkways on the ground floors of the barracks (Figure-58) have been mostly or partially enclosed with walls or windows to accommodate the conversion to administrative office uses. These modifications reflect a wide range of variation in the use of style, materials, consistency, and aesthetics.

- Typically all exterior doors (Figure-61) have been replaced with new metal doors. Additionally door transoms have been covered or filled-in. These changes impact the overall original character of the buildings.

- Light fixtures on the walls of the galleries have been widely replaced.

- Visible on the exterior of many buildings are the addition of external electrical conduits and boxes and mechanical and communications equipment (Figure-60). Facing the interior courtyard, a large part of the ground floor space in Building 650 is used for kitchen and the exterior reflects many visible mechanical ductworks.

- Several covered walkway additions project from the ground floor arcade (Figure-60).

3. **Detracting Features:** Discussion of recommendations below includes only those components of the buildings that have resulted from the past major renovations, and that are detracting from the original integrity of the historical elements.

- New casement or double-hung aluminum windows that no longer carry the same flavor or the original divided mullion style of the era should be replaced with windows that better closely match the original flavor and character.
- The blocking of fenestration in the window openings that has altered the architectural proportions of the original design intent, and the flavor of the period should be replaced as much as possible.
- Modern doors represent new visual style. Door transoms have been covered or in-filled changing the overall proportions and should be replaced with new doors that better match the original style and flavor.
- Metal railing at arcades are of vertical design pattern and should be replaced with ones matching the horizontal design of the original.
- The ground floor that has been converted to various office use has altered the original appearance of the exterior and resulted in inconsistent treatment of the facade. These variations in façade treatments of materials and finishes should be corrected.
- Covered walkways that have been added on the courtyard side should better match in style or material.
- Visible mechanical ductworks, electrical conduits, boxes and pipes on the exterior walls should be consolidated and concealed as much as possible.

DESCRIPTION OF INTERIOR

1. **Original Character Defining Features:**

Plan: The plan of the barracks was originally partitioned to serve primarily as sleeping quarters for the brigade. Originally each barracks contained: squad rooms, typically an open room measuring approximately fifty feet by ninety feet, four each on

second and third floors; common lavatory/shower rooms, two each on the second and third floors; day rooms, kitchens, and mess halls filled the first floor. The floors were connected through open stairs and covered arcades.

2. Alterations to Original:

Generally the interior space plan of all barracks have been altered during various past renovation projects. Typically, new partitioned walls have been placed to accommodate the need for modern facilities and more private individual rooms for the squad. The majority of the ground floor has been converted to office use. Ceilings throughout the interiors have been dropped to accommodate installation of modern conveniences such as air-conditioning to all the individual barrack rooms and office areas.

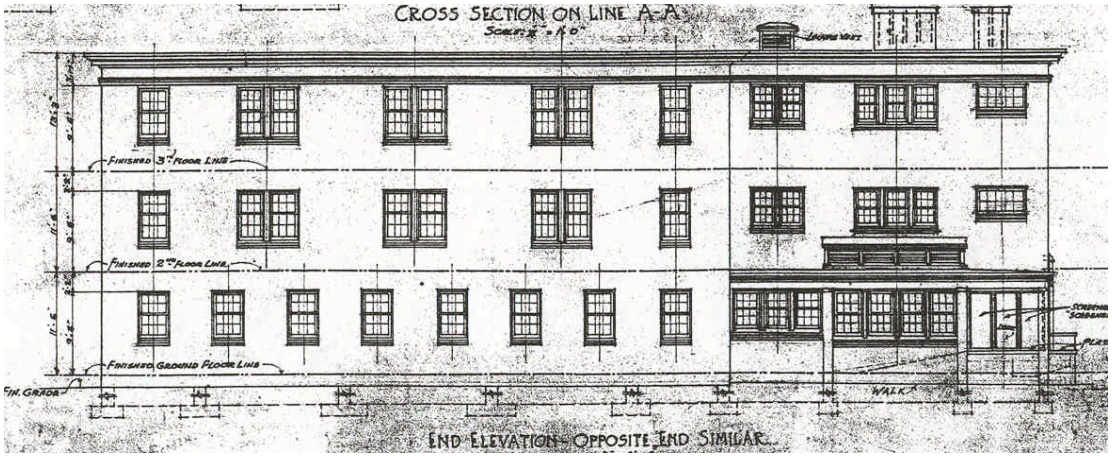
3. Detracting Features:

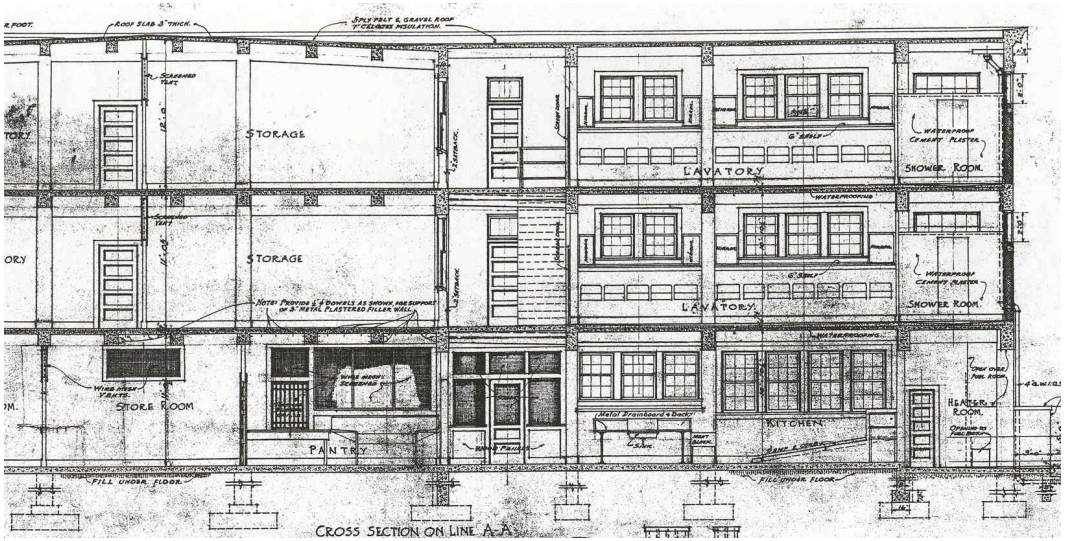
The general interior modifications to plan layout throughout the buildings, as well as those resulting in lowered ceiling heights are significant to the overall building character. The lowered ceiling heights have resulted in loss of original scale and proportions. The interior ceilings should be soffited around the door and window openings so that the full height of the original openings can be used, and windows and doors matching the original style, and if possible, material should be installed.

E. SUMMARY OF CHARACTER DEFINING FEATURES

Bldg. No	**Character Defining Features Remaining**	**Detracting Features – To Remove**	**Character Defining Features – To Restore**
Quad F 650 Barracks	EXTERIOR Plan: • Quadrangular relationship • Rectilinear plan layout Mass/Scale: • Three-story height	EXTERIOR Façade: • Wood windows changed to a different visual style and material • Top of windows in-filled and painted with a dark color	EXTERIOR Façade: • Restore the overall size and scale of window openings • Install window types to better closely match the original flavor and character with heavy

	• Linear and horizontal scale Architectural Features: • Stucco finish/painted • Horizontal base course emphasis • Flat roof with horizontal shallow overhang • Simple cornice detail • Window/doors rhythm & uniformity • Arcade openings rhythm & uniformity with rectangular openings <u>INTERIOR</u> Interior Architectural Features: • Plan layout	• Doors changed to a different visual style, and transoms covered/in-filled • Vertical pattern at railings not reflecting original horizontal lines • Visible exterior pipes, conduits, boxes and mechanical ducts on exterior • Visible downspouts on exterior • New light fixtures <u>INTERIOR</u> Plan: • Altered interior floor plans Interior Architectural Features: • Dropped ceilings impacting the proportion of the interior as well as the size of original openings <u>OTHER/LANDSCAPE</u> • Neglect, plant growth, dirt, rust, broken materials etc.	divisions and multi-divisional mullions • Install doors to closely match the historic-style at exteriors • Conceal and consolidate electrical conduits, mechanical ducts etc., as much as possible within building or in a covered exterior areas • Replace railing design to reflect the original horizontal emphasis <u>INTERIOR</u> Interior Architectural Features: • Soffit ceilings at doors and windows in order to restore the scale and proportion of openings <u>LANDSCAPE</u> • Remove vegetation growing within three feet of building, ensure sprinklers do not spray water on building • Clear building premises of debris


CROSS SECTION ON LINE A-A
FINISHED 3rd FLOOR LINE
FINISHED 2nd FLOOR LINE
FINISHED GROUND FLOOR LINE
FIN. GRADE
WALK
END ELEVATION - OPPOSITE END SIMILAR

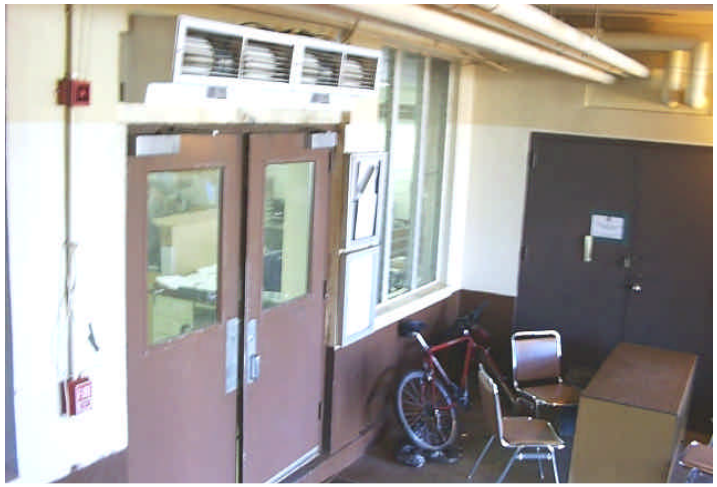


Barracks (Buildings 650, 651, & 652): Partial elevations of arcades
(taken from the original drawings)

Courtyard and street facing facades

Window alterations typical throughout (shown on side façade)

Visible mechanical ducts, typical throughout (shown on side façade)



Visible pipes (top) and modern door shown on ground floor (bottom)

QUAD F – BUILDINGS 649, 650, **651**, & 652

A. LOCATION

Quad F is located on the Main Post of the Schofield Barracks Historic District. Quad F is the last of the five quads (Figure-62, & Section III-Figure-6) forming a linear design along a central line in the district and it is located approximately in the northeast portion of Schofield Barracks between Waianae and Foote Avenues. Building 651 is one of three barracks buildings for Quad F, located to the side of the administration building.

B. HISTORICAL CONTEXT

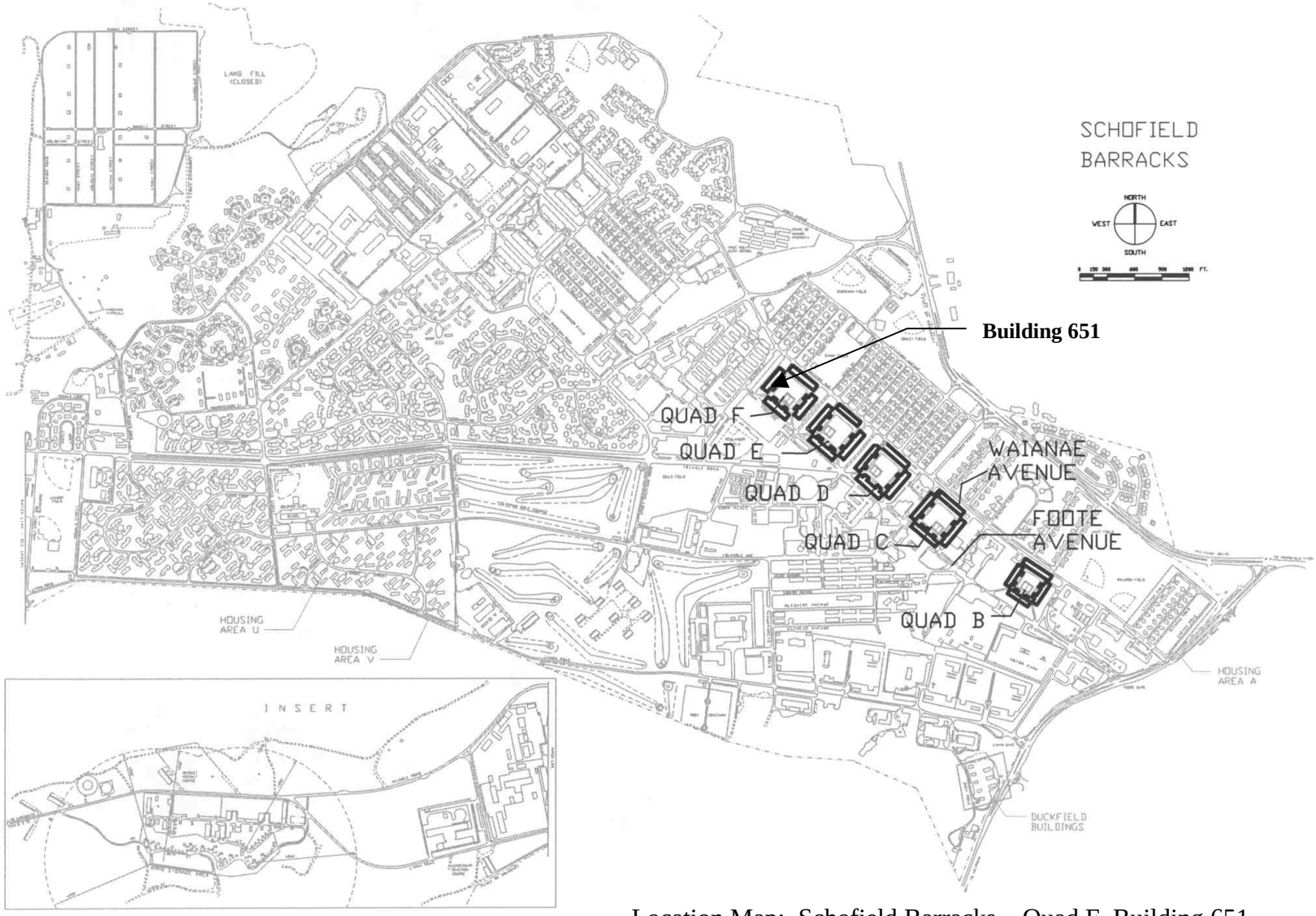
QUADS AT SCHOFIELD BARRACKS

Refer to Building 649, the Administration Building.

BUILDING SIGNIFICANCE

Quad F was constructed in 1931 as the 19th Infantry barracks. These barracks historically provided the centralized housing, dining, and administrative space for troops stationed at SBMR.

Building 651 is one of three barracks buildings for Quad F. It was originally designed to serve primarily as sleeping quarters for the brigade. Originally each barracks contained: squad rooms, typically an open space plan measuring approximately fifty feet by ninety feet, four each on second and third floors; two common lavatory/shower rooms each on the second and third floors; day rooms, kitchens, and mess halls filled the first floor.



Location Map: Schofield Barracks – Quad F, Building 651

C. PHYSICAL HISTORY

Date (s) of erection: Constructed in 1931. Contractor/builder unknown.

Architect: Drawings prepared under direction of G.W. Armitage, Captain Q. M. C., purchasing and contracting officer for the Office of The Department Quartermaster, Fort Shafter, Hawaii.

Original plans and construction: The original drawings for Quad F, Barracks Building are dated back to April 12, 1930. Of the original set of documents, twenty-two sheets are still remaining and are filed at the Department of Public Works, at Wheeler Army Airfield (Appendix B).

Original and subsequent owners: U. S. Army.

Applicable Land Use Plans and Policies: Quads are situated on Federal land whereby State and City land use designations are not enforceable. Nevertheless, the following land uses are designated: State land use is Urban; City and County of Honolulu zoning is Military and Federal; and the Development Plan is Medium Density Apartments. The Quads do not lie within the City's Special Management Area.

Alterations and Additions: The demand for better and private facilities led to the modernization of the interiors of all of the quadrangle barracks buildings in the 1970's. Various alterations and renovations projects have since taken place. Currently Quad F, Building 651 is mostly unoccupied.

D. ARCHITECTURAL HISTORY

ARCHITECTURAL CHARACTER

The architectural composition of Quad F is the distinctive quadrangle layout of four buildings: one administration and three barracks sited to enclose the four sides of the central courtyard. Architectural differences in functional layout and architectural massing are reflected in the two building types: the administration building (Bldg. 649), and the barracks.

The architecture style of Quad F buildings reflect a more simplified era and were designed and built with less adornment as compared with the original design of Quads B, C, D, E, I & J which were designed in a very modest Second Renaissance Revival Style. Despite of subtle stylistic architectural difference, Quad F buildings follow similar functional layout and architectural massing.

The primary classical architectural element in the barracks is typically the arcades or galleries. The double arcade is an architectural feature typical of Quads D, E, and F. Quad F barracks feature rectangular openings instead of arched openings of the earlier quads; windows maintain rectangular and uniform shapes; entablature is unadorned and absent of frieze pattern and topped with a simple cornice detail. Building eaves are rather short, terminating with a cornice detail and a flat tar and gravel roof sloped slightly for Hawaiian rains. Buildings are typically a three-story mass with a strong linear horizontal emphasis evident on the exterior street facing façade through the use of arcades and uniform openings. The courtyard elevations are more informal in nature. The inner arcade galleries are broken up with small projections into the courtyard containing the kitchen and lavatories. Despite the solidity of their design and structure, the buildings were well ventilated by the Hawaiian trade winds. High ceilings and deep porches aided in keeping the rooms cool.

Condition: Although generally the structures still retain their appearance of overall mass, plan and some of their original interior details, some significant architectural features have been altered which affect the original integrity of their historic intent and significance. The overall condition of Quad F buildings is fair. Structurally Quads appear in reasonable condition, however it is apparent that these structures have suffered aging problems, exposure to environment, and poor maintenance. To name a few, points of observation during this survey were: peeling paint, spalling concrete leaving reinforcing steel exposed, chipped and damaged building parts, broken glass, mold and dirt around the premises. Currently it stands mostly unoccupied.

The following detailed description of the Quad F, administration building elaborates on these differences.

DESCRIPTION OF EXTERIOR

1. Original Character Defining Features

Plan: Each quad is a quadrangular composition, with the three barracks buildings situated around three sides of an open courtyard and anchored by the administration building, generally, in the northern direction. The barracks represent the more private functions of the infantry.

Massing: Similar to other quad buildings, the barracks are three-story structures with an overall length of approximately 320 feet and height of approximately 38 feet. The overall shape maintains a strong linear and horizontal emphasis evident on the exterior street façade through the use of arcade openings, horizontal base course, and uniform window openings. The horizontal scale is further achieved with the delineation of the eave line and the cornice detail terminating with a flat roof. The building mass on the courtyard side is more informal in nature. The inner arcade galleries are broken up with small projections into the courtyard.

Exterior Architectural Elements: Various distinct features of the architectural façade for Building 651 include:

- Façade (Figure-57): Walls are of stucco finish with a base course emphasizing the linear shape. The walls terminate with a plain and unadorned entablature and a simple cornice detail that further delineates the horizontal lines of the buildings. Although the Quad F architectural details have been simplified to a more utilitarian design, nevertheless, the overall façade massing and elements together are still of significance to the original architectural style of quad buildings.

- Arcades or walkways (Figure-57): Typical of Quad F barracks, the galleries on the street and courtyard side of the façade have rectangular shape openings (instead of arched openings of other quads). The consistent repetition and uniformity of the arcade openings re-emphasize the horizontal nature of the façade and plays a significant importance in the overall design.

- Windows/Doors (Figure-57): Windows on all elevations are uniformly aligned of similar character, originally, multi-mullions or divided-light in wood casement type or double-hung. The uniformity and scale of these window openings with heavy wood dividers give the overall mass character, proportion and scale. The intricacy of construction style contributes to the overall flavor and character of the architectural style of the era. All original exterior doors reflect similar multi-mullion or divided-light construction and therefore, possess similar importance in maintaining the overall integrity.

- Stairs and railings: Railings at stairs and arcades were originally designed with a horizontal steel bar design emphasis and are significant to the character of the exterior façade.

Structure: Refer to detailed structural analysis in Appendix C: Quad F of this report.

2. Alterations To Original Features:

Generally all quad structures still retain the integrity of the original overall plan, architectural massing and scale, and other architectural elements as described above. Discussion below includes only those components of the building that have been since modified or drastically altered during the past major renovations.

- Typically all original windows have been replaced with new casement or double-hung aluminum windows (Figure-64) that no longer carry the divided mullion style of the era. This alteration is the most intrusive, or character changing of the alterations that have been done to the Quad.

- The majority of the original building fenestrations have been retained (Figure-64), however, needed modifications have been made that have called for blocking whole windows reflected in plaster or partial blocking reflected in painted surface that matches the window frames. Although the overall uniformity which still remains, helps to maintain the sense of scale and original design intent, the changes alter the original architectural proportions and the flavor of the period.

- The stair rails at arcades no longer carry the original horizontal steel bar design, instead, vertical metal railing has been typically used for all the Quad buildings.

- Typically, the street-facing arcade or gallery walkways on the ground floors of the barracks (Figure-63) have been mostly or partially enclosed with walls or windows to accommodate the conversion to administrative office uses. These modifications reflect a wide range of variation in the use of materials, consistency, and aesthetics.

- Typically all exterior doors have been replaced with new metal doors. Additionally door transoms have been covered or filled-in. These changes impact the overall original character of the buildings.

- Visible on the exterior of many buildings are the addition of external electrical conduits and boxes, mechanical and communication equipment.

- Downspouts have been replaced and are now on the exterior of the façade (Figure-63). Original drawings and photographs show the downspouts on the interior walls of the arcade (Figure-65).

- Although a few light fixtures were noted possibly original during this survey (Figure-65), most other exterior fixtures on the side facades are new. Fixtures on the walls of the galleries have been widely replaced.

3. **Detracting Features:** Discussion of recommendations below includes only those components of the buildings that have resulted from the past major renovations, and that are detracting from the original integrity of the historical elements.

- New casement or double-hung aluminum windows that no longer carry the same flavor or the original divided mullion style of the era should be replaced with windows that better closely match the original flavor and character.
- The blocking of fenestration in the window openings that has altered the architectural proportions of the original design intent, and the flavor of the period should be replaced as much as possible.
- Modern doors represent new visual style. Door transoms have been covered or in-filled changing the overall proportions and should be replaced with new doors that better match the original style and flavor.
- Metal railing at arcades are of vertical design pattern and should be replaced with ones matching the horizontal design of the original.
- The ground floor that has been converted to various office use has altered the original appearance of the exterior and resulted in inconsistent treatment of the facade. These variations in façade treatments of materials and finishes should be corrected.
- Visible electrical conduits, boxes and pipes on the exterior walls should as much as possible be consolidated and concealed.
- Poorly maintained building elements and premises, peeling paint, spalling concrete, chipped or exposed concrete should be noted and repaired. Building element corners and edges have been chipped, exposing the concrete to the damaging environment. The building elements should be cleaned, repainted or sealed, chipped or broken areas should be repaired, and the sprinklers should be adjusted so that the building is not getting wet.

DESCRIPTION OF INTERIOR

1. Original Character Defining Features:

Plan: The plan of the barracks was originally partitioned to serve primarily as sleeping quarters for the brigade. Originally each barracks contained: squad rooms, typically an open room measuring approximately fifty feet by ninety feet, four each on second and third floors; two common lavatory/shower rooms each on second and third floors; day rooms, kitchens, and mess halls filled the first floor. The floors were connected through open stairs and covered arcades.

2. Alterations to Original:

Generally the interior space plan of all barracks structures have been altered during various past renovation projects. Typically, new partitioned walls have been placed to accommodate the need for modern facilities and more private individual rooms for the squad. The majority of ground floors have been converted to office use. Ceilings throughout the interiors have been dropped to accommodate installation of modern conveniences such as air-conditioning to individual barrack rooms and office areas.

3. Detracting Features:

The general interior modifications to plan layout throughout the buildings, as well as those resulting in lowered ceiling heights are significant to the overall building character. The lowered ceiling heights have resulted in loss of original scale and proportions. The interior ceilings should be soffited around the door and window openings so that the full height of the original openings can be used, and windows and doors matching the original style, and if possible, material should be installed.

E. SUMMARY OF CHARACTER DEFINING FEATURES

Bldg. No	Character Defining Features Remaining	Detracting Features – To Remove	Character Defining Features – To Restore
Quad F	EXTERIOR	EXTERIOR	EXTERIOR

651 Barracks	Plan: • Quadrangular relationship • Rectilinear plan layout Mass/Scale: • Three-story height • Linear and horizontal scale Architectural Features: • Stucco finish/painted • Horizontal base course emphasis • Flat roof with horizontal shallow overhang • Simple cornice detail • Window/doors rhythm & uniformity • Arcade openings rhythm & uniformity with rectangular openings <u>INTERIOR</u> Interior Architectural Features: • Plan layout	Façade: • Wood windows changed to a different visual style • Top of windows in-filled and painted with a dark color • Doors changed to a different visual style, and transoms covered/in-filled • Vertical pattern at railings not reflecting original horizontal lines • Visible exterior pipes, conduits and boxes • Visible downspouts on exterior <u>INTERIOR</u> Plan: • Altered interior floor plans Interior Architectural Features: • Dropped ceilings impacting the proportion of the interior as well as the size of original openings <u>OTHER/LANDSCAPE</u> • Neglect, plant growth, dirt, rust, broken materials etc.	Façade: • Restore the overall size and scale of window openings • Install window types to better closely match the original flavor and character with heavy divisions and multi-divisional mullions • Install doors to closely match the historic-style at exteriors • Conceal and consolidate electrical conduits as much as possible within building or in a covered exterior area • Replace railing design to reflect the original horizontal emphasis <u>INTERIOR</u> Interior Architectural Features: • Soffit ceilings at doors and windows in order to restore the scale and proportion of openings <u>LANDSCAPE</u> • Remove vegetation growing within three feet of building, ensure sprinklers do not spray water on building • Clear building premises of debris

Street and courtyard facing facades

Window alterations typical throughout (shown on side façades)

Original location of downspouts (top)
Possibly original light fixtures (bottom)

QUAD F – BUILDINGS 649, 650, 651, & **652**

A. LOCATION

Quad F is located on the Main Post of the Schofield Barracks Historic District. Quad F is the last of the five quads (Figure-66, & Section III-Figure-6) forming a linear design along a central line in the district and it is located approximately in the northeast portion of Schofield Barracks between Waianae and Foote Avenues. Building 652 is one of three barracks buildings for Quad F and is located to the side of the administration building.

B. HISTORICAL CONTEXT

QUADS AT SCHOFIELD BARRACKS

Refer to building 649, Administration Building.

BUILDING SIGNIFICANCE

Quad F was constructed in 1931 as the 19th Infantry barracks. These barracks historically provided the centralized housing, dining, and administrative space for troops stationed at SBMR.

Building 652 is one of the barracks buildings for Quad F. It was originally designed to serve primarily as sleeping quarters for the brigade. Originally each barracks contained: squad rooms, typically an open space plan measuring approximately fifty feet by ninety feet, four each on second and third floors; two common lavatory/shower rooms each on the second and third floors; day rooms, kitchens, and mess halls filled the first floor.

Location Map: Schofield Barracks – Quad F, Building 652

C. PHYSICAL HISTORY

Date (s) of erection: Constructed in 1931. Contractor/builder unknown.

Architect: Drawings prepared under direction of G.W. Armitage, Captain Q. M. C., purchasing and contracting officer for the Office of The Department Quartermaster, Fort Shafter, Hawaii.

Original plans and construction: The original drawings for Quad F, Barracks Building are dated back to April 12, 1930. Of the original set of documents, twenty-two sheets are still remaining and are filed at the Department of Public Works, at Wheeler Army Airfield (Appendix B).

Original and subsequent owners: U. S. Army.

Applicable Land Use Plans and Policies: Quads are situated on Federal land whereby State and City land use designations are not enforceable. Nevertheless, the following land uses are designated: State land use is Urban; City and County of Honolulu zoning is Military and Federal; and the Development Plan is Medium Density Apartments. The Quads do not lie within the City's Special Management Area.

Alterations and Additions: The demand for better and private facilities led to the modernization of the interiors of all the Quadrangle barracks buildings in the 1970's. Various alterations and renovations projects have since taken place. Currently Quad F, Building 652 is mostly unoccupied.

D. ARCHITECTURAL HISTORY

ARCHITECTURAL CHARACTER

The architectural composition of Quad F is the distinctive quadrangle layout of four buildings: one administration and three barracks sited to enclose the four sides of the central courtyard. Architectural differences in functional layout and architectural massing are reflected in the two building types: the administration building (Bldg. 649), and the barracks.

The architecture style of Quad F buildings reflect a more simplified era and were designed and built with less adornment as compared with the original design of Quads B, C, D, E, I & J which were designed in a very modest Second Renaissance Revival

Style. Despite of subtle stylistic architectural difference, Quad F buildings follow similar functional layout and architectural massing.

The primary classical architectural element in the barracks is typically the arcades or galleries. The double arcade is an architectural feature typical of Quads D, E, and F. Quad F barracks feature rectangular openings instead of arched openings of the earlier quads; windows maintain rectangular and uniform shapes; entablature is unadorned and absent of frieze pattern and topped with a simple cornice detail. Building eaves are rather short, terminating with the cornice and a flat tar and gravel roof sloped slightly for Hawaiian rains. Buildings are typically a three-story mass with a strong linear horizontal emphasis evident on the exterior street facing façade through the use of arcades and uniform openings. The courtyard elevations are more informal in nature. The inner arcade galleries are broken up with small projections into the courtyard containing the kitchen and lavatories. Despite the solidity of design and structure, the buildings are well ventilated by the Hawaiian trade winds. High ceilings and deep porches aid in keeping the rooms cool.

Condition: Although generally the structures still retain their appearance of overall mass, plan and some of their original interior details, some significant architectural features have been altered which affect the original integrity of their historic intent and significance. The overall condition of Quad F buildings is fair. Structurally Quads appear in reasonable condition, however it is apparent that these structures have suffered aging problems, exposure to environment, and poor maintenance. To name a few, points of observation during this survey were: peeling paint, spalling concrete leaving reinforcing steel exposed, chipped and damaged building parts, broken glass, mold and dirt around the premises. Currently it stands mostly unoccupied.

The following detailed description of the Quad F, administration building elaborates on these differences.

DESCRIPTION OF EXTERIOR

1. Original Character Defining Features

Plan: Each quad is a quadrangular composition, with the three barracks buildings situated around three sides of an open courtyard and anchored by the administration building, generally, in the northern direction. The barracks represent the more private functions of the infantry.

Massing: Similar to other quad buildings, the barracks are three-story structures with an overall length of approximately 320 feet and height of approximately 38 feet. The overall shape maintains a strong linear and horizontal emphasis evident on the

exterior street façade through the use of arcade openings. The building mass on the courtyard side is more informal in nature. The inner arcade galleries are broken up with small projections into the courtyard.

Exterior Architectural Elements: Various distinct features of the architectural façade for Building 652 include:

- Façade (Figure-57): Walls are of stucco finish with a base course emphasizing the linear shape. The walls terminate with a plain and unadorned entablature and a simple cornice detail that further delineates the horizontal lines of the buildings. Although the Quad F architectural details have been simplified to a more utilitarian design, nevertheless, the overall façade massing and elements together are still of significance to the original architectural style of quad buildings.

- Arcades or walkways (Figure-57): Typical of Quad F barracks, the galleries on the street and courtyard side of the façade have rectangular shape openings (instead of arched openings of other quads). The consistent repetition and uniformity of the arcade openings re-emphasize the horizontal nature of the façade and plays a significant importance in the overall design.

- Windows/Doors (Figure-57): Windows on all elevations are uniformly aligned of similar character, originally, multi-mullions or divided-light in wood casement type or double-hung. The uniformity and scale of these openings give the overall mass character. The intricacy of construction style contributes to the overall flavor and character of the architectural style of the era. All original exterior doors reflect similar multi-mullion or divided-light construction and therefore, possess similar importance in maintaining the overall integrity.

- Stairs and railings: Railings at stairs and arcades were originally designed with a horizontal emphasis and are significant to the character of the exterior façade.

Structure: Refer to detail structural analysis in Appendix C: Quad F of this report.

2. Alterations To Original Features:

Generally all quad structures still retain the integrity of the original overall plan, architectural massing and scale, and other architectural elements as described above. Discussion below includes only those components of the building that have been since modified or drastically altered during the past major renovations.

- Typically all original windows have been replaced with new casement or double-hung aluminum windows (Figure-68) that no longer carry the divided mullion style of the era. This alteration is the most intrusive, or character changing of the alterations that have been done to the Quad.

- The majority of the original building fenestration have been retained, however, needed modifications have been made that have called for blocking whole windows reflected in plaster or partial blocking reflected in painted surface (Figure-68) that matches the window frames. Although the overall uniformity which still remains, helps to maintain the sense of scale and original design intent, the changes alter the original architectural proportions and the flavor of the period.

- The stair rails at arcades no longer carry the original horizontal steel bar design, instead, vertical metal railing has been typically used for all the Quad buildings.

- Typically, the street-facing arcade or gallery walkways on the ground floors of the barracks (Figure-67) have been mostly or partially enclosed with walls or windows to accommodate the conversion to administrative office uses. These modifications reflect a wide range of variation in the use of materials, consistency, and aesthetics. There are variations in window styles used.

- Typically all exterior doors have been replaced with new metal doors. Additionally door transoms have been converted or filled-in. These changes impact the overall original character of the buildings.

- Visible on the exterior of many buildings are the addition of external electrical conduits and boxes, mechanical and communication equipments.

- Downspouts have been replaced and are now on the exterior of the façade. Original drawings and photographs show the downspouts on the interior walls of the arcade (Figure-69).

- Although a few light fixtures were noted possibly original during this survey (Figure-69), most other exterior fixtures on the side facades are new. Fixtures on the walls of the galleries have been widely replaced.

3. **Detracting Features:** Discussion of recommendations below includes only those components of the buildings that have resulted from the past major renovations, and that are detracting from the original integrity of the historical elements.

- New casement or double-hung aluminum windows that no longer carry the same flavor or the original divided mullion style of the era should be replaced with windows that better closely match the original flavor and character.

- The blocking of fenestration in the window openings that has altered the architectural proportions of the original design intent, and the flavor of the period should be replaced as much as possible.

- Modern doors represent new visual style. Door transoms have been covered or in-filled changing the overall proportions and should be replaced with new doors that better match the original style and flavor.

- Metal railing at arcades are of vertical design pattern and should be replaced with ones matching the horizontal design of the original.

- The ground floor that has been converted to various office uses has altered the original appearance of the exterior and resulted in inconsistent treatment of the facade. These variations in façade treatments of materials and finishes should be corrected.

- Visible electrical conduits, boxes and pipes on the exterior walls should as much as possible be consolidated and concealed.

- Poorly maintained building elements and premises, peeling paint, spalling concrete, chipped or exposed concrete should be noted and repaired. Building element corners and edges have been chipped, exposing the concrete to the damaging environment. The building elements should be cleaned, repainted or sealed, chipped or broken areas should be repaired, and the sprinklers should be adjusted so that the building is not getting wet.

DESCRIPTION OF INTERIOR

1. Original Character Defining Features:

Plan: The plan of the barracks was originally partitioned to serve primarily as sleeping quarters for the brigade. Originally each barracks contained: squad rooms, typically an open room measuring approximately fifty feet by ninety feet, four each on second and third floors; two common lavatory/shower rooms each on the second and third floors; day rooms, kitchens, and mess halls filled the first floor. The floors were connected through open stairs and covered arcades.

2. Alterations to Original:

Generally the interior space plan of all barracks structures have been altered during various past renovation projects. Typically, new partitioned walls have been placed to accommodate the need for modern facilities and more private individual rooms for the squad. The majority of ground floors have been converted to office use. Ceilings throughout the interiors have been dropped to accommodate installation of modern conveniences such as air-conditioning to individual barrack rooms and office areas.

3. Detracting Features:

The general interior modifications to plan layout throughout the buildings, as well as those resulting in lowered ceiling heights are significant to the overall building character. The lowered ceiling heights have resulted in loss of original scale and proportions. The interior ceilings should be soffited around the door and window openings so that the full height of the original openings can be used, and windows and doors matching the original style, and if possible, material should be installed.

E. SUMMARY OF CHARACTER DEFINING FEATURES

Bldg. No	Character Defining Features Remaining	Detracting Features – To Remove	Character Defining Features – To Restore
Quad F 652 Barracks	EXTERIOR Plan: • Quadrangular relationship • Rectilinear plan layout Mass/Scale: • Three-story height • Linear and horizontal scale Architectural Features: • Stucco finish/painted	EXTERIOR Façade: • Wood windows changed to a different visual style • Top of windows in-filled and painted with a dark color • Doors changed to a different visual style, and transoms covered/in-filled • Vertical pattern at railings not reflecting original horizontal	EXTERIOR Façade: • Restore the overall size and scale of window openings • Install window types to better closely match the original flavor and character with heavy divisions and multi-divisional mullions • Install doors to closely match the historic-style at exteriors

	• Horizontal base course emphasis • Flat roof with horizontal shallow overhang • Simple cornice detail • Window/doors rhythm & uniformity • Arcade openings rhythm & uniformity with rectangular openings <u>INTERIOR</u> Interior Architectural Features: • Plan layout	lines • Visible exterior pipes, conduits and boxes • Visible downspouts on exterior <u>INTERIOR</u> Plan: • Altered interior floor plans Interior Architectural Features: • Dropped ceilings impacting the proportion of the interior as well as the size of original openings <u>OTHER/LANDSCAPE</u> • Neglect, plant growth, dirt, rust, broken materials etc.	• Conceal and consolidate electrical conduits as much as possible within building or in a covered exterior area • Replace railing design to reflect the original horizontal emphasis <u>INTERIOR</u> Interior Architectural Features: • Soffit ceilings at doors and windows in order to restore the scale and proportion of openings <u>LANDSCAPE</u> • Remove vegetation growing within three feet of building, ensure sprinklers do not spray water on building • Clear premises of debris

Courtyard and street facing facades

Window alterations typical throughout (shown on side facades)

Shown: Original location of downspouts and modern light fixtures in arcades

BIBLIOGRAPHY

BIBLIOGRAPHY

Addleman, Lt. William C.
1939 *History of the United States Army in Hawaii, 1849 to 1939*. Division Headquarters Detachment, Hawaiian Division, Schofield Barracks, Territory of Hawaii. Typescript report at Schofield Tropic Lightning Museum and Sgt. Yano Library, Schofield Barracks.

Alvarez, Patricia M.
1982 *A History of Schofield Barracks Military Reservation*. Prepared for Department of the Army U.S. Army Engineer Division, Fort Shafter, Hawaii.

Bishop Museum
1977 *Historical Property Inventory and Evaluation Report, Summary Report*. Prepared for Department of the Army, U.S. Army Support Command, Hawaii.

Chorpening, Claude H.
1924 "The Engineers in Hawaii," in *Hawaii Infantry Journal*, Vol. XXIV, April 1924.

Dannemiller, A.F.
1924 "A Tour of Duty in Hawaii," in *Hawaii Infantry Journal*, Vol. XXIV, April 1924.

Hawaii State Archives
various Historic photographs of Schofield.

Honolulu Advertiser
1940 "Gen. Wilson Dedicates Post Office at Schofield," *Honolulu Advertiser*, 2-22-40, p. 1.

1940 "Schofield History is Told From Days of Horseback," *Honolulu Advertiser*, 4-6-40, p. 14.

1940 "Great Era of Construction at Schofield," *Honolulu Advertiser*, 4-6-40, p. 14.

1946 "Schofield Most Important U.S. Base, Says Ike," *Honolulu Advertiser*, p. 1.

Honolulu Star Bulletin
1931 "Fourth Large Wheeler Field Contract Soon," *Honolulu Star Bulletin*, 9-8-31, p. 1.

1933 "Schofield Barracks Largest Army Post in United States," *Honolulu Star Bulletin*, 2-1-33, p. 6, military section.

1933 "Schofield Barracks History," *Honolulu Star Bulletin*, 6-27-33, sec. 3, p. 2.

1936 "Schofield Site Picked by Army Officers in '08," *Honolulu Star Bulletin*, 6-13-36, sec. 3, p. 2.

BIBLIOGRAPHY

1936 "Yesterday - Today, A Pictorial History of Schofield Barracks," *Honolulu Star Bulletin*, 9-19-36, sec. 3, p. 1.

1936 "Post Construction Told, Castner Recalls Old Days," *Honolulu Star Bulletin*, 12-26-36, sec. 3, p. 2.

1938 "Schofield Barracks is Largest Military Post in the Nation," *Honolulu Star Bulletin*, 4-8-38, sec.3, p. 14.

Pacific Commercial Advertiser
1908 "Big Work to Start Soon at Leilehua," *Pacific Commercial Advertiser*, 12-5-08, p. 1.

Rosendahl, Paul H., Ph.D., Inc.
1993 *Inventory and Evaluation of Properties with Potential Historic Significance at Schofield Barracks Military Reservation, Oahu*. Prepared for Belt Collins & Associates, Honolulu, Hawaii.

U.S. Army, Directorate of Public Works
Various Quad drawings

U.S. Army Museum Hawaii
Various Historic photographs of Schofield. Fort DeRussy, Hawaii.

Tropics Light Museum
Various Historic photographs of Schofield. Schofield, Hawaii.

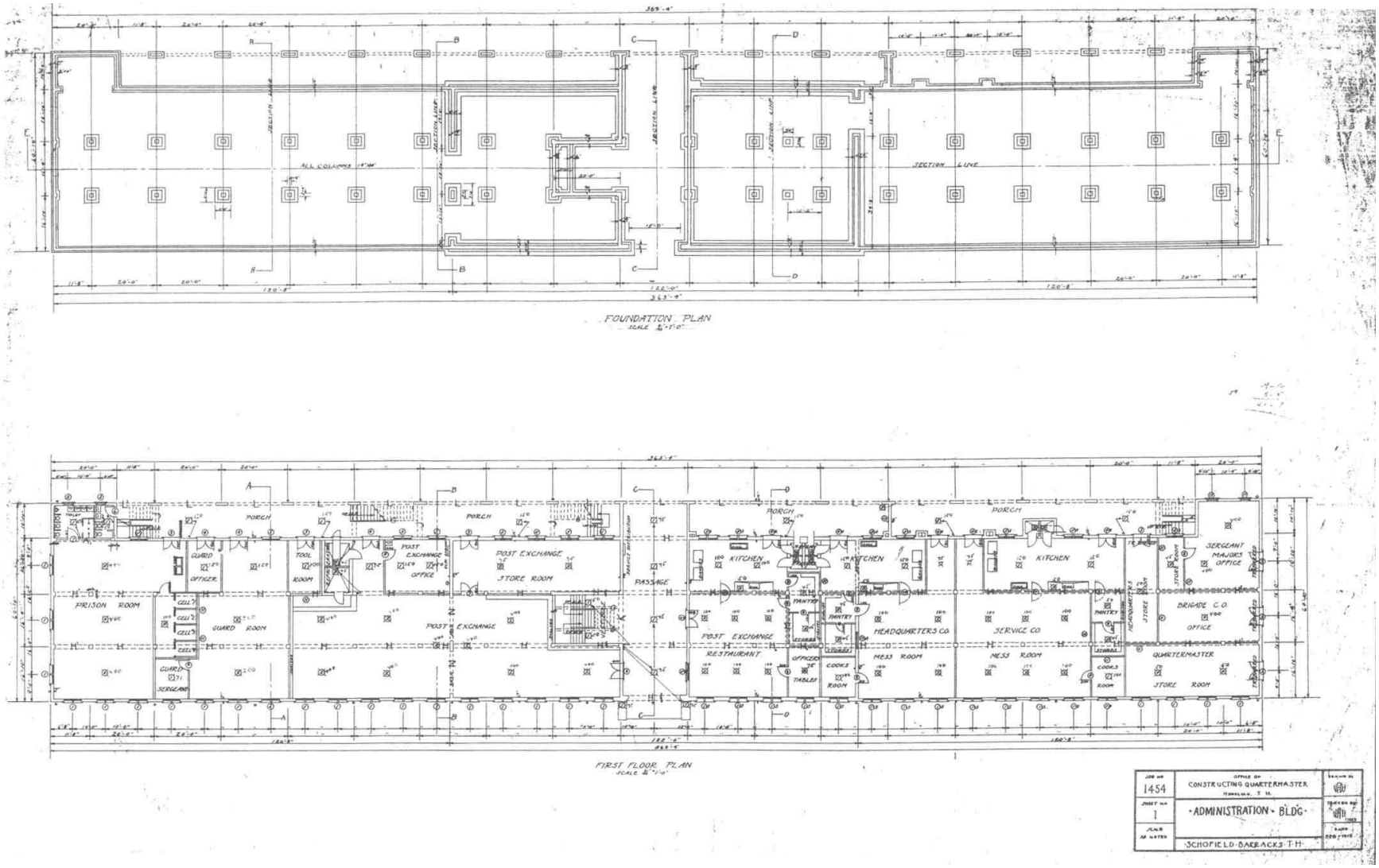
Van Hoften, Ellen
1970 *History of the Honolulu Engineer District.* Prepared for the U.S Army Honolulu Engineer District, Fort Armstong, Hawaii.

Belt Collins Hawaii
1998-1999 *Whole Barracks Renewal Phase 4A for Quads C, D, E, and F*. Prepared by Belt Collins & Associates, Honolulu, Hawaii.

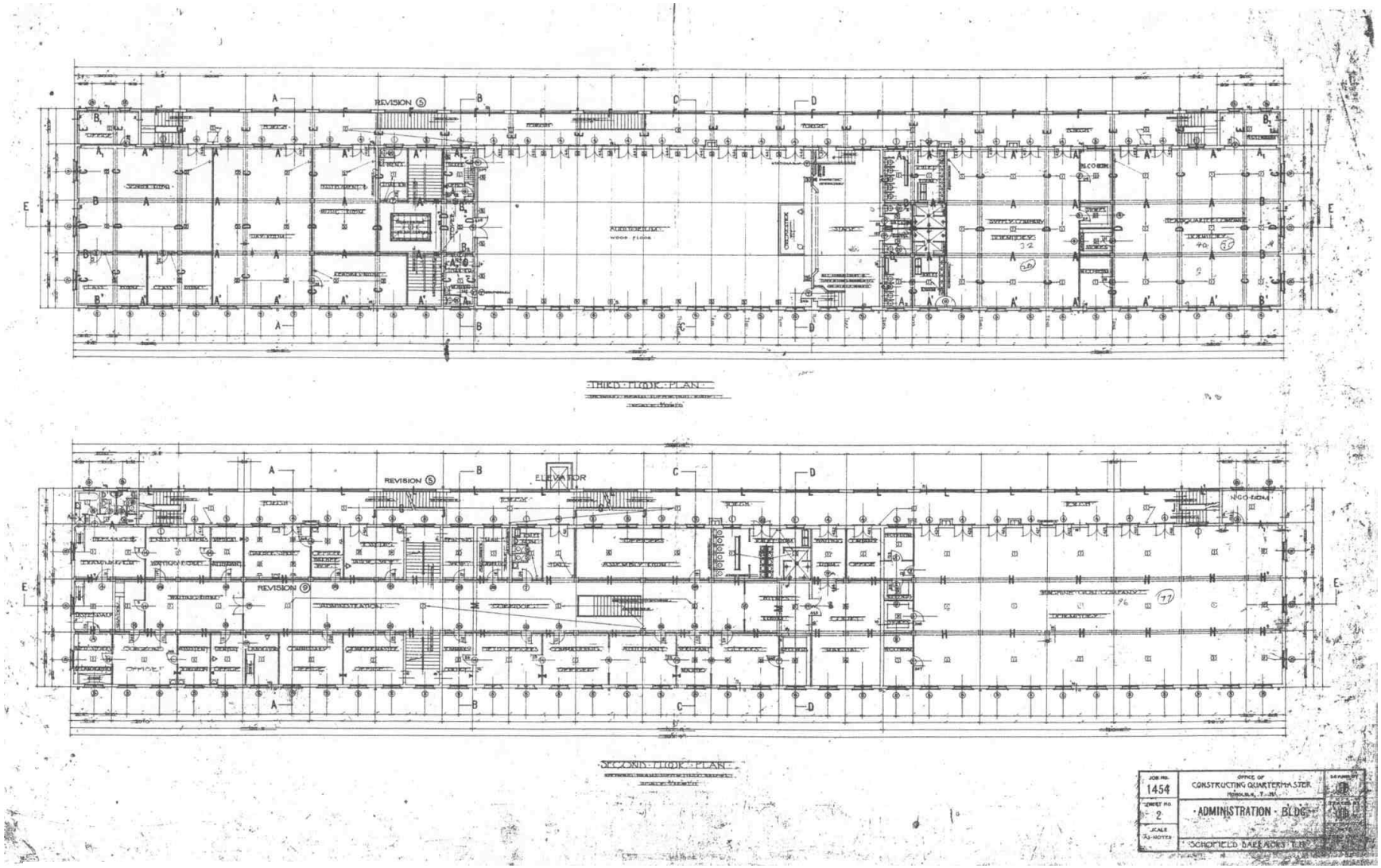
Belt Collins Hawaii, Mason Architects, and International Archaeological Research Institute, Inc.
4/2000 Schofield Barracks Cultural Resource Management Plan. Prepared for United States Army, Commander, 25th Infantry Division (Light) and United States Army Hawaii. Prepared for U.S. Army Corps of Engineers, Honolulu Engineer District.

Scott Williams & Barbara Shideler & Tomasi Patolo
11/1997 *Historic Preservation Measures FY 1995-2006 Whole Barracks Renewal Program at various U.S. Army Installations and the FY 95/96 New Infantry Brigade Complex, Schofield Barracks, Oahu Island, Hawaii.* Draft report prepared by Ogden Environmental Services and Spenser Mason Architects for the U.S. Army Engineer District, Corps of Engineers, Fort Shafter, Oahu, Hawaii.

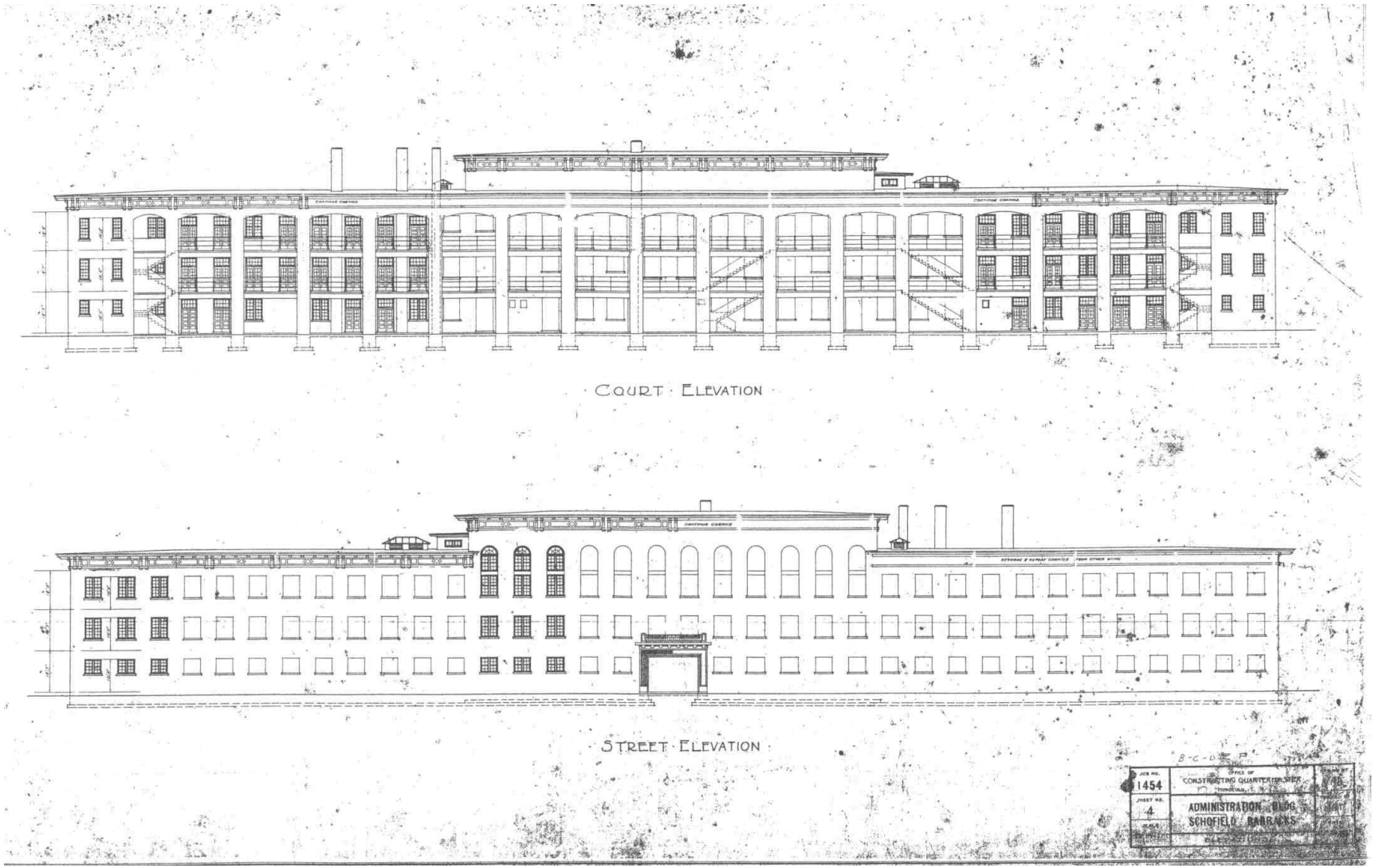
APPENDIX - A



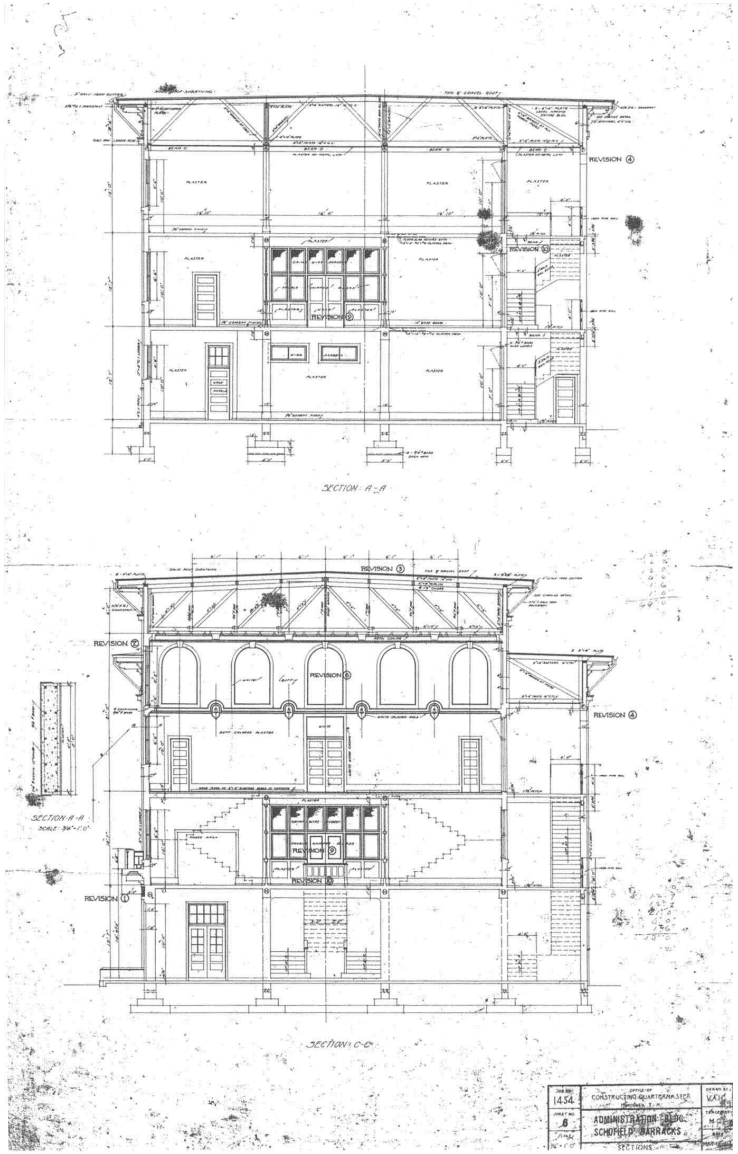
Foundation and First Floor Plan



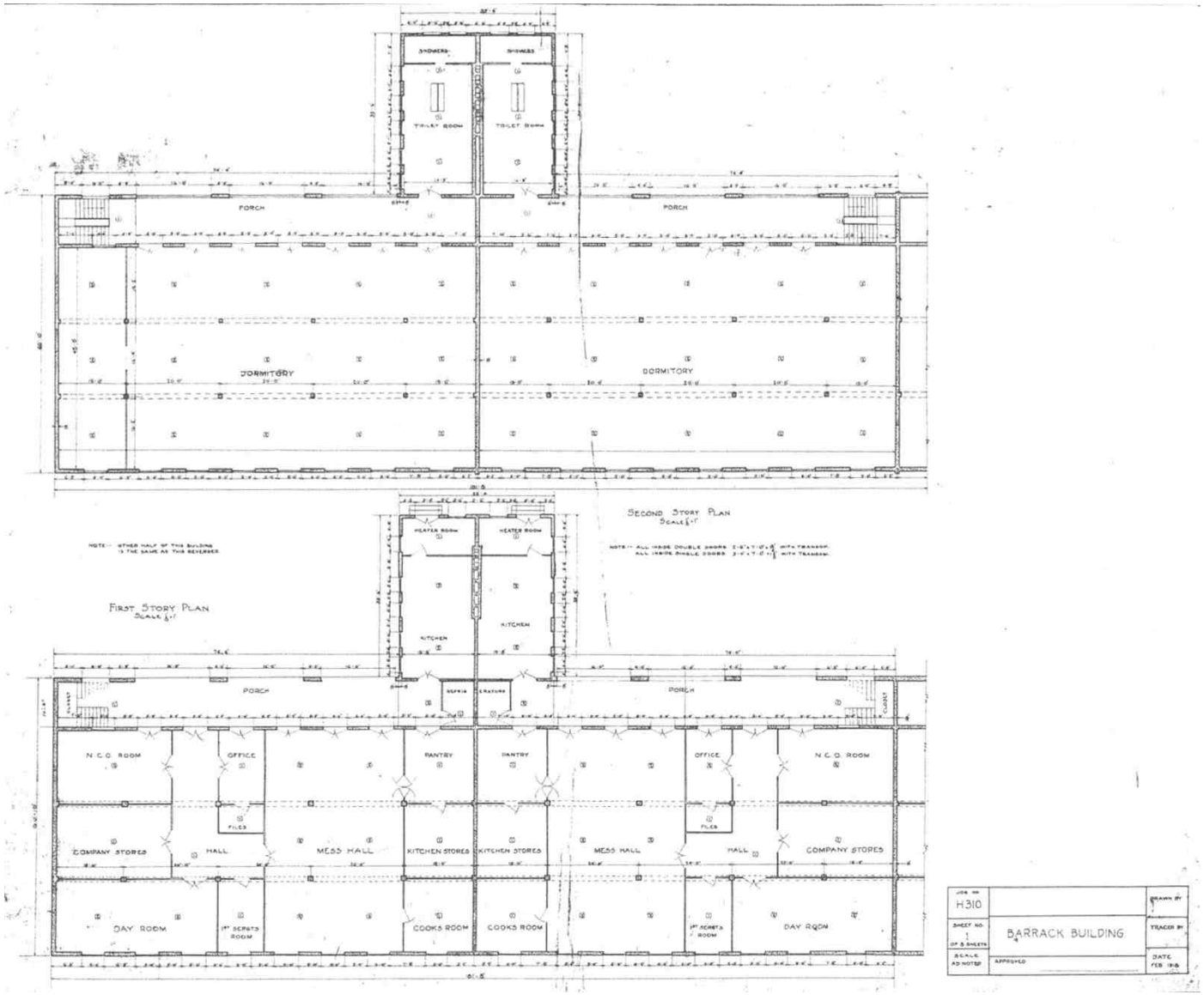
Second and Third Floor Plan


COURT · ELEVATION
STREET · ELEVATION
JOB NO.
1454
SHEET NO.
4
OFFICE OF
CONSTRUCTING QUARTERMASTER
ADMINISTRATION BLDG
SCHOFIELD BARRACKS

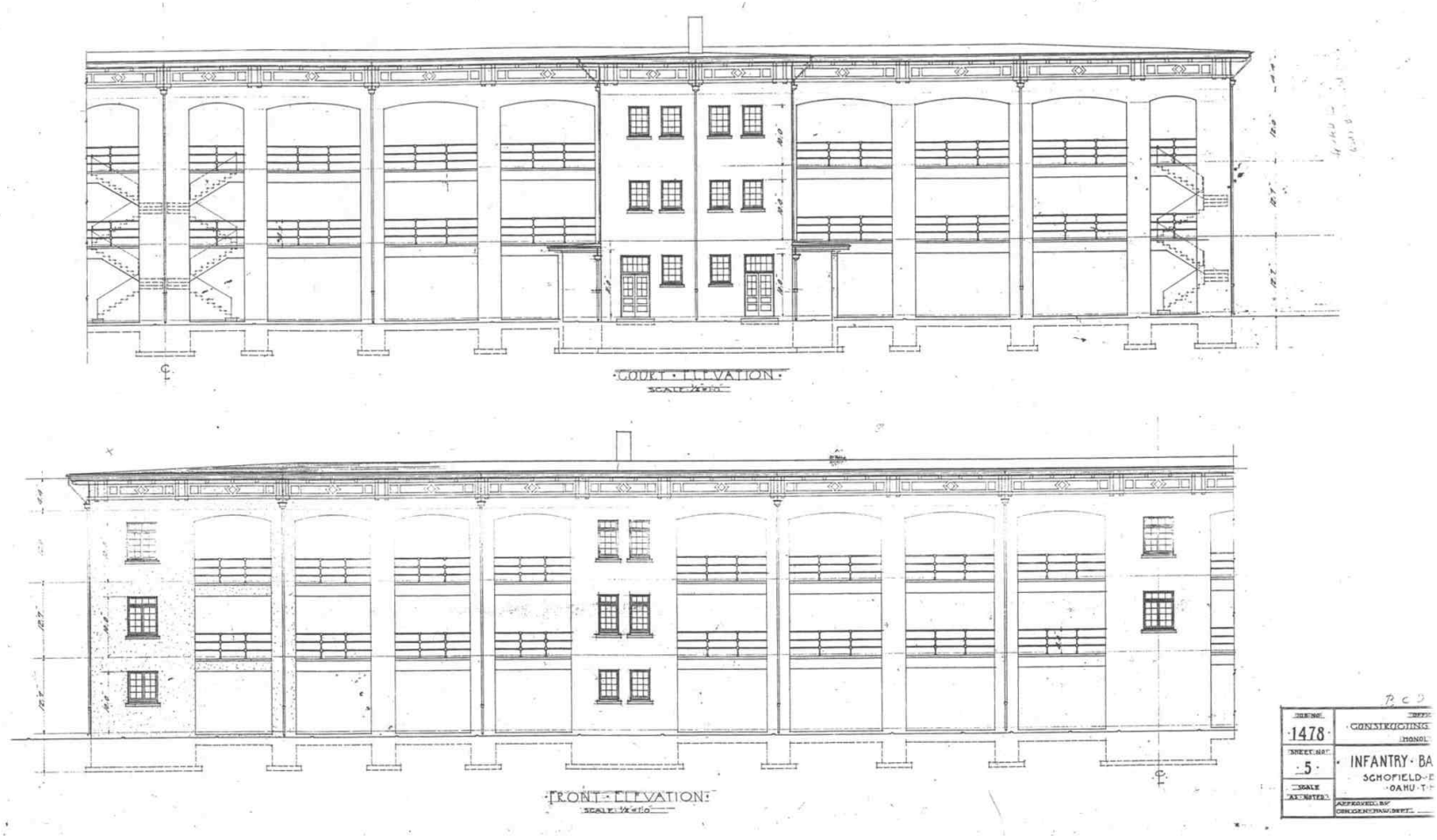
Elevations


SECTION A-A
SECTION C-C
CONSTRUCTING QUARTERMASTER
ADMINISTRATION BLDG.
SCHOFIELD BARRACKS
SECTIONS

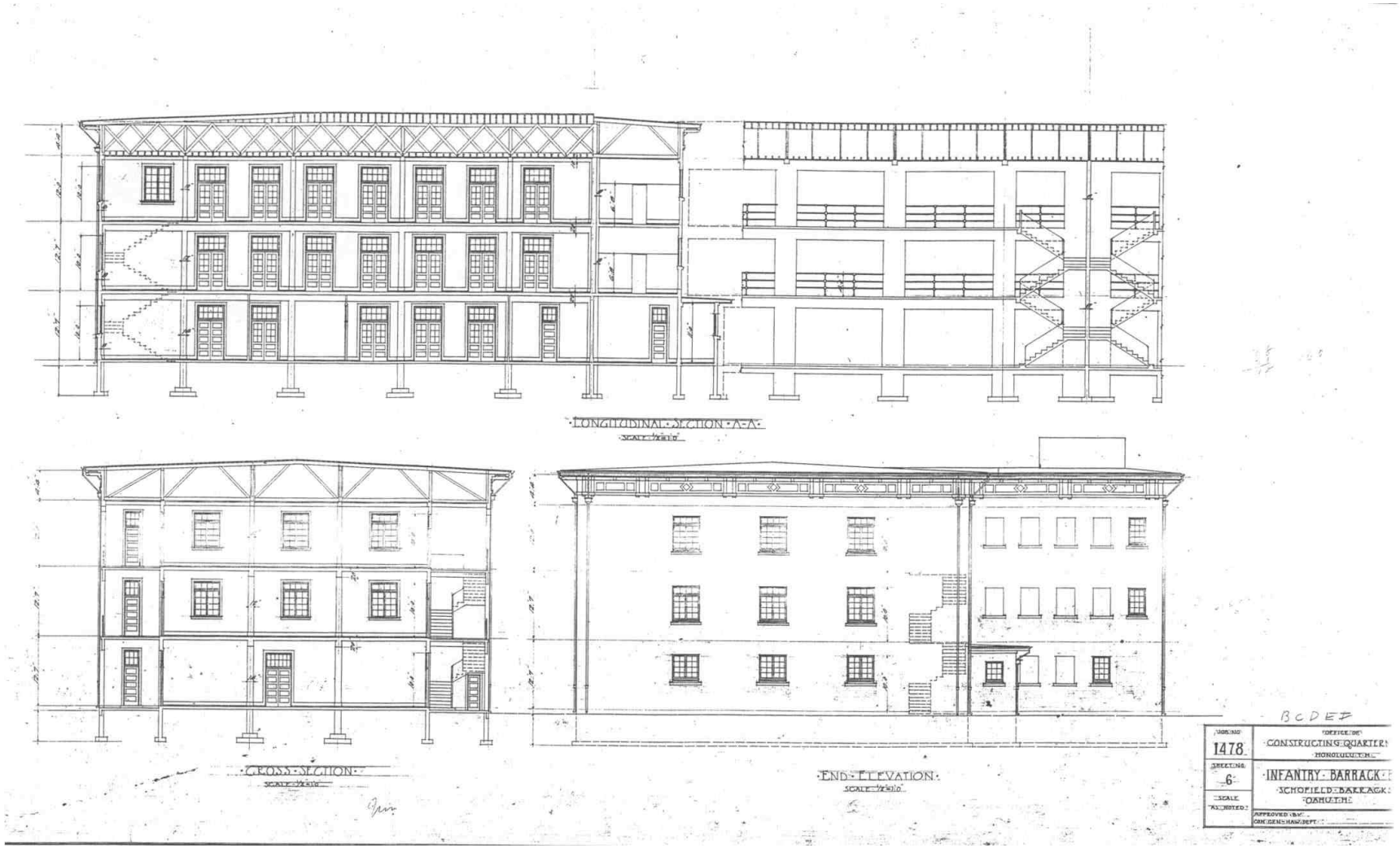
Section


SHOWERS
SHOWERS
TOILET ROOM
TOILET ROOM
PORCH
PORCH
DORMITORY
DORMITORY
SECOND STORY PLAN
SCALE 1/8"
HEATER ROOM
HEATER ROOM
KITCHEN
KITCHEN
FIRST STORY PLAN
SCALE 1/8"
PORCH
PORCH
N.C.O. ROOM
OFFICE
PANTRY
PANTRY
OFFICE
N.C.O. ROOM
FILES
FILES
COMPANY STORES
HALL
MESS HALL
KITCHEN STORES
KITCHEN STORES
MESS HALL
HALL
COMPANY STORES
DAY ROOM
1ST SERGTS ROOM
COOKS ROOM
COOKS ROOM
1ST SERGTS ROOM
DAY ROOM
H310
BARRACK BUILDING
SCALE AS NOTED
APPROVED
DATE FEB 1916

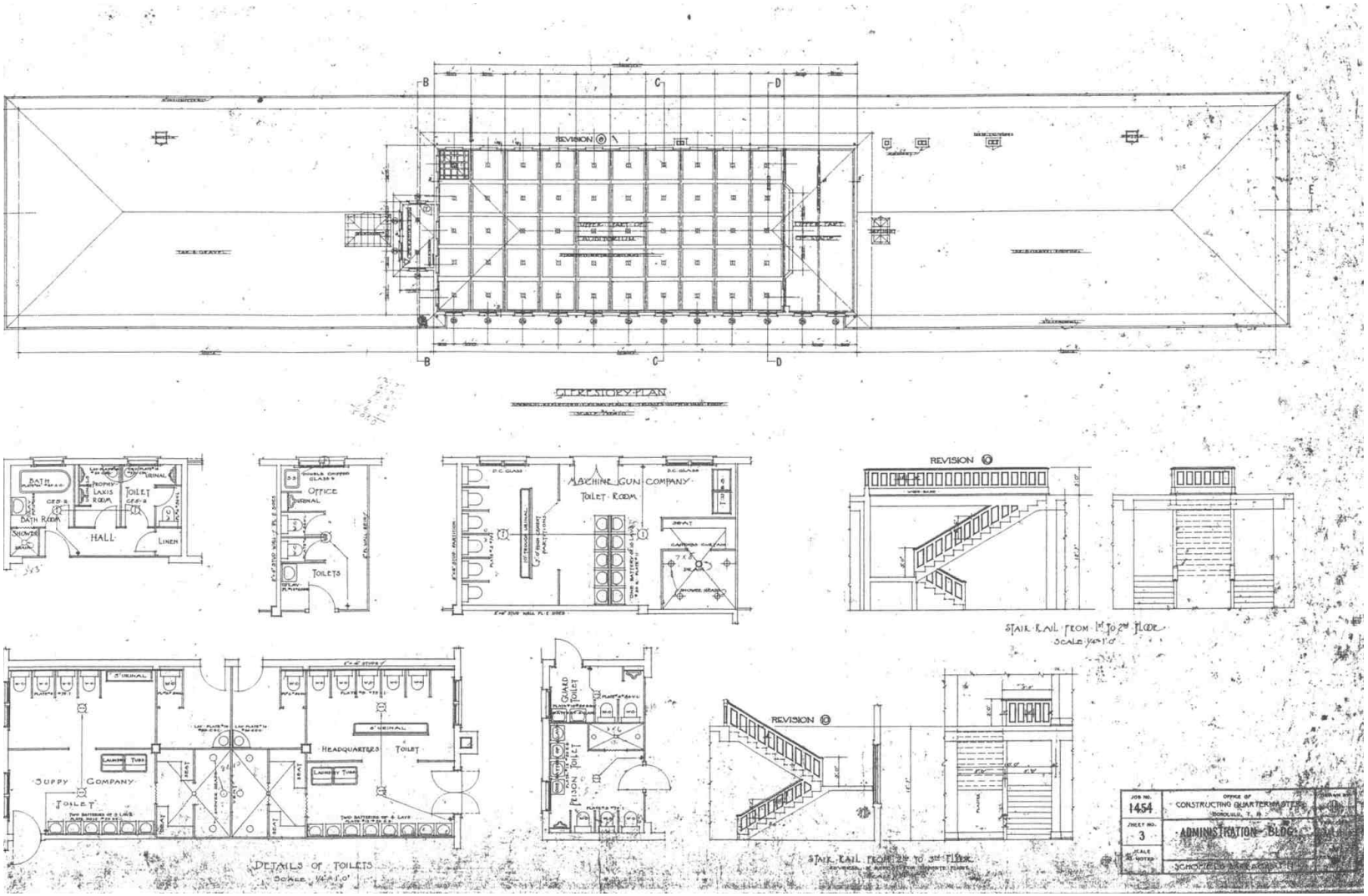
Floor Plan



Front Elevation

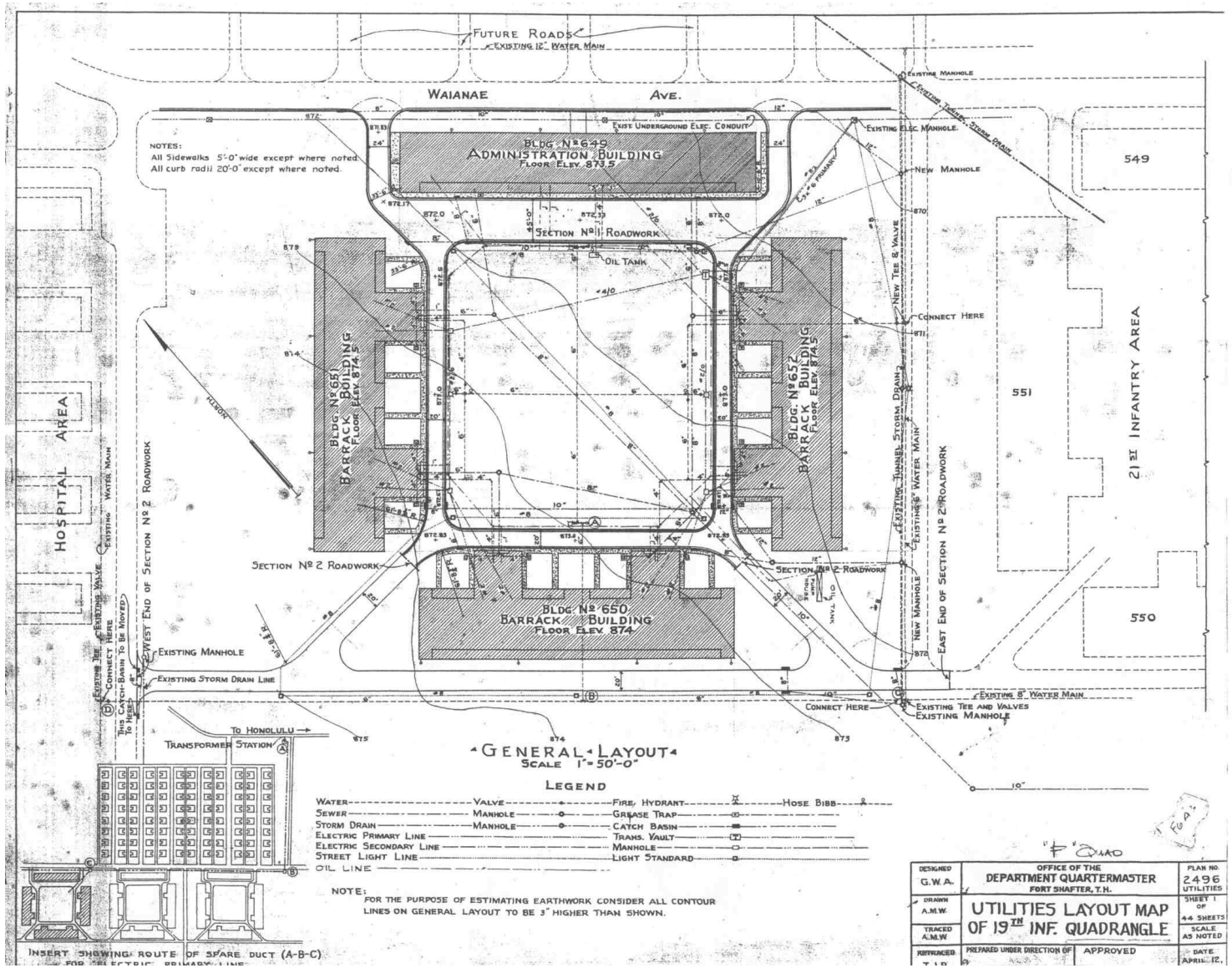


End Elevation

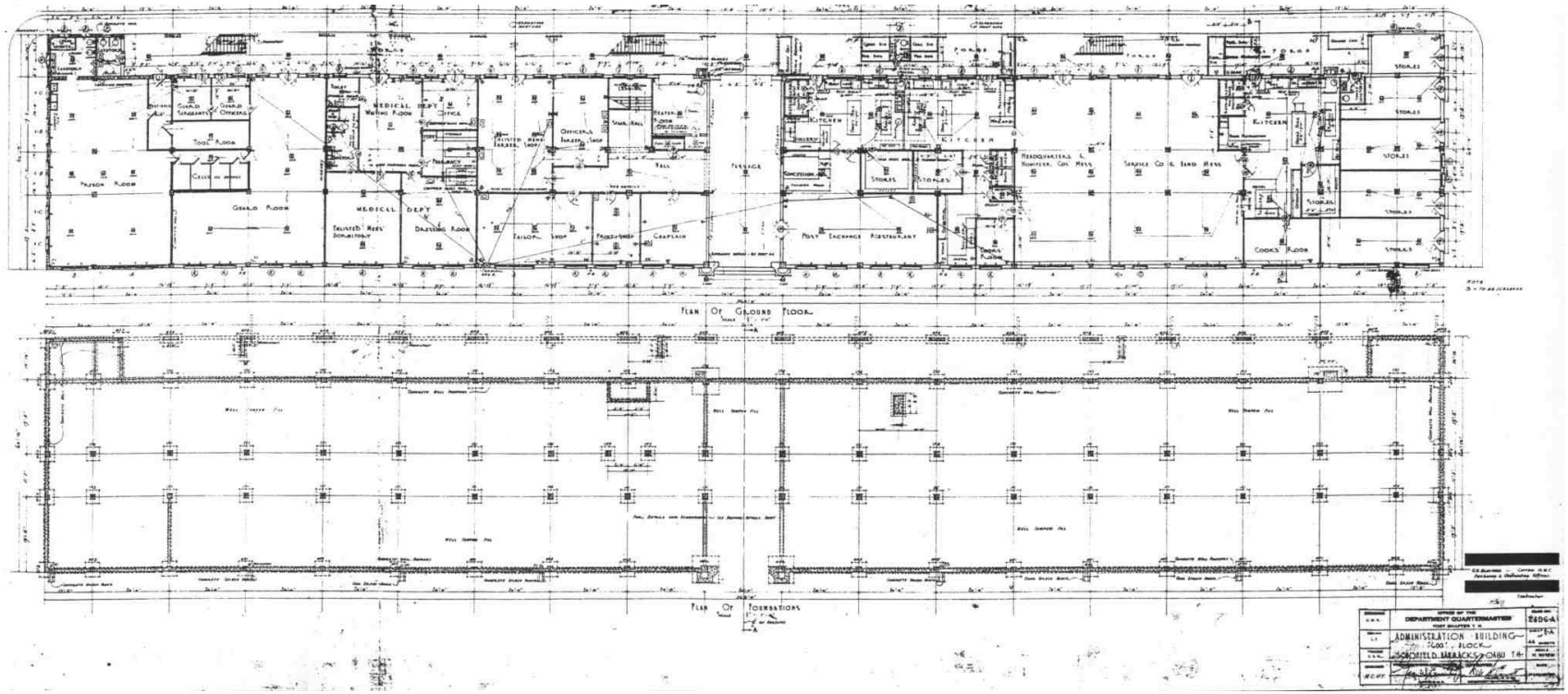

CLERESTORY PLAN
REVISION
MACHINE GUN COMPANY
TOILET ROOM
OFFICE
TOILETS
HALL
BATH ROOM
SHOWER
LINEN
HEADQUARTERS
TOILET
SUPPY COMPANY
TOILET
DETAILS OF TOILETS
STAIR RAIL FROM 1st TO 2nd FLOOR
STAIR RAIL FROM 2nd TO 3rd FLOOR
1454
CONSTRUCTING QUARTERMASTER
ADMINISTRATION BLDG.
SCHOFIELD BARRACKS

Clerestory

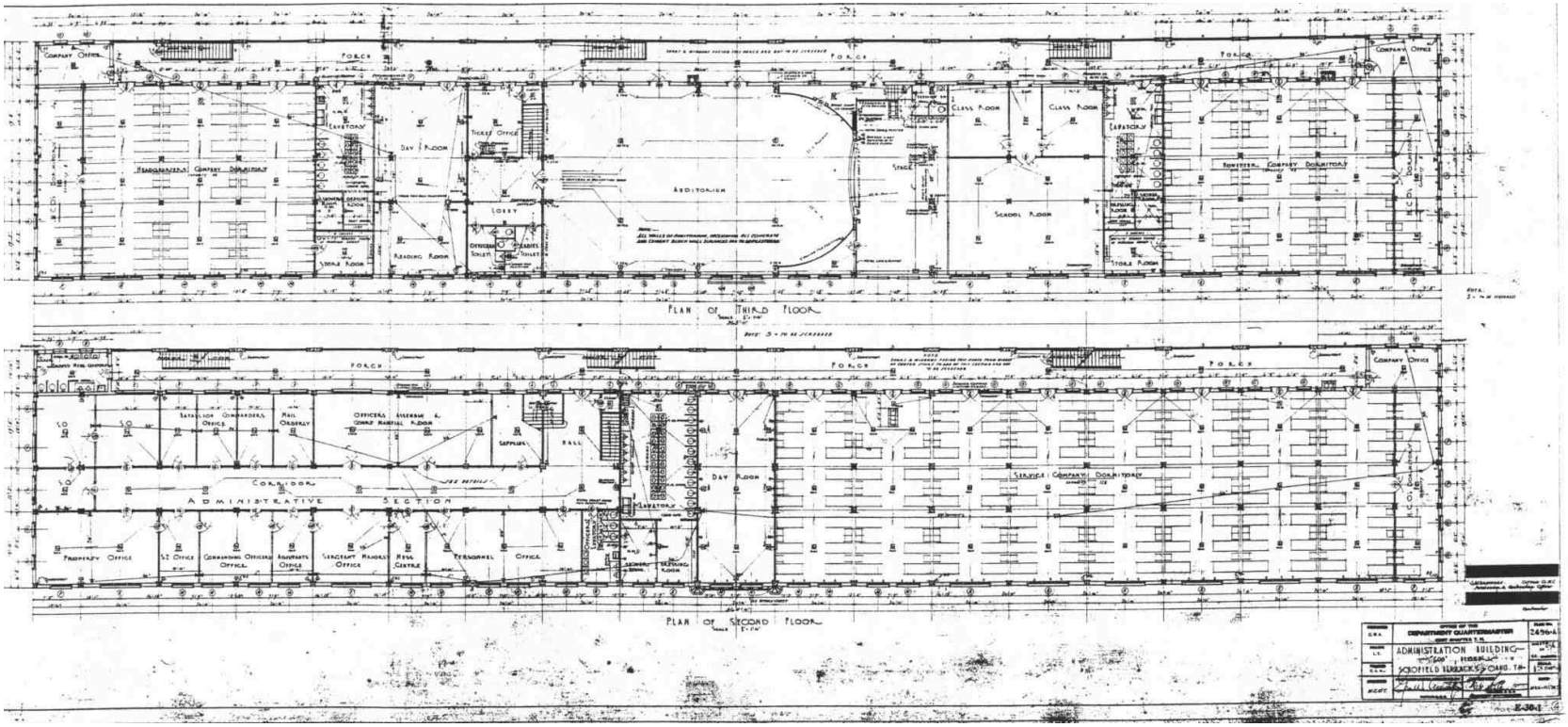
APPENDIX - B


FUTURE ROADS
EXISTING 12" WATER MAIN
WAIANAE AVE.
NOTES:
All Sidewalks 5'-0" wide except where noted.
All curb radii 20'-0" except where noted.
BLDG. Nº 649
ADMINISTRATION BUILDING
FLOOR ELEV. 873.5
EXIST UNDERGROUND ELEC. CONDUIT
SECTION Nº 11 ROADWORK
OIL TANK
BLDG. Nº 651
BARRACK BUILDING
FLOOR ELEV. 874.5
BLDG. Nº 652
BARRACK BUILDING
FLOOR ELEV. 874.5
BLDG. Nº 650
BARRACK BUILDING
FLOOR ELEV. 874
SECTION Nº 2 ROADWORK
WEST END OF SECTION Nº 2 ROADWORK
EAST END OF SECTION Nº 2 ROADWORK
EXISTING MANHOLE
EXISTING STORM DRAIN LINE
EXISTING 8" WATER MAIN
CONNECT HERE
EXISTING TEE AND VALVES
EXISTING MANHOLE
NEW MANHOLE
NEW TEE & VALVE
EXISTING TUNNEL STORM DRAIN
EXISTING ELEC. MANHOLE
HOSPITAL AREA
21ST INFANTRY AREA
549
550
551
TO HONOLULU
TRANSFORMER STATION
GENERAL LAYOUT
SCALE 1"=50'-0"
LEGEND
WATER
SEWER
STORM DRAIN
ELECTRIC PRIMARY LINE
ELECTRIC SECONDARY LINE
STREET LIGHT LINE
OIL LINE
VALVE
MANHOLE
FIRE HYDRANT
GREASE TRAP
CATCH BASIN
TRANS. VAULT
LIGHT STANDARD
HOSE BIBB
NOTE:
FOR THE PURPOSE OF ESTIMATING EARTHWORK CONSIDER ALL CONTOUR LINES ON GENERAL LAYOUT TO BE 3" HIGHER THAN SHOWN.
INSERT SHOWING ROUTE OF SPARE DUCT (A-B-C)
DESIGNED G.W.A.
DRAWN A.M.W.
TRACED A.M.W.
OFFICE OF THE DEPARTMENT QUARTERMASTER
FORT SHAFTER, T.H.
UTILITIES LAYOUT MAP OF 19TH INF. QUADRANGLE
PLAN NO. 2496 UTILITIES
SHEET 1 OF 44 SHEETS
SCALE AS NOTED
DATE APRIL 12,
PREPARED UNDER DIRECTION OF
APPROVED

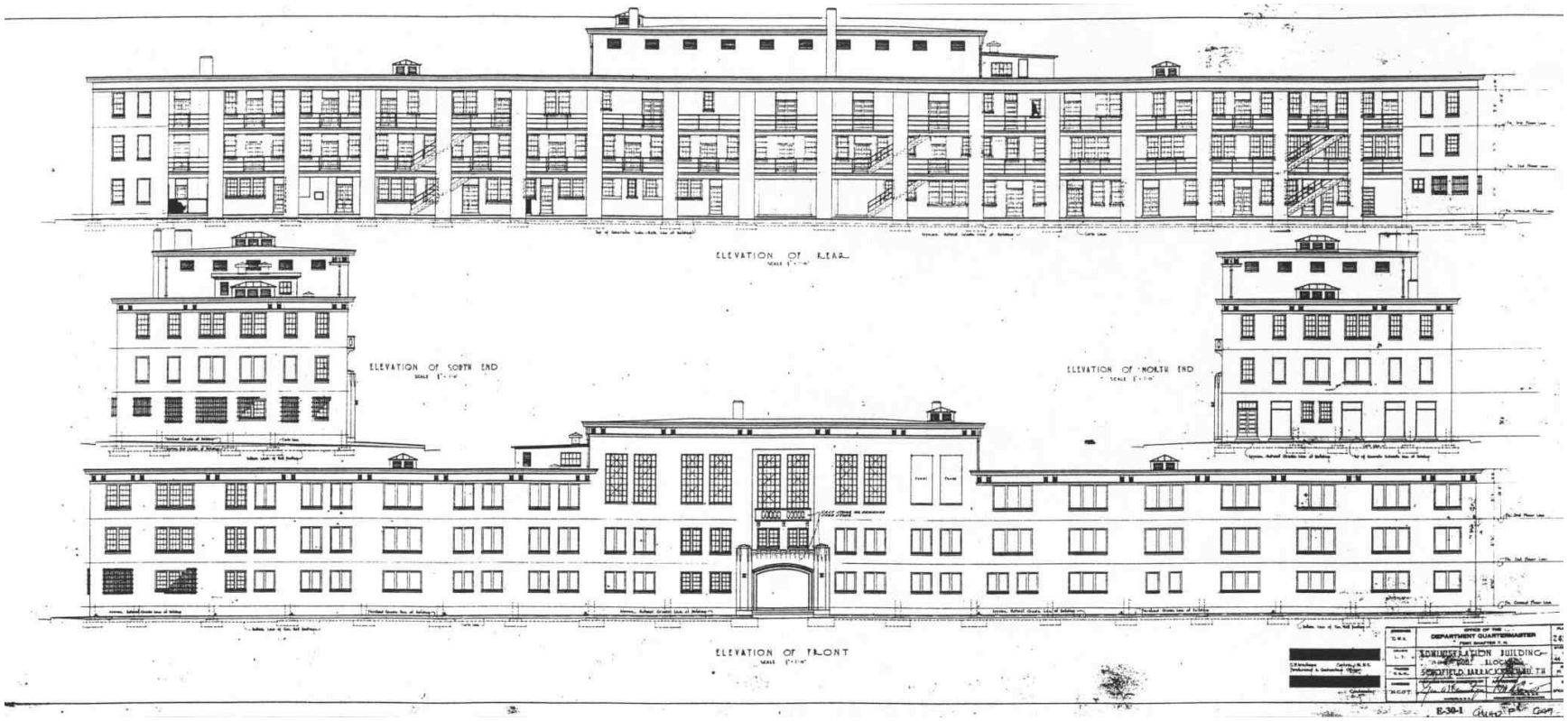
Quad F Plan



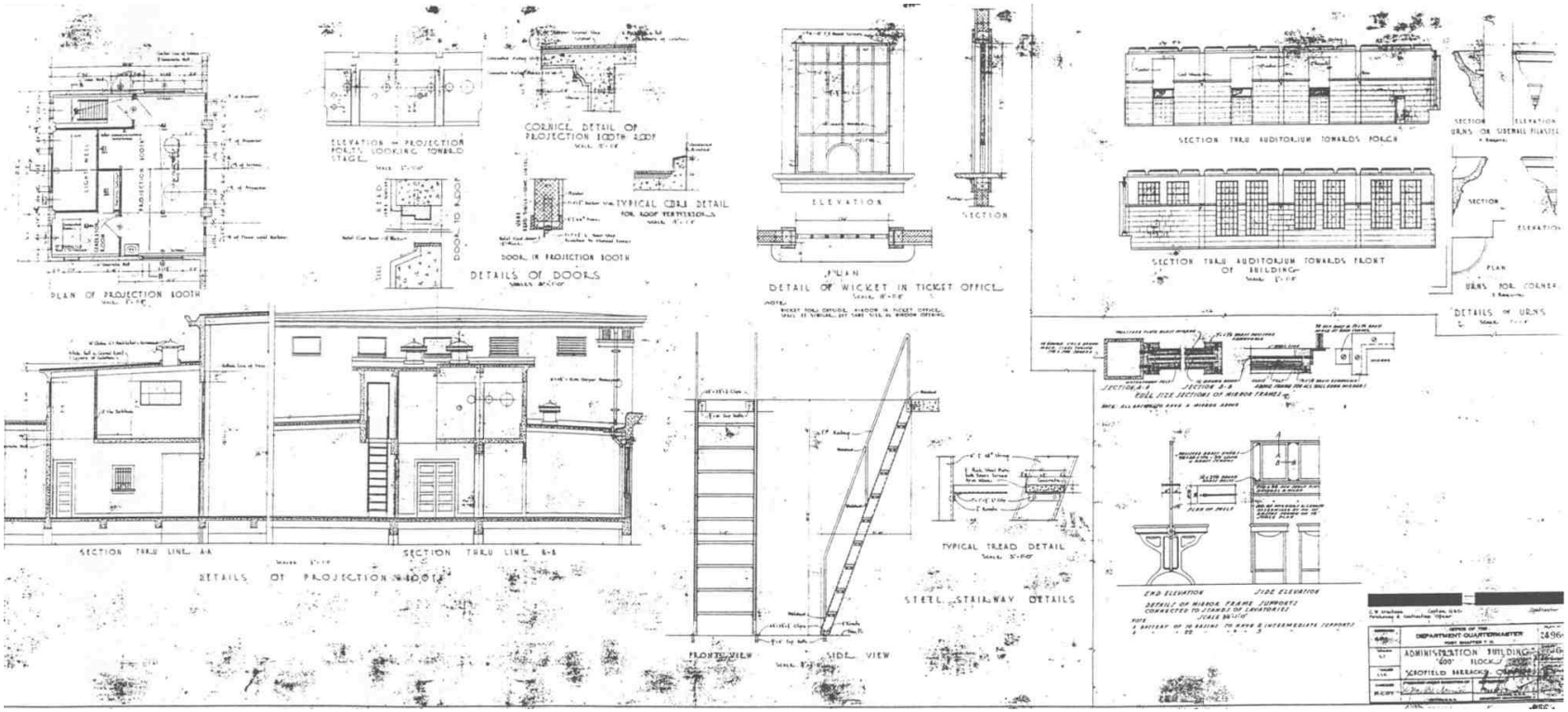
Foundation and First Floor Plan



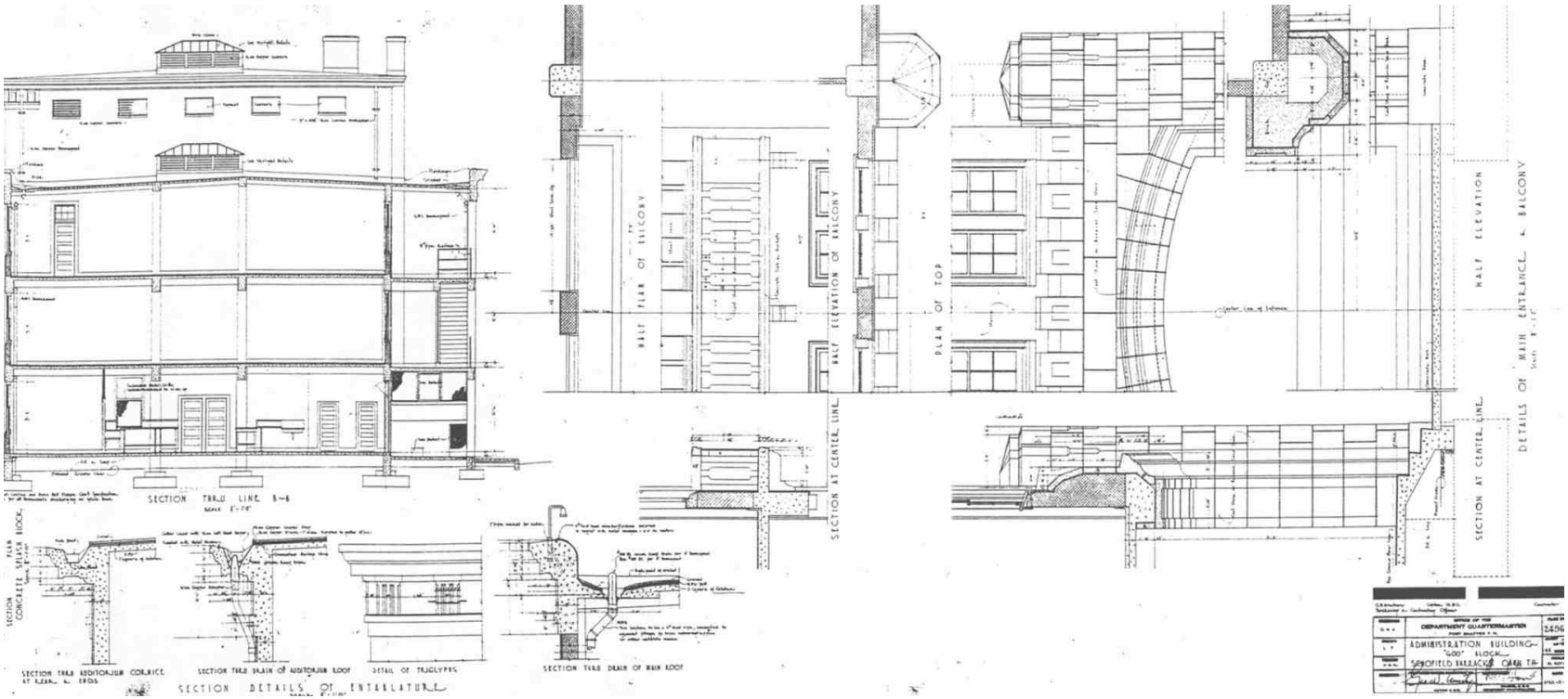
Second and Third Floor Plan


ELEVATION OF REAR
ELEVATION OF SOUTH END
ELEVATION OF NORTH END
ELEVATION OF FRONT
DEPARTMENT QUARTERMASTER
ADMINISTRATION BUILDING
SCHOFIELD BARRACKS, HAWAII
E-30-1

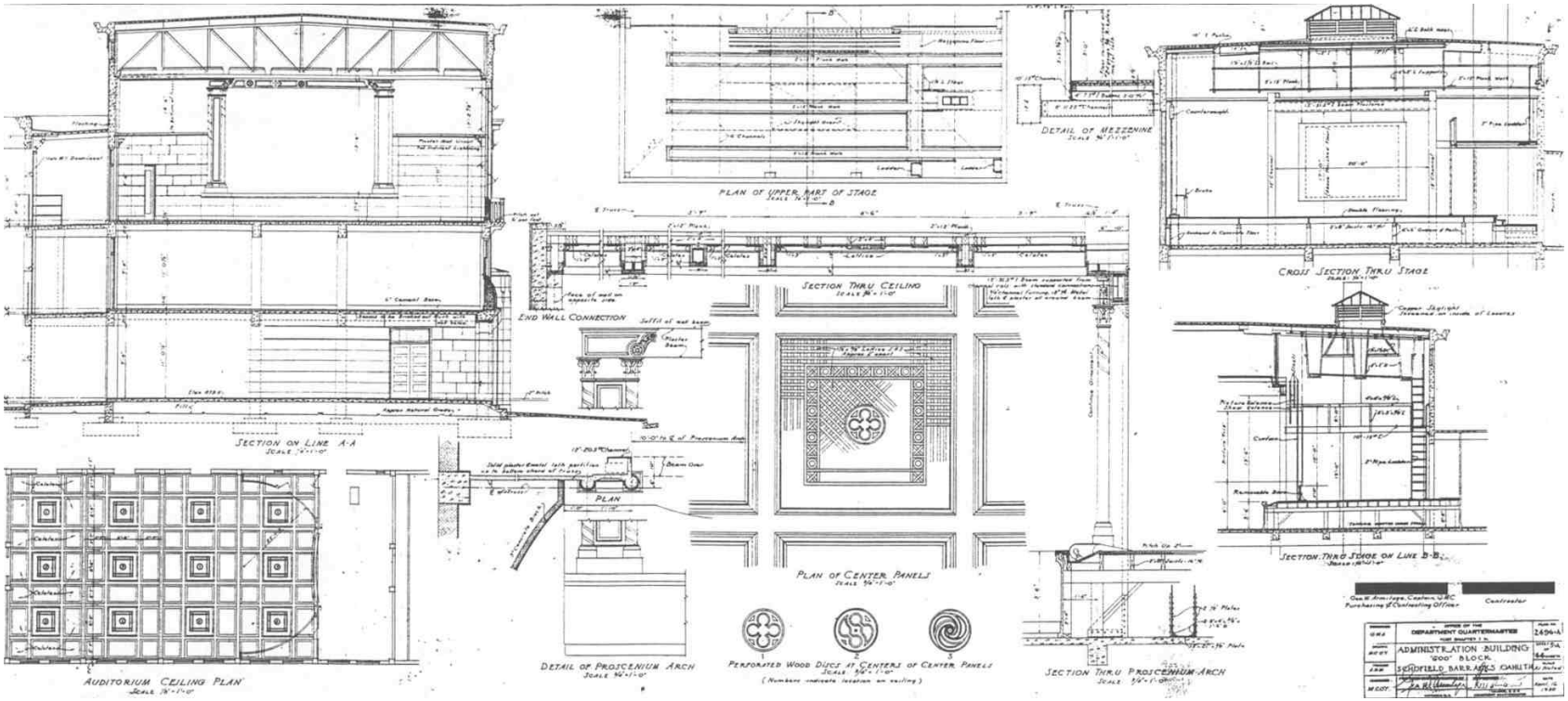
Elevations


PLAN OF PROJECTION BOOTH
ELEVATION — PROJECTION BOOTH LOOKING TOWARD STAGE
CORNICE DETAIL OF PROJECTION BOOTH ROOF
TYPICAL CORE DETAIL FOR ROOF VENTILATORS
DOOR IN PROJECTION BOOTH
DETAILS OF DOORS
ELEVATION
SECTION
PLAN
DETAIL OF WICKET IN TICKET OFFICE
SECTION THRU AUDITORIUM TOWARDS FOYER
SECTION THRU AUDITORIUM TOWARDS FRONT OF BUILDING
SECTION
ELEVATION
PLAN
URNS FOR CORNER
DETAILS OF URNS
SECTION THRU LINE AA
SECTION THRU LINE BB
DETAILS OF PROJECTION BOOTH
FULL SIZE SECTIONS OF MIRROR FRAMES
TYPICAL TREAD DETAIL
STEEL STAIRWAY DETAILS
FRONT VIEW
SIDE VIEW
END ELEVATION
SIDE ELEVATION
DEPARTMENT QUARTERMASTER
ADMINISTRATION BUILDING
SCHOFIELD BARRACKS

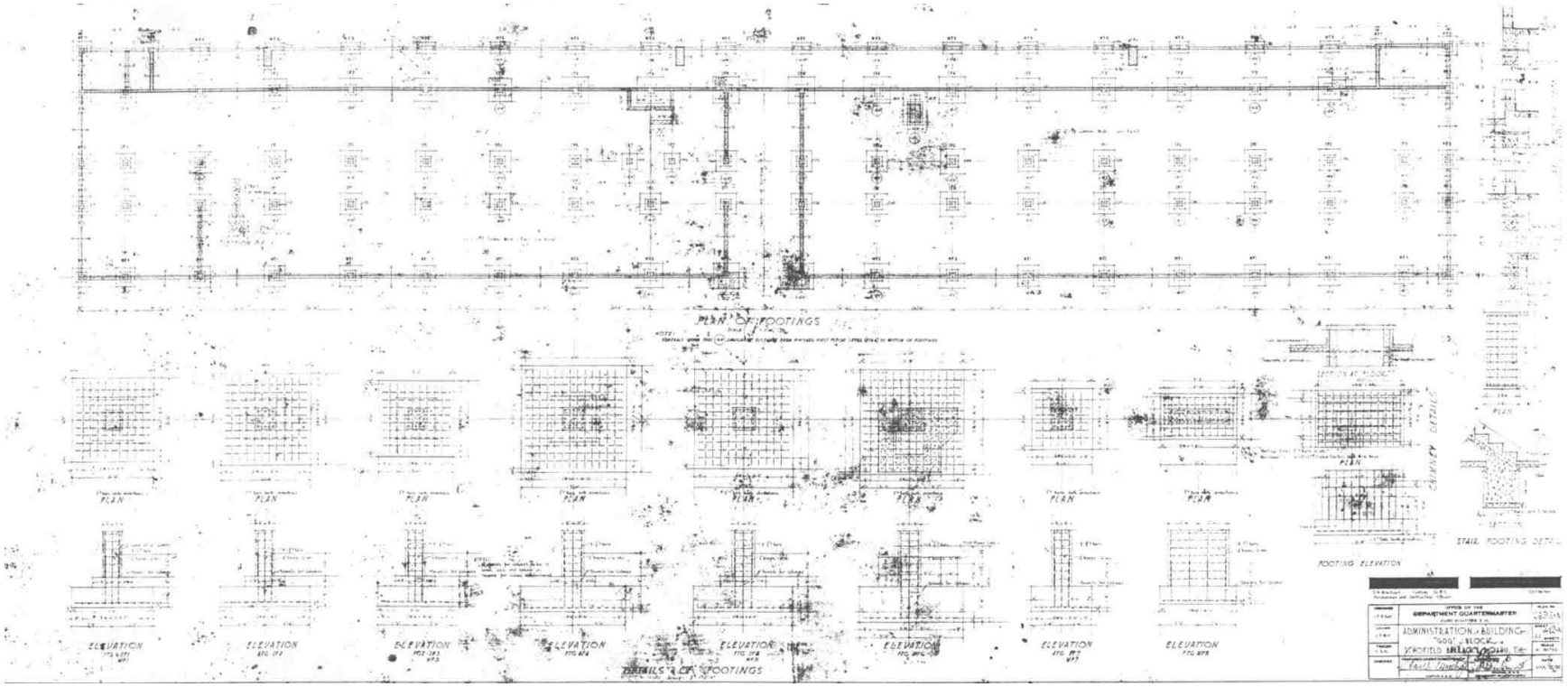
Section



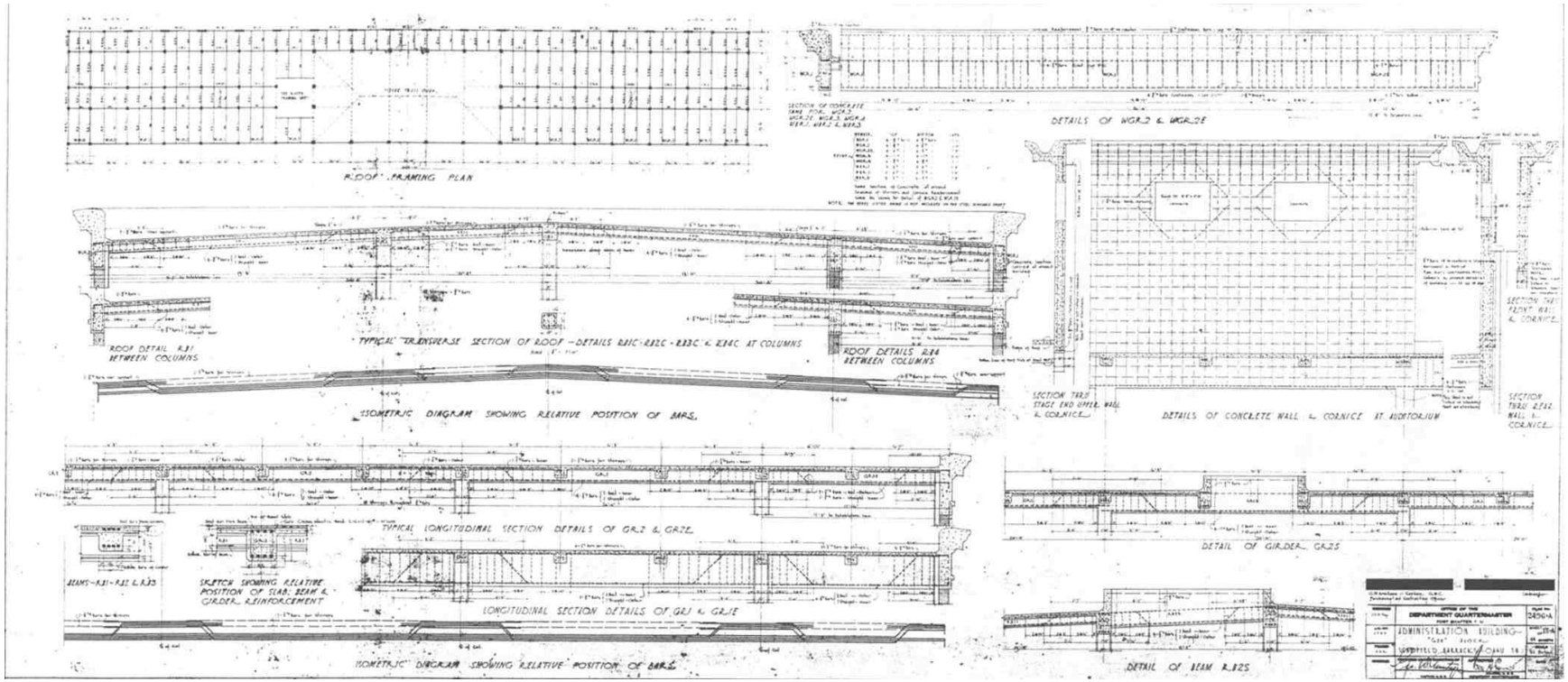
Entrance Detail



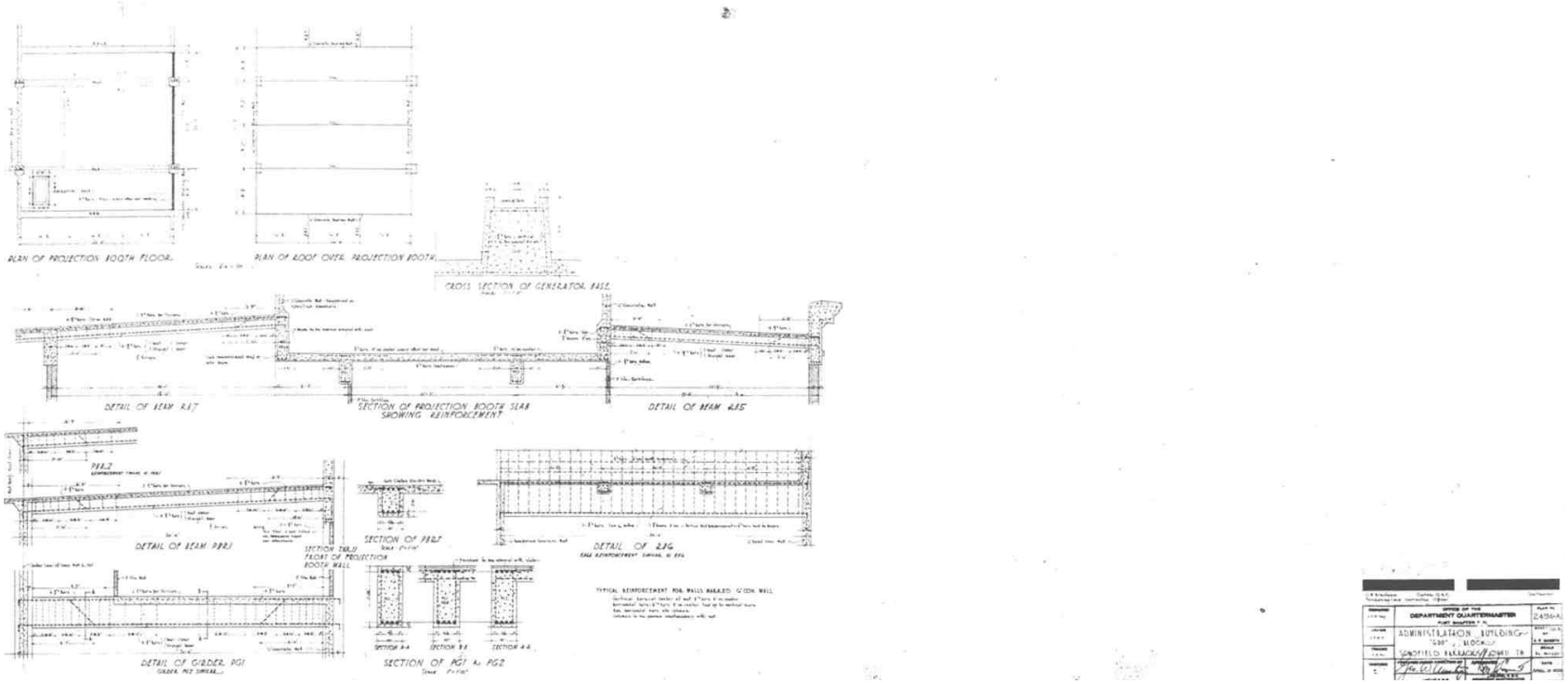
Ceiling Plans and Detail



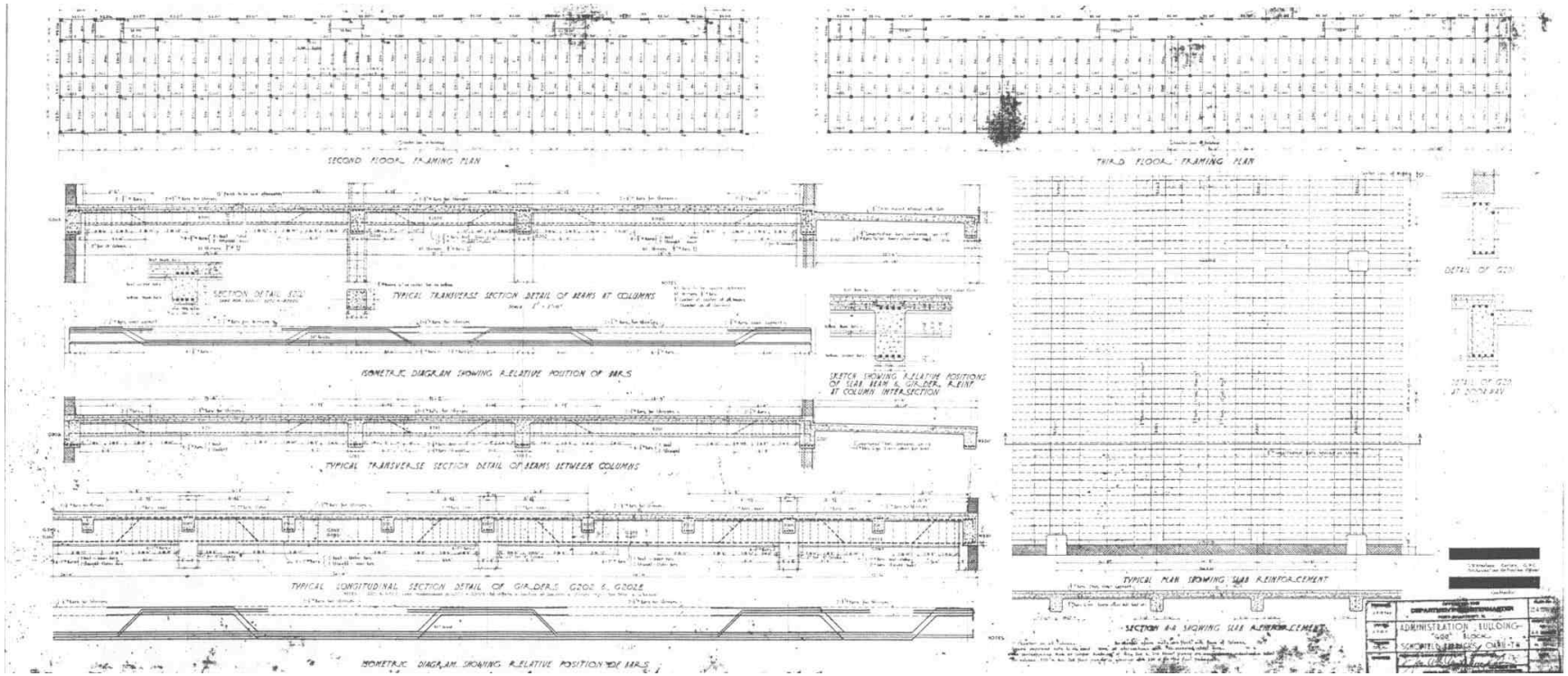
Foundation Detail


ROOF FRAMING PLAN
DETAILS OF WGR2 & WGR2E
ROOF DETAIL R31 BETWEEN COLUMNS
TYPICAL TRANSVERSE SECTION OF ROOF - DETAILS R31C - R32C - R33C & R34C AT COLUMNS
ROOF DETAILS R34 BETWEEN COLUMNS
ISOMETRIC DIAGRAM SHOWING RELATIVE POSITION OF BARS.
SECTION THRU STAGE END OPEN. WALL & CORNICE
DETAILS OF CONCRETE WALL & CORNICE AT AUDITORIUM
SECTION THRU FRONT WALL & CORNICE
SECTION THRU REAR WALL & CORNICE
TYPICAL LONGITUDINAL SECTION DETAILS OF GR2 & GR2E
DETAIL OF GIRDER GR2S
BEAMS - R31 - R32 & R33
SKETCH SHOWING RELATIVE POSITION OF SLAB, BEAM & GIRDER REINFORCEMENT
LONGITUDINAL SECTION DETAILS OF GR1 & GR1E
ISOMETRIC DIAGRAM SHOWING RELATIVE POSITION OF BARS
DETAIL OF BEAM R32S
DEPARTMENT QUARTERMASTER
ADMINISTRATION BUILDING

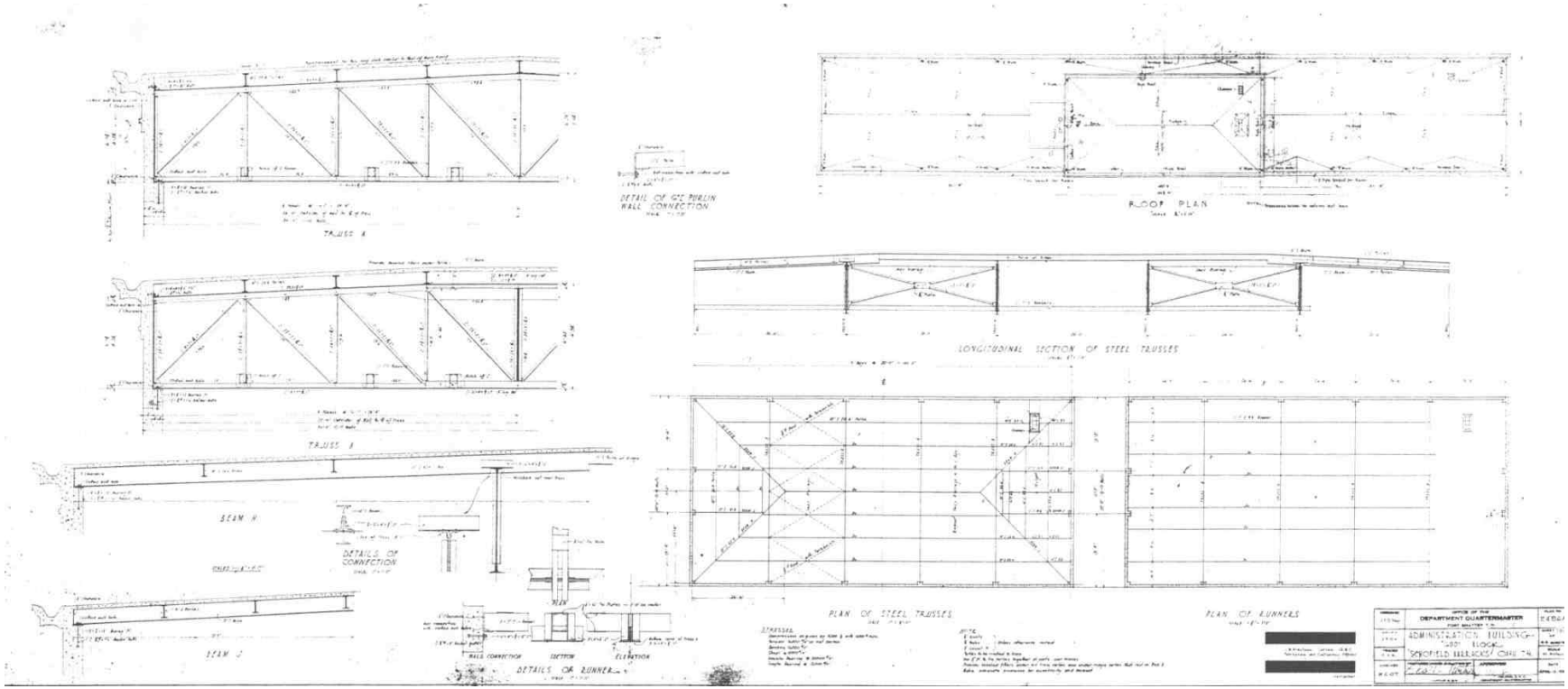
Wall Detail



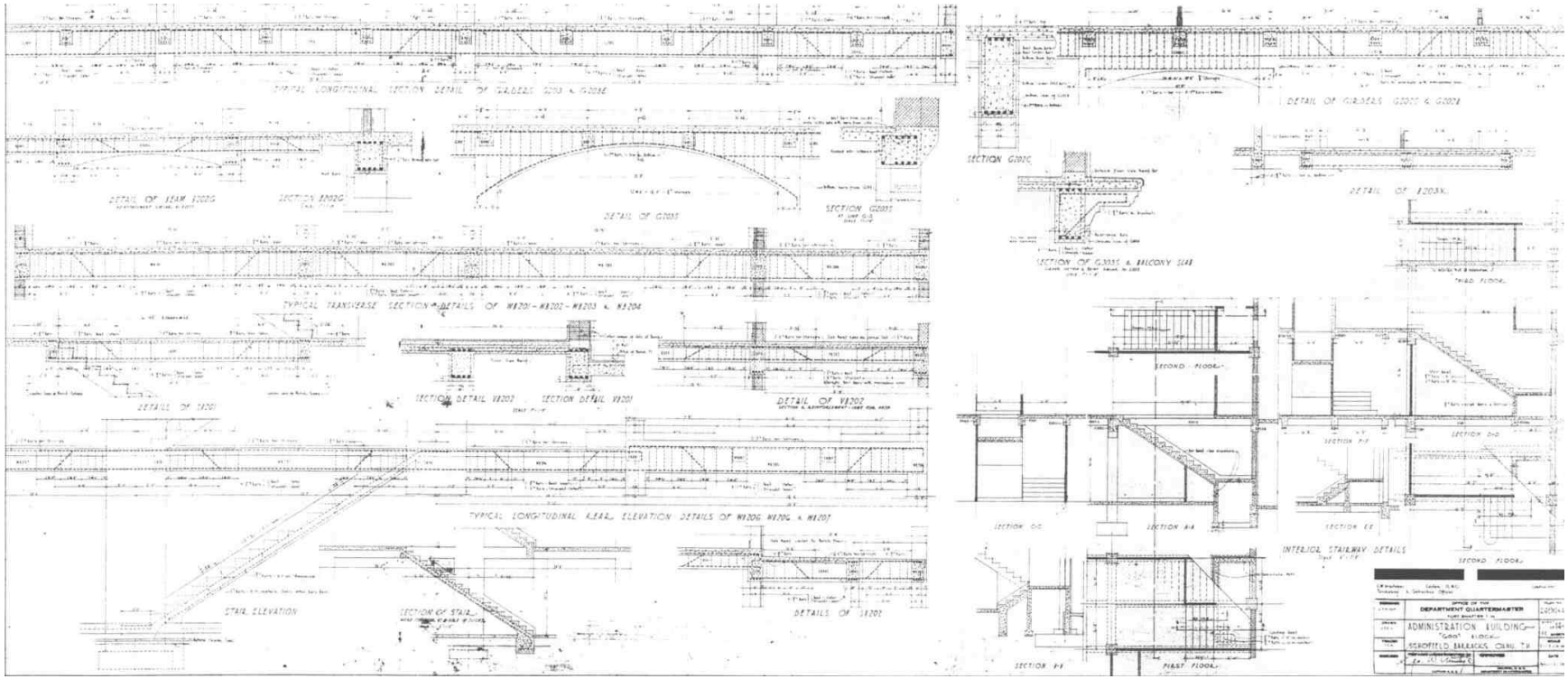
Construction Detail



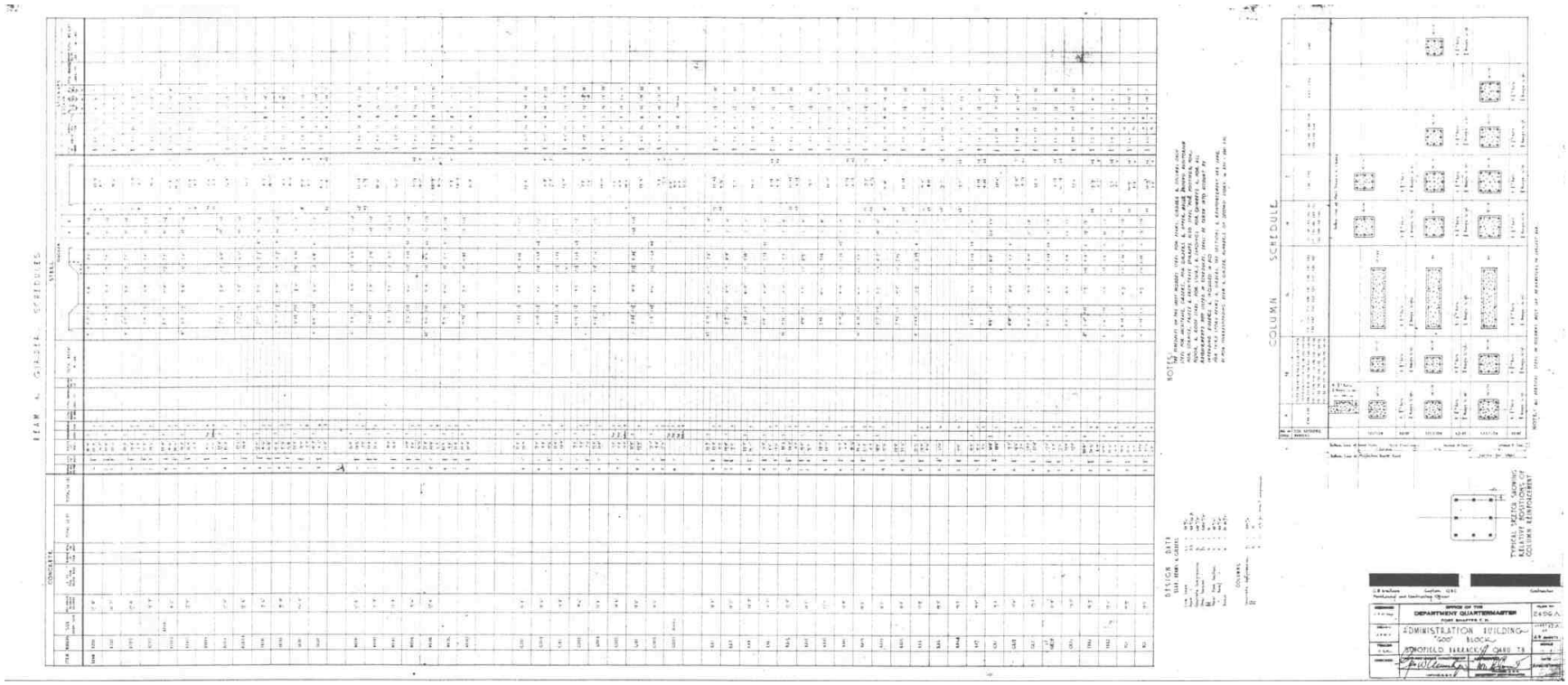
Column Detail



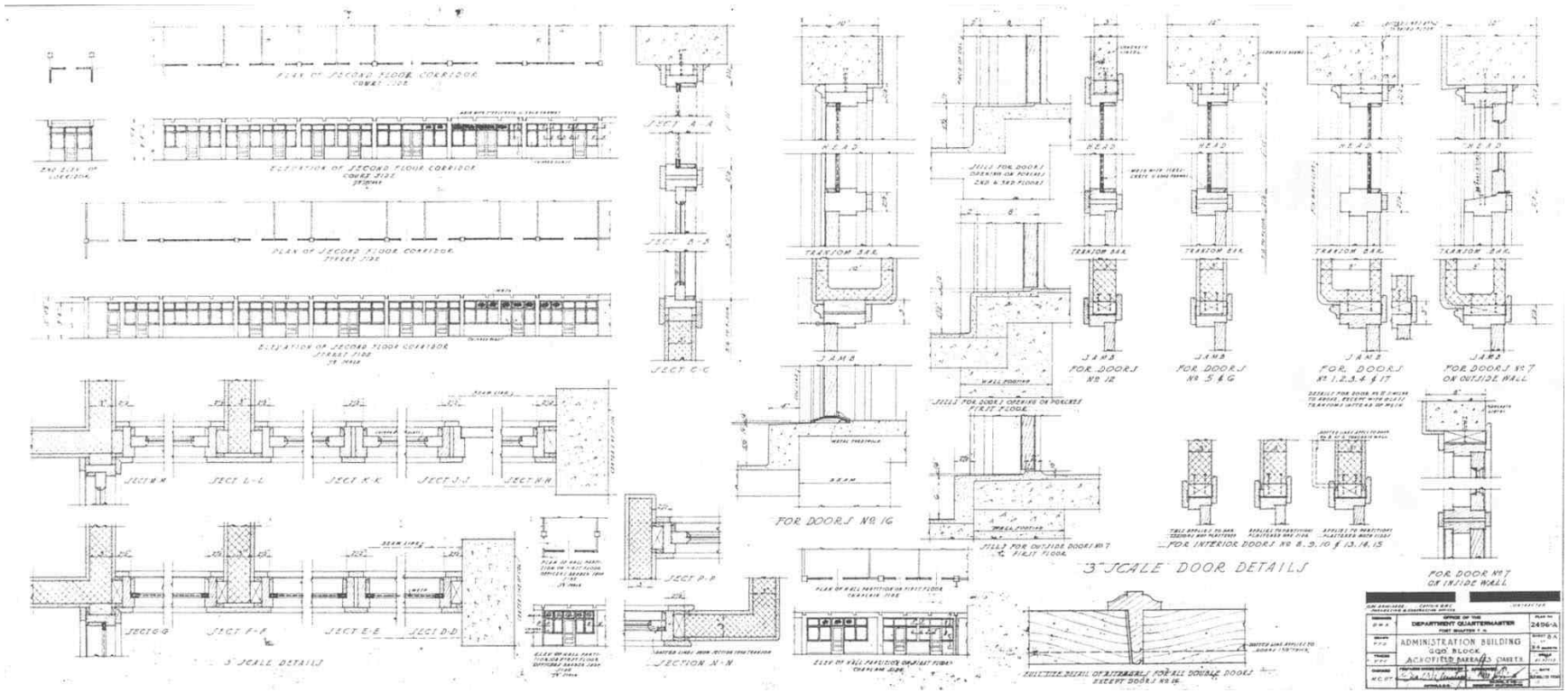
Truss Detail



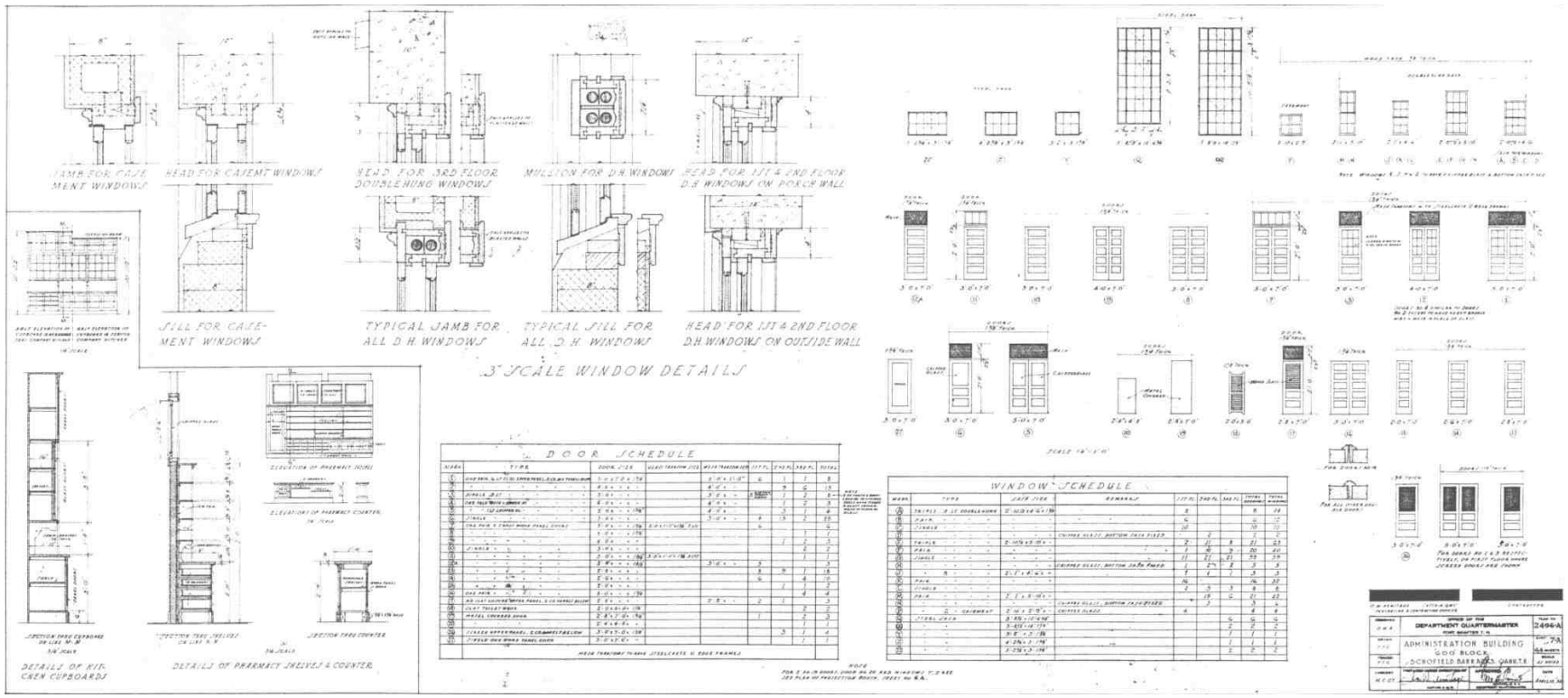
Girder Detail



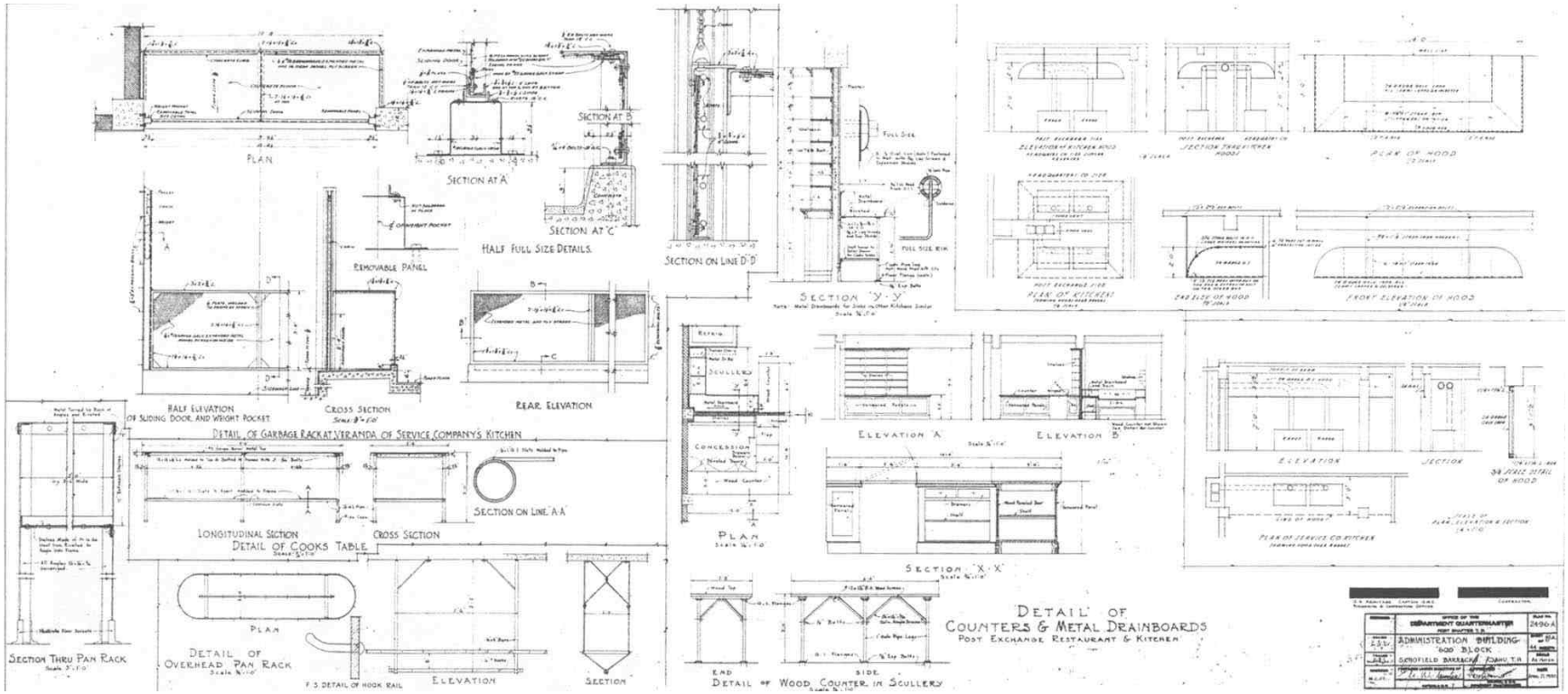
Beam and Girder Detail


3" SCALE DOOR DETAILS
FOR DOOR NO 16
FOR DOOR NO 12
FOR DOOR NO 5 & 6
FOR DOORS NO 1,2,3,4 & 17
FOR DOOR NO 7 ON OUTSIDE WALL
FOR INTERIOR DOORS NO 8,9,10 & 13,14,15
3" SCALE DETAILS
SECTION N-N
ADMINISTRATION BUILDING
900 BLOCK
SCHOFIELD BARRACKS

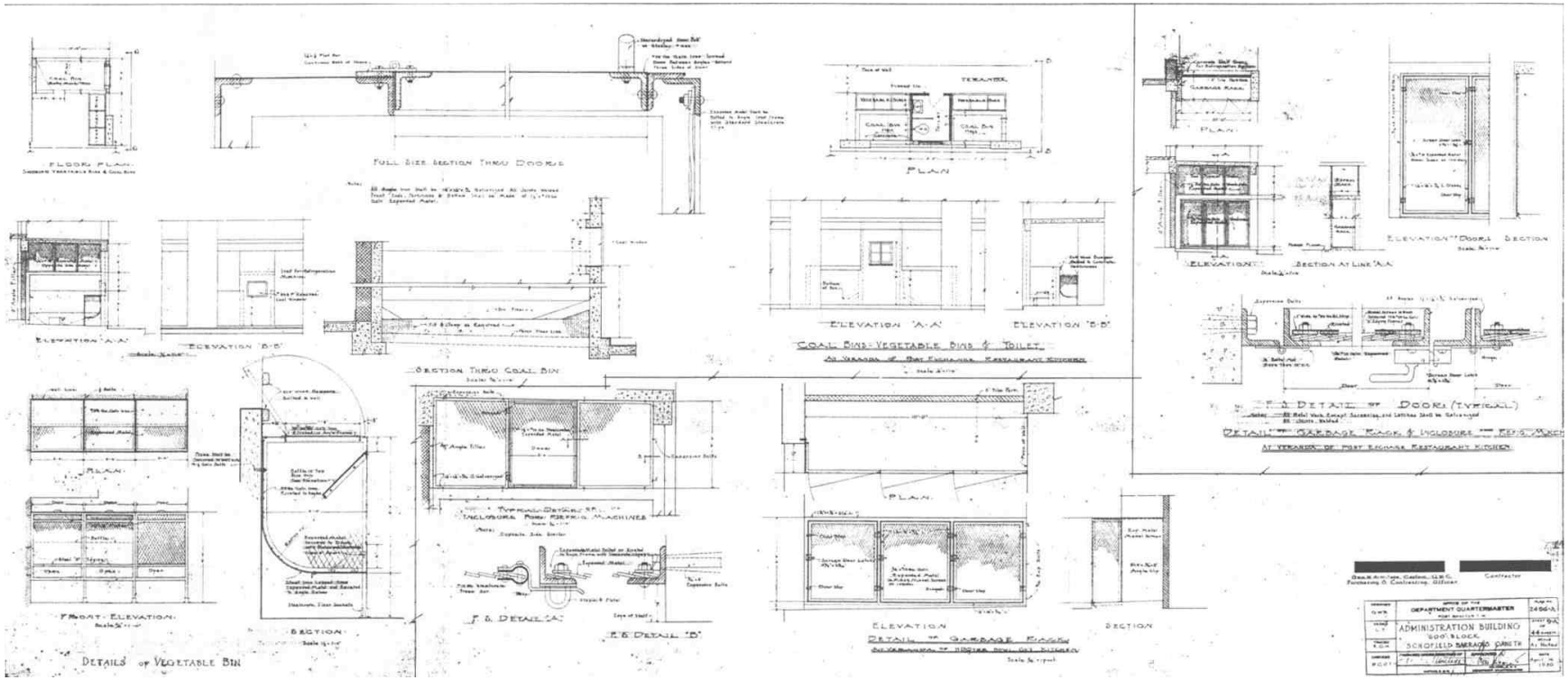
Door Detail



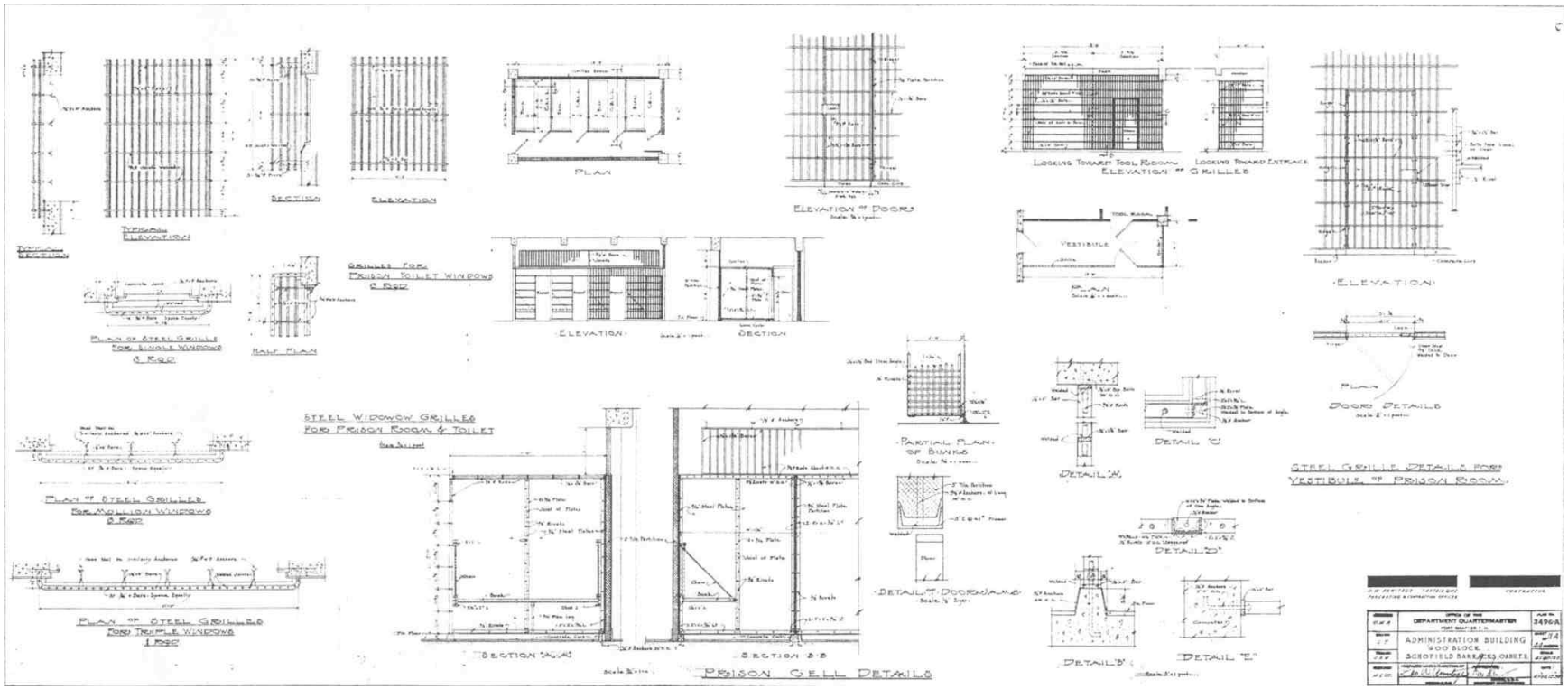
Window and Door Detail



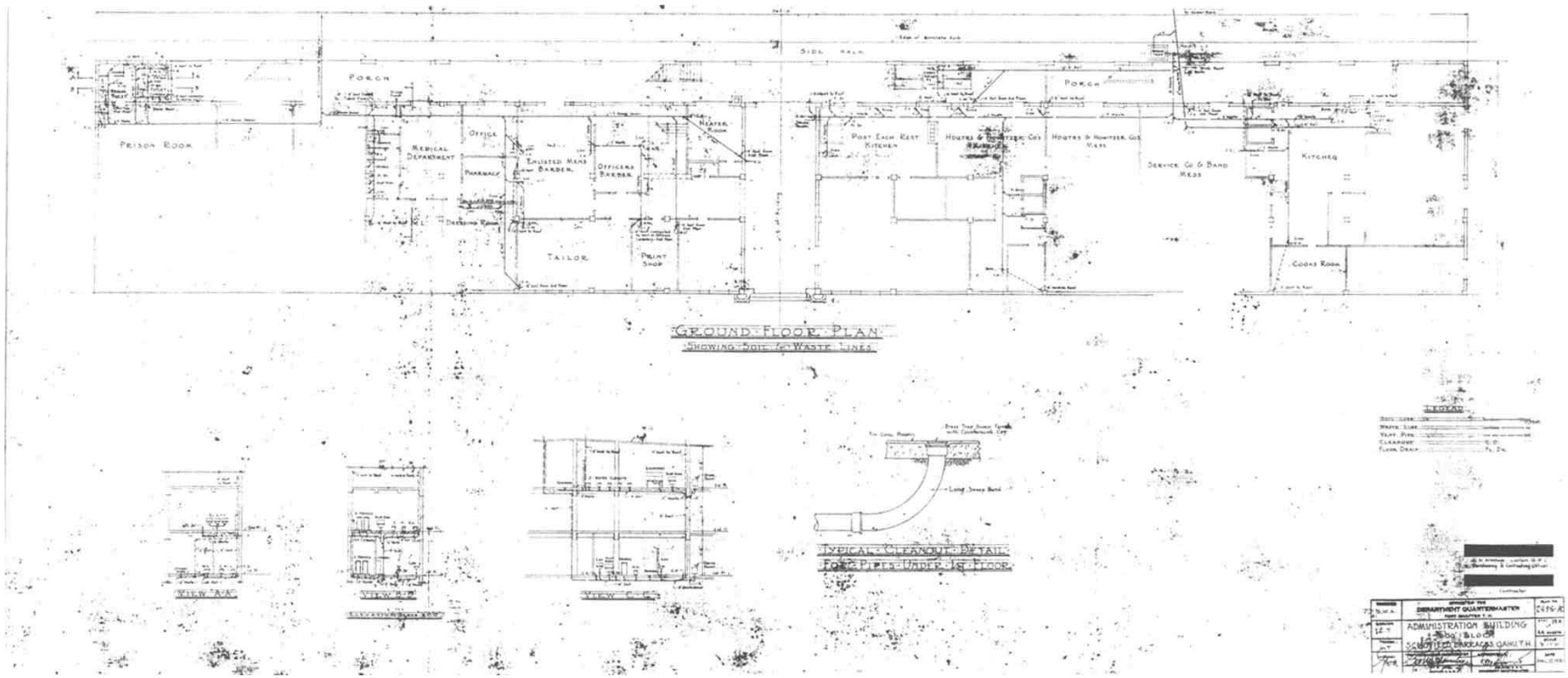
Counter Detail



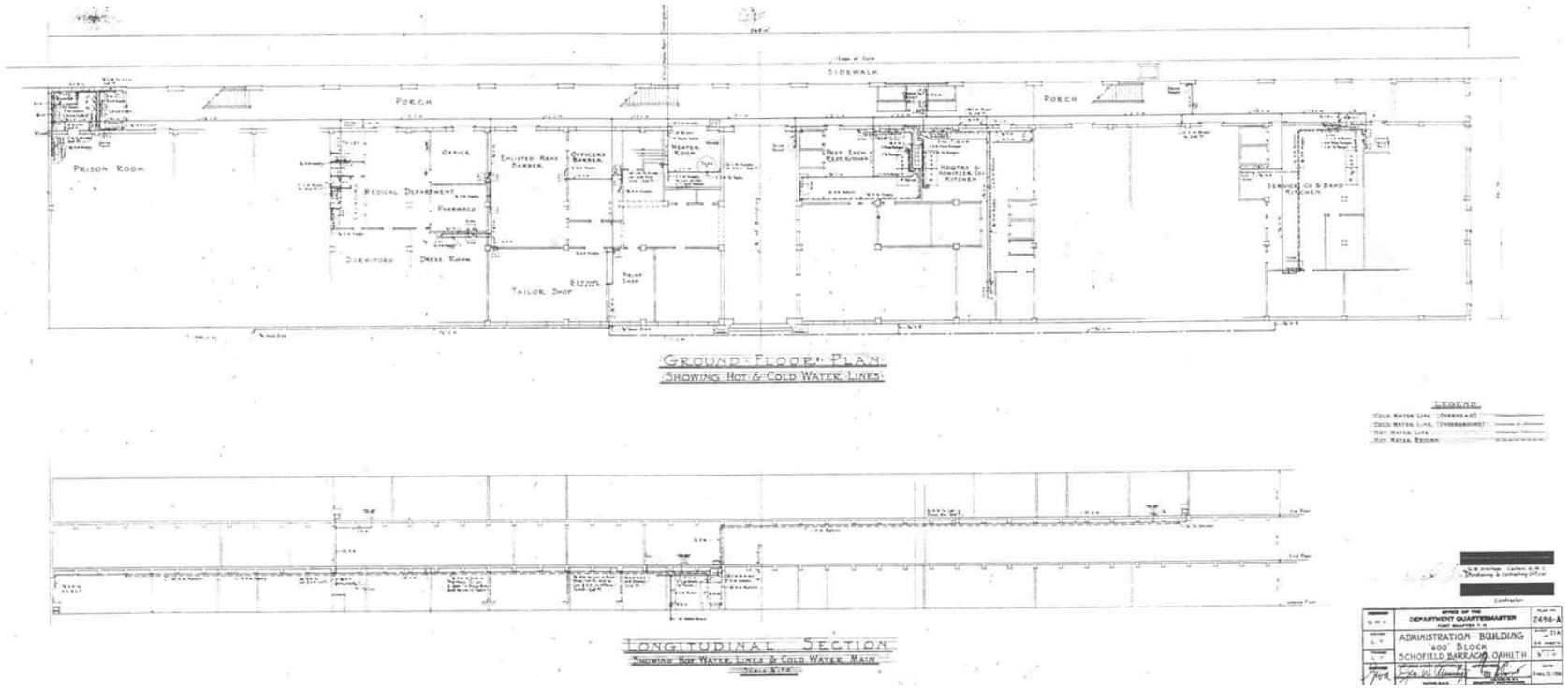
Garbage Detail



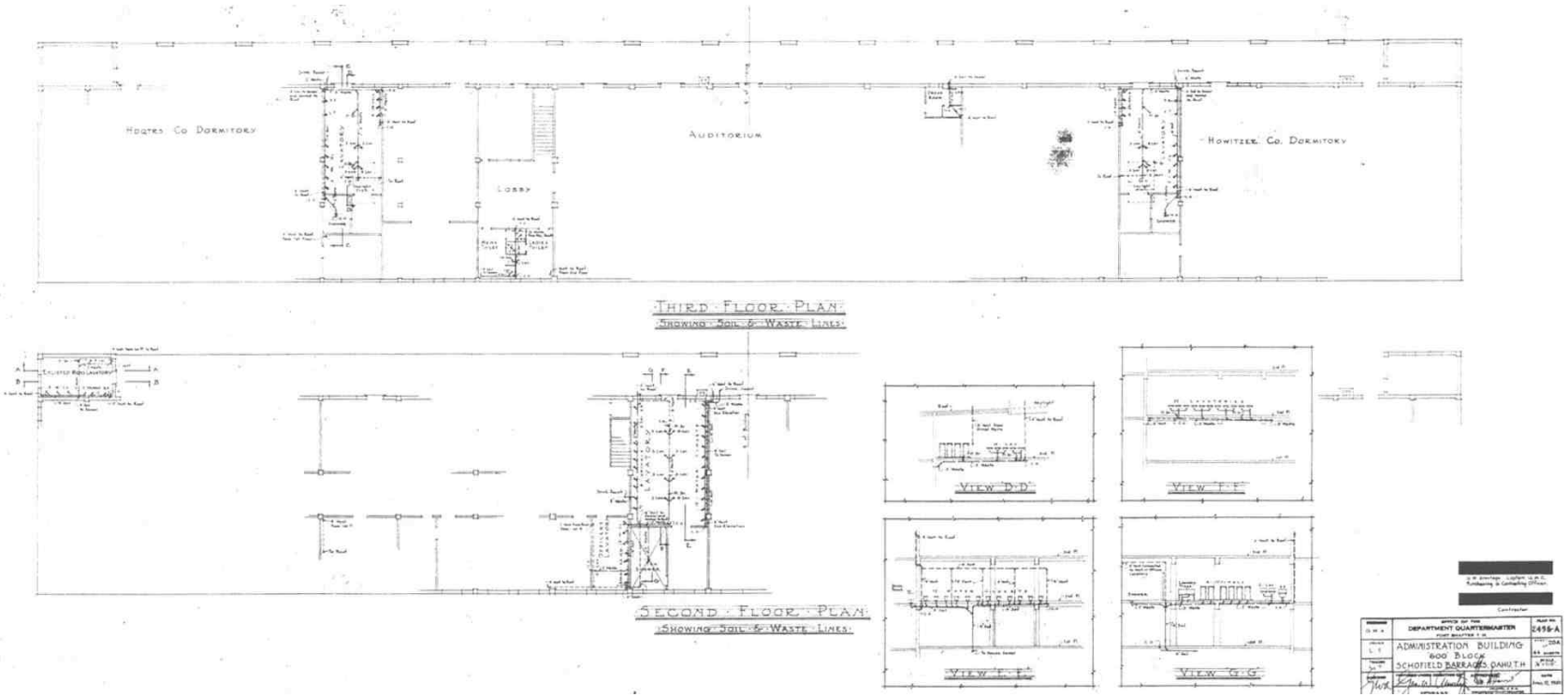
Prison Cell Detail



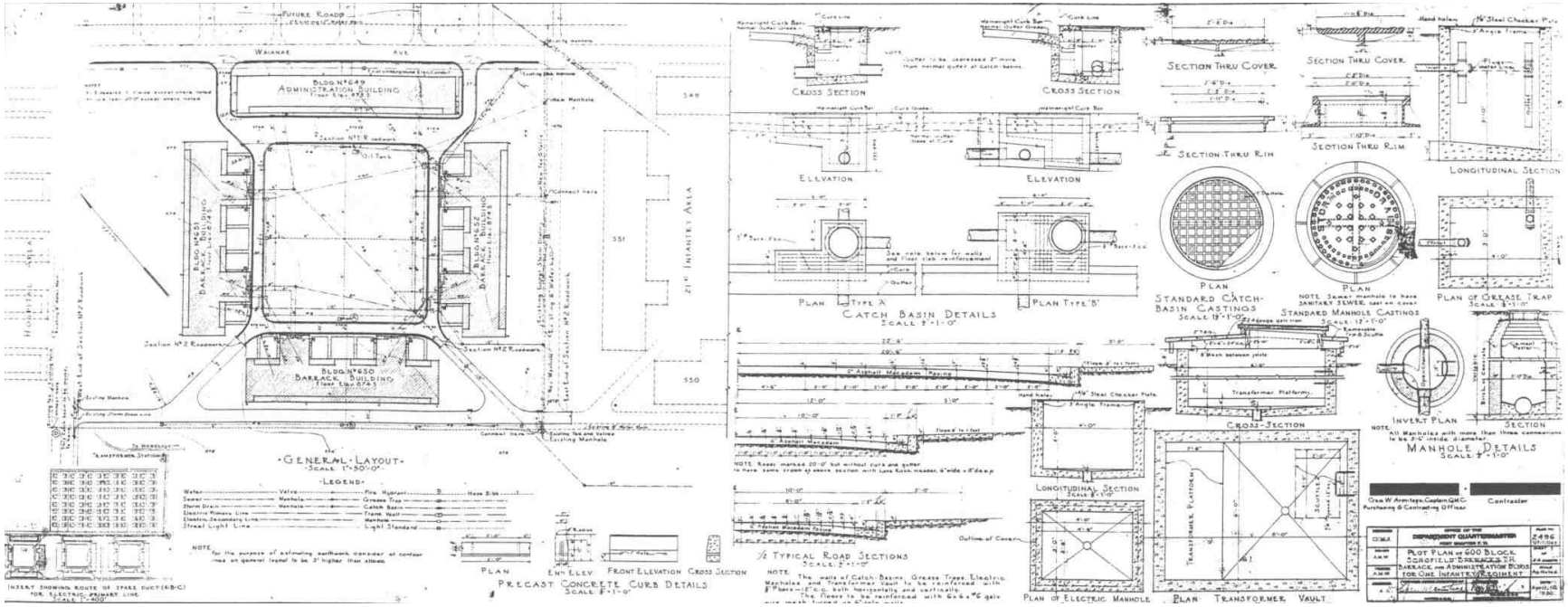
Ground Waste Line Plan



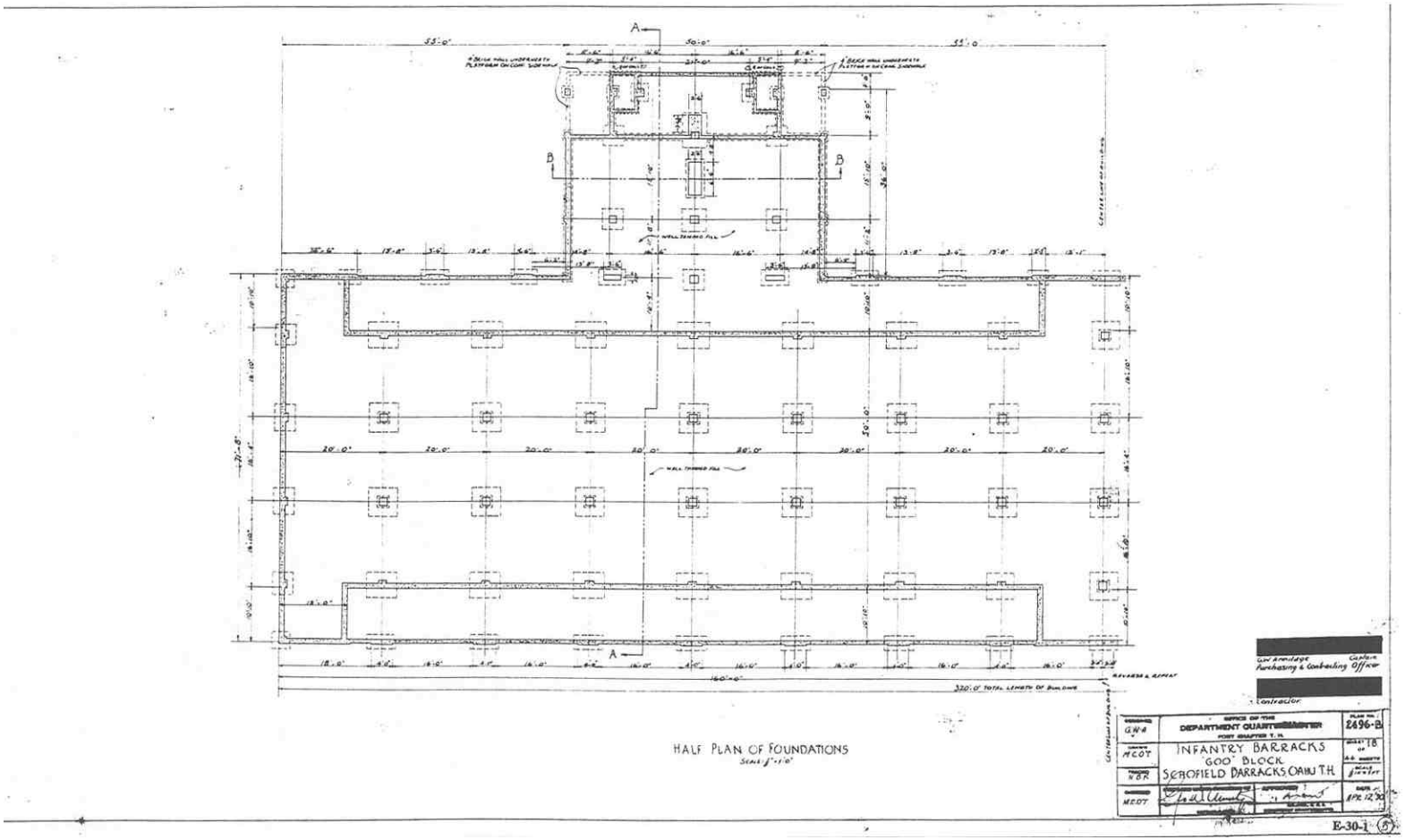
Ground Water Plan



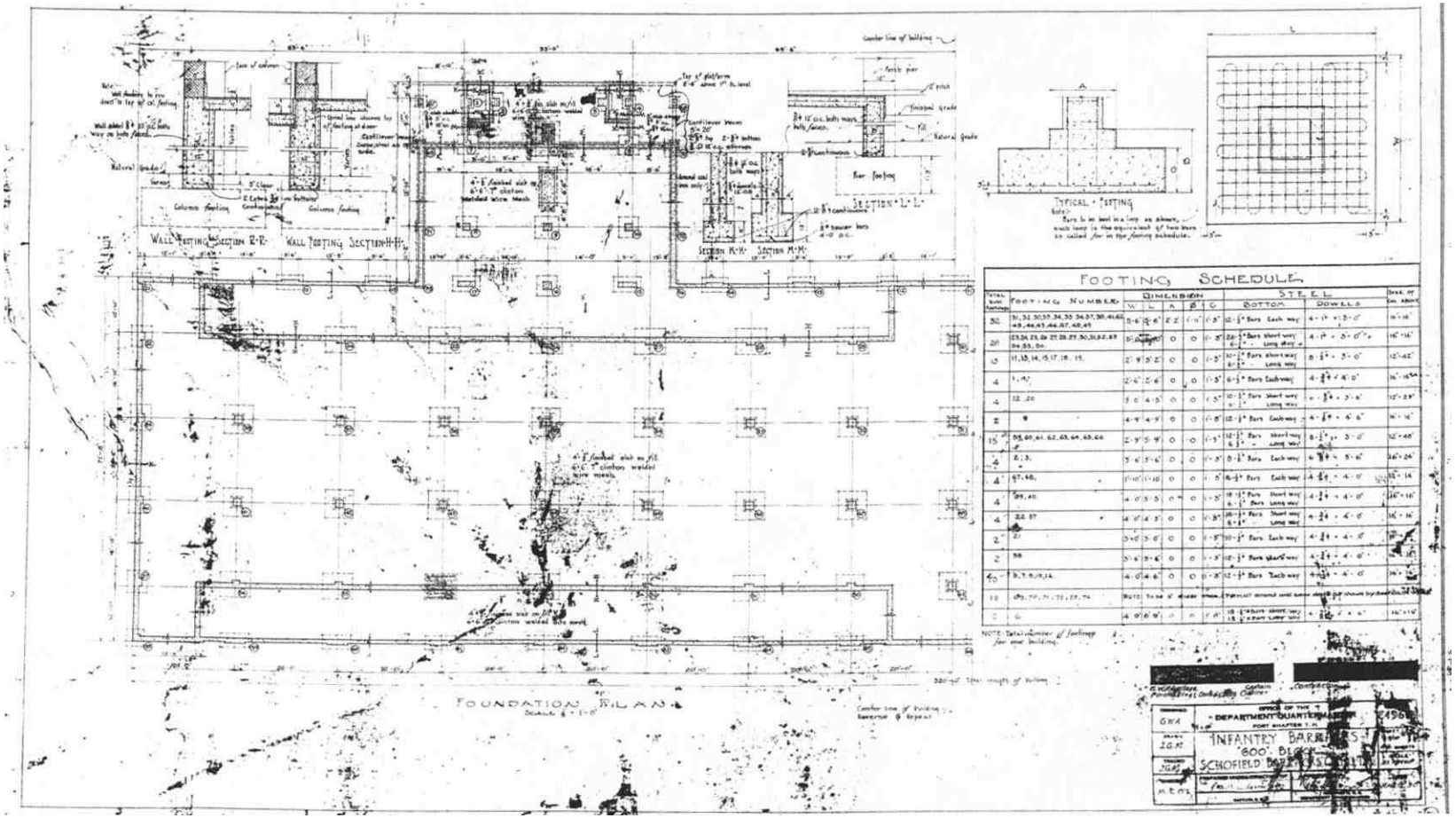
Second and Third Floor Water Line Plan



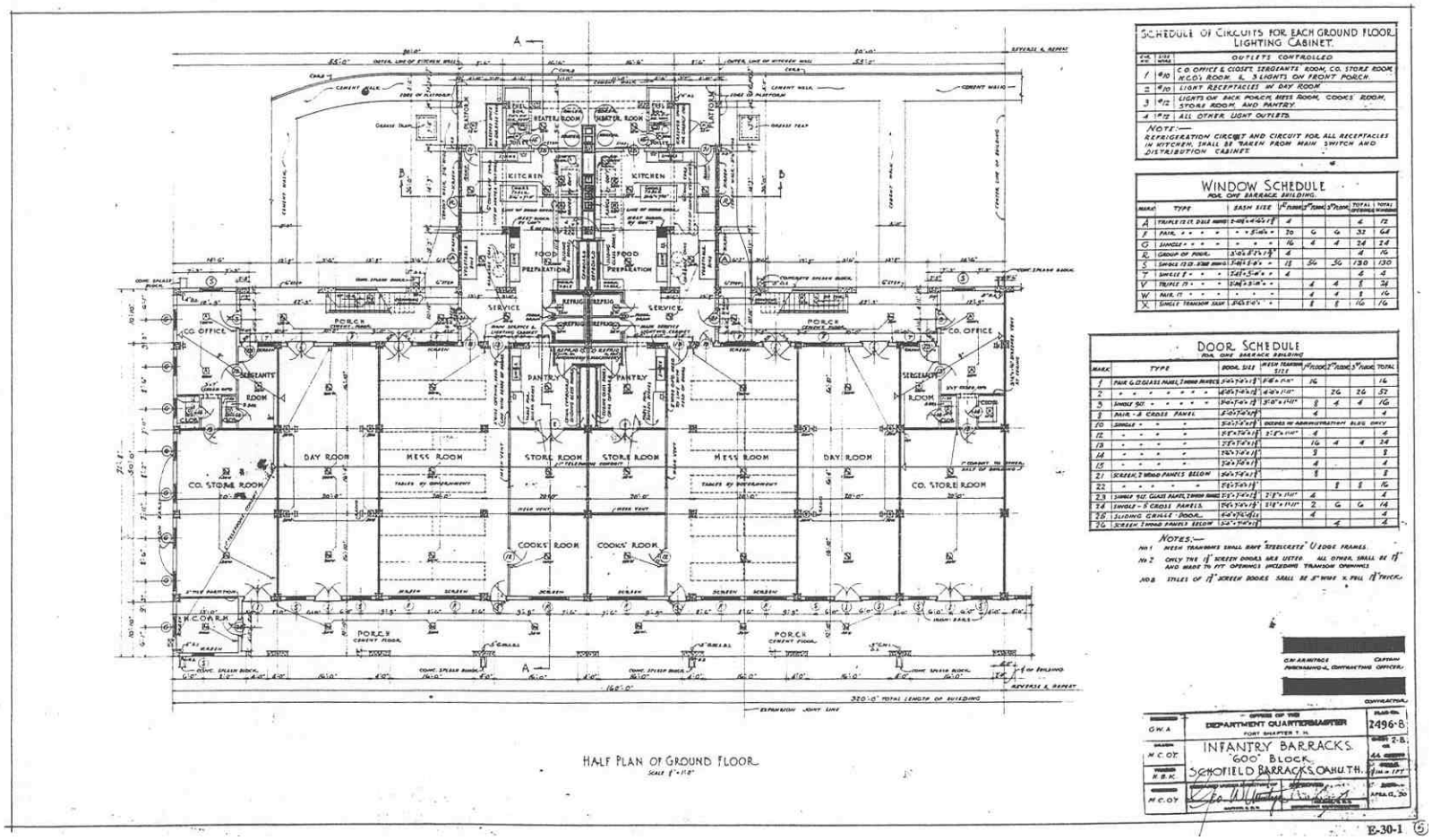
Plumbing Details



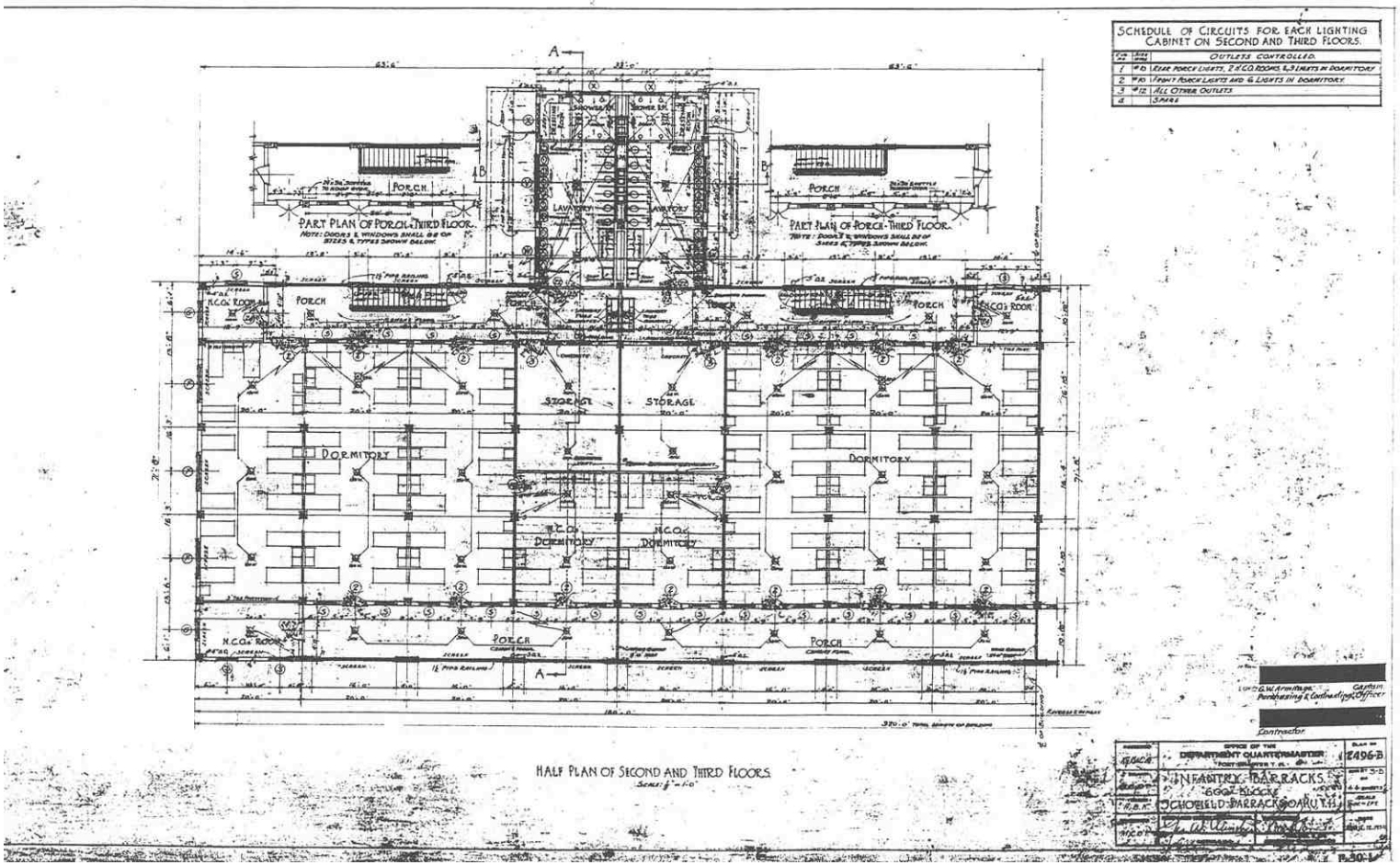
Half Foundation Plan



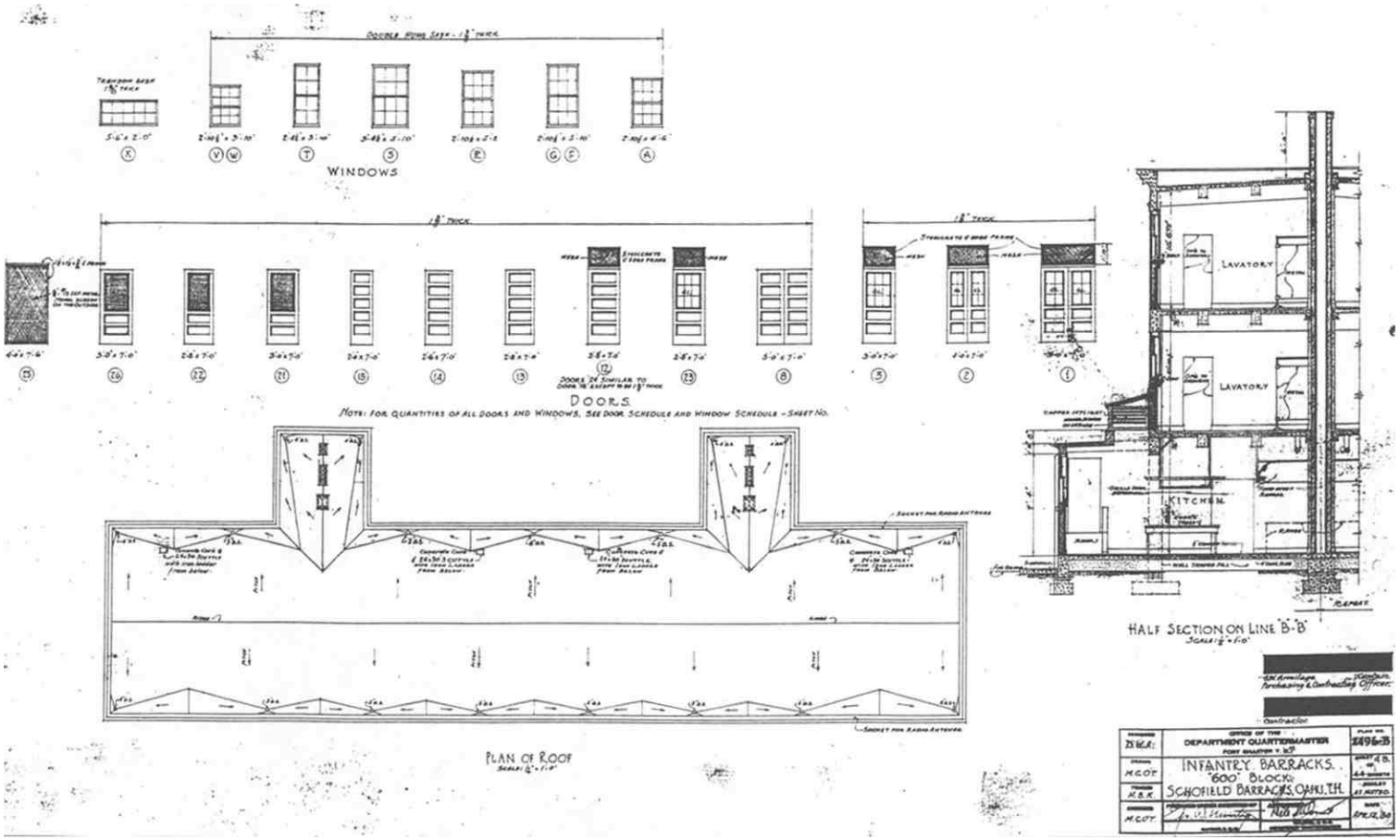
Foundation Plan



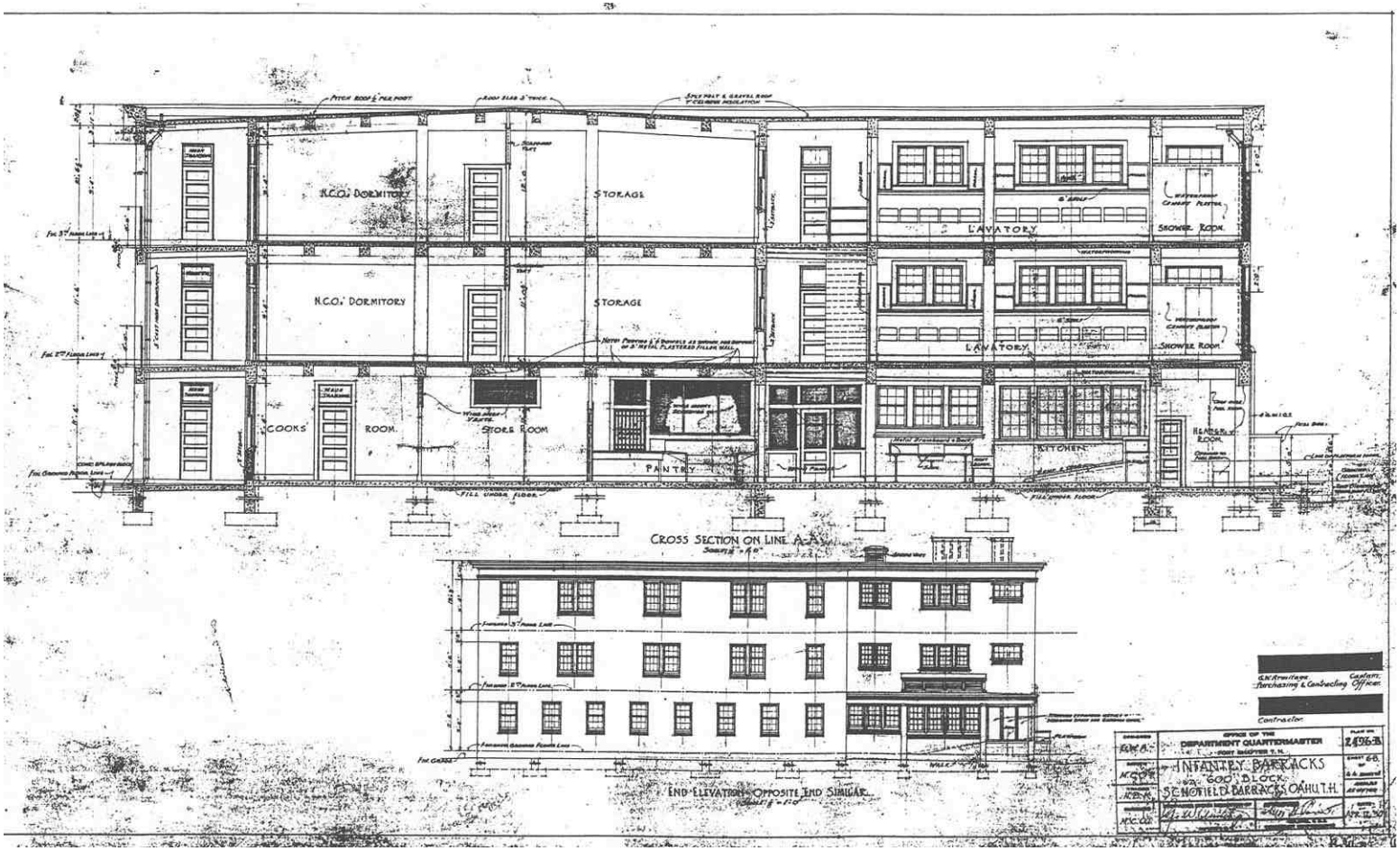
Ground Floor Plan



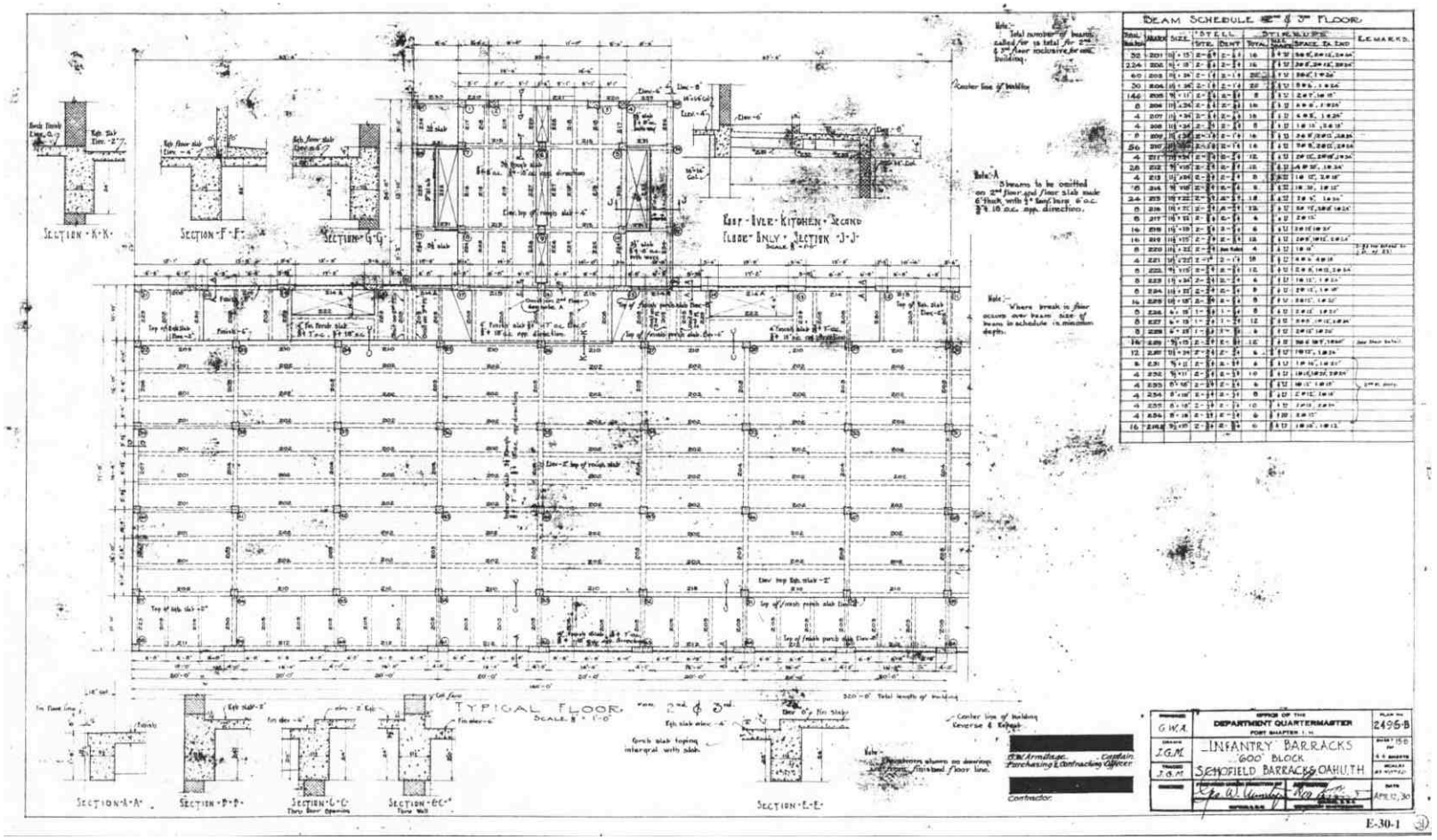
Second and Third Floor Plans


WINDOWS
DOORS
NOTE: FOR QUANTITIES OF ALL DOORS AND WINDOWS, SEE DOOR SCHEDULE AND WINDOW SCHEDULE - SHEET NO.
PLAN OF ROOF
HALF SECTION ON LINE B-B
LAVATORY
LAVATORY
KITCHEN
DEPARTMENT QUARTERMASTER
INFANTRY BARRACKS
"600" BLOCK
SCHOFIELD BARRACKS, OAHU, T.H.

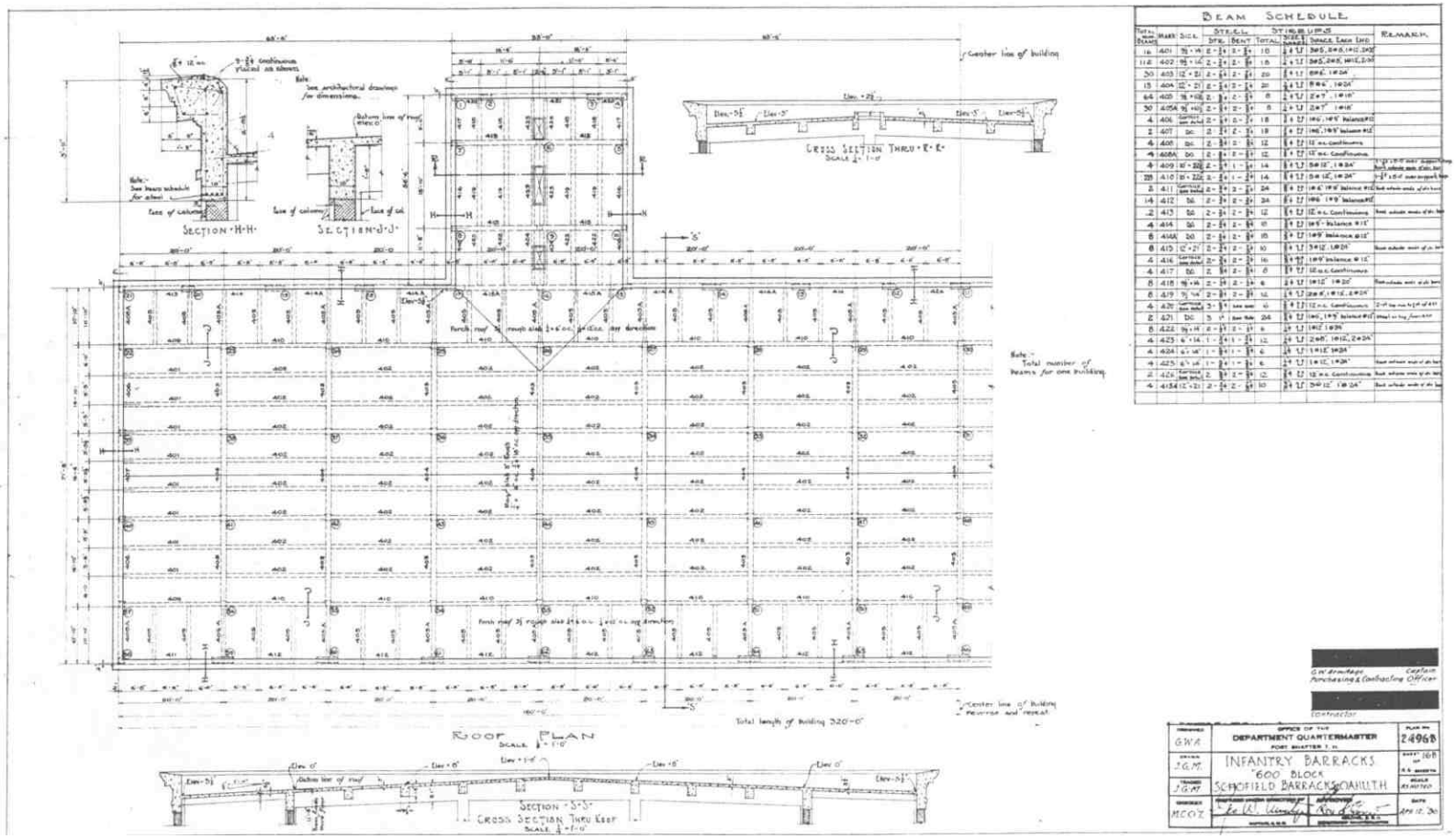
Roof Plan



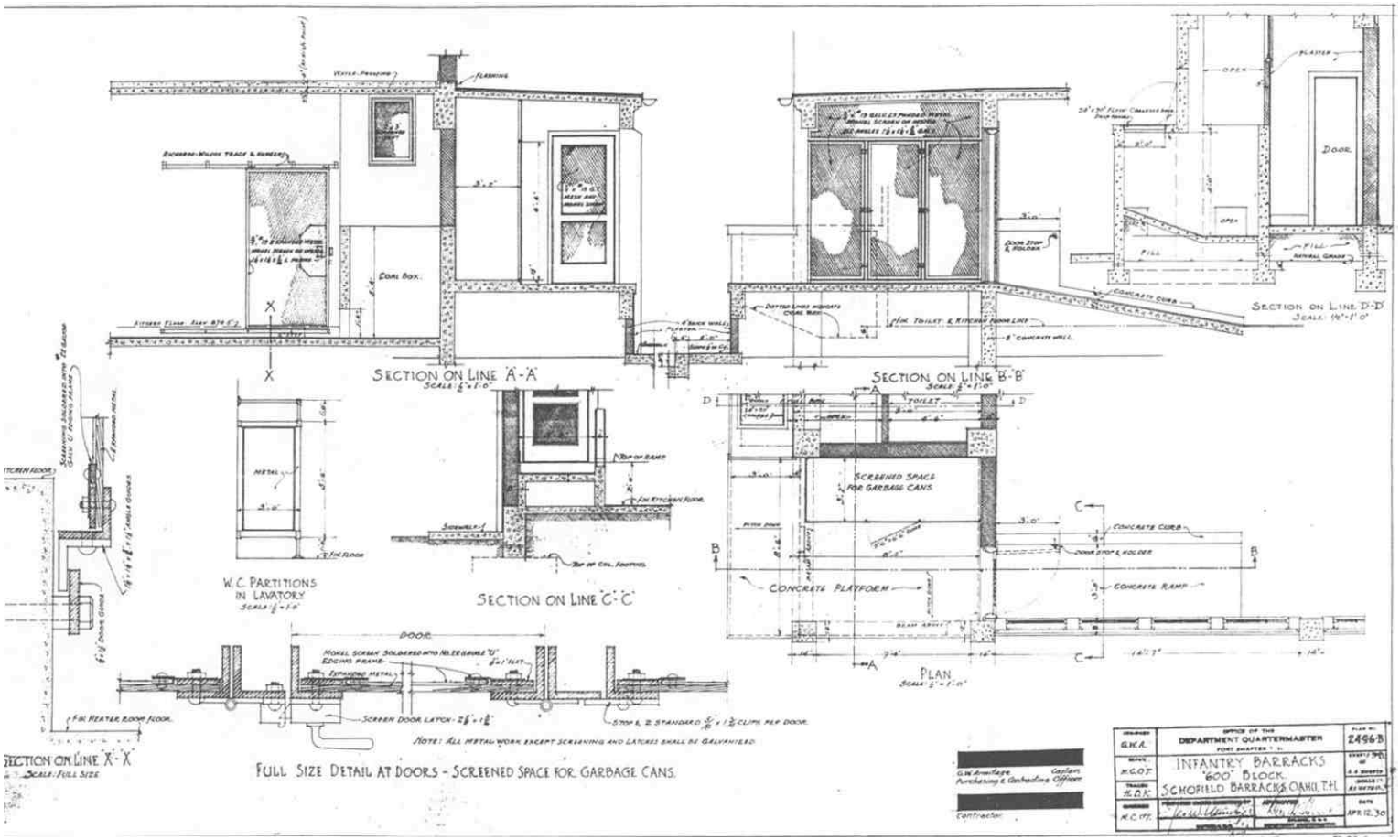
Cross Section and Elevation



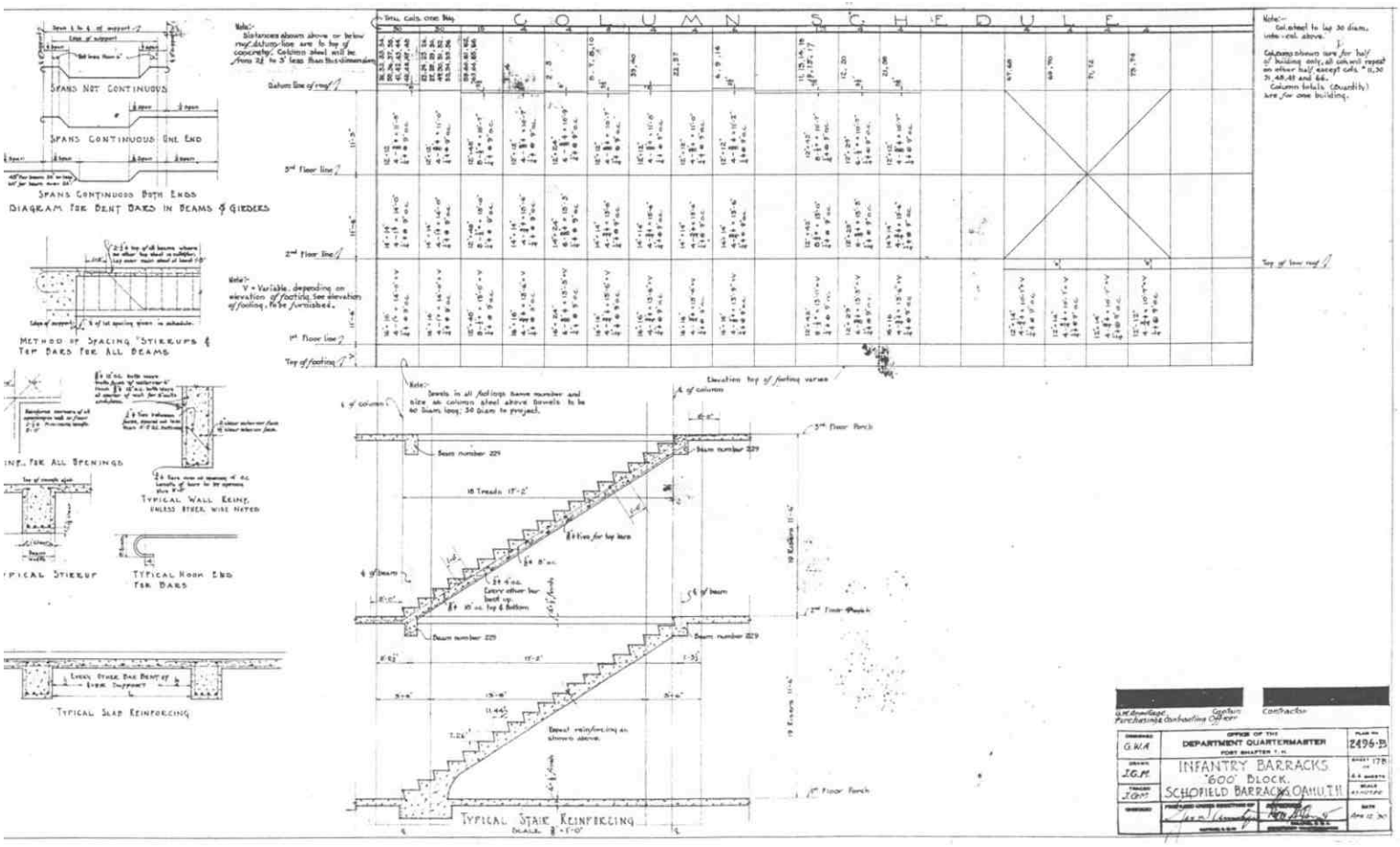
Typical Floor Plan



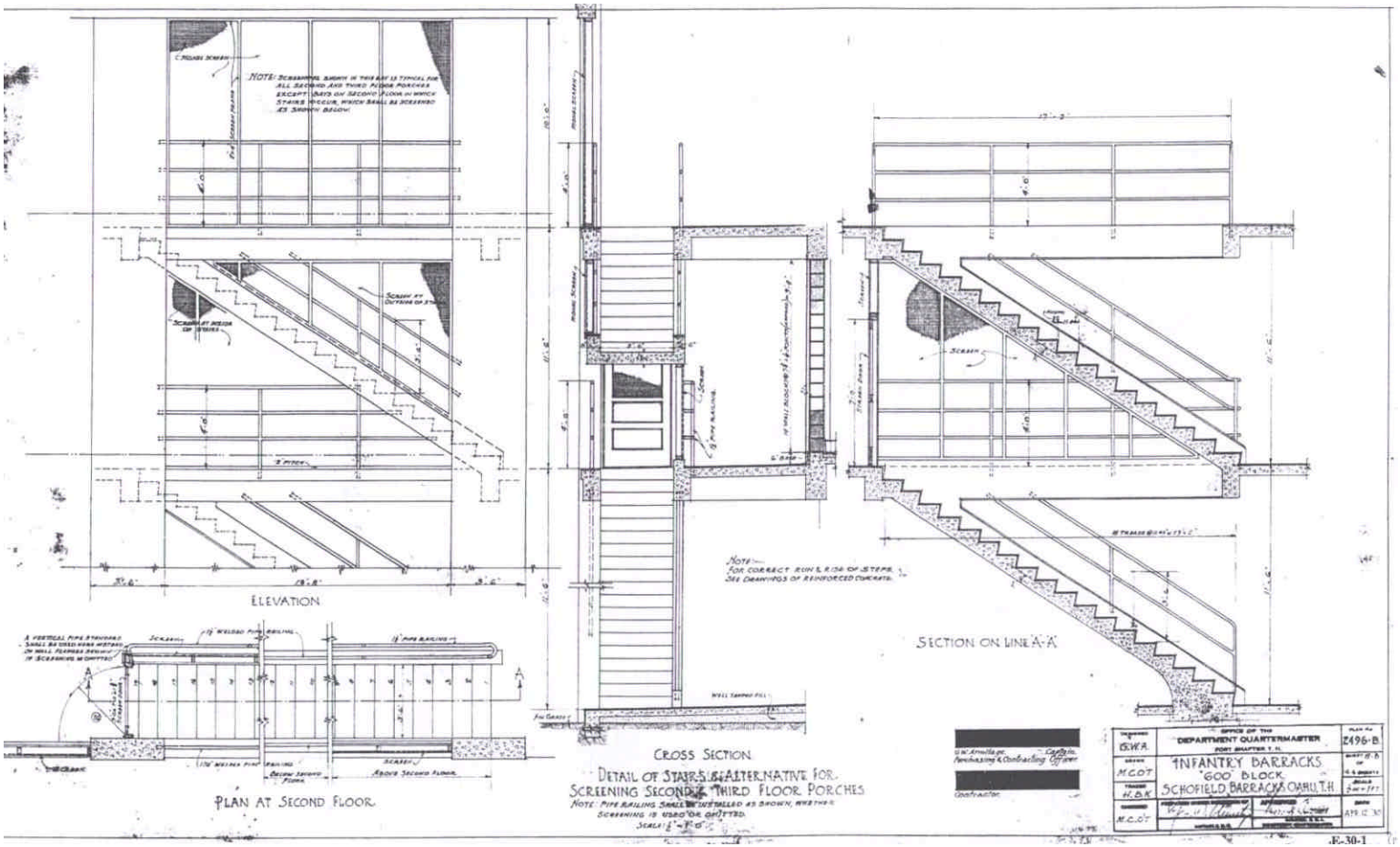
Roof Structural Plan


SECTION ON LINE 'A'-'A'
SECTION ON LINE 'B'-'B'
SECTION ON LINE 'C'-'C'
SECTION ON LINE 'D'-'D'
SECTION ON LINE 'X'-'X'
W.C. PARTITIONS IN LAVATORY
PLAN
COAL BOX
DOOR
TOILET
SCREENED SPACE FOR GARBAGE CANS
CONCRETE PLATFORM
CONCRETE RAMP
CONCRETE CURB
FULL SIZE DETAIL AT DOORS - SCREENED SPACE FOR GARBAGE CANS.
NOTE: ALL METAL WORK EXCEPT SCREENING AND LATCHES SHALL BE GALVANIZED
DEPARTMENT QUARTERMASTER
INFANTRY BARRACKS
"600" BLOCK
SCHOFIELD BARRACKS OAHU T.H.
APR 12, 30

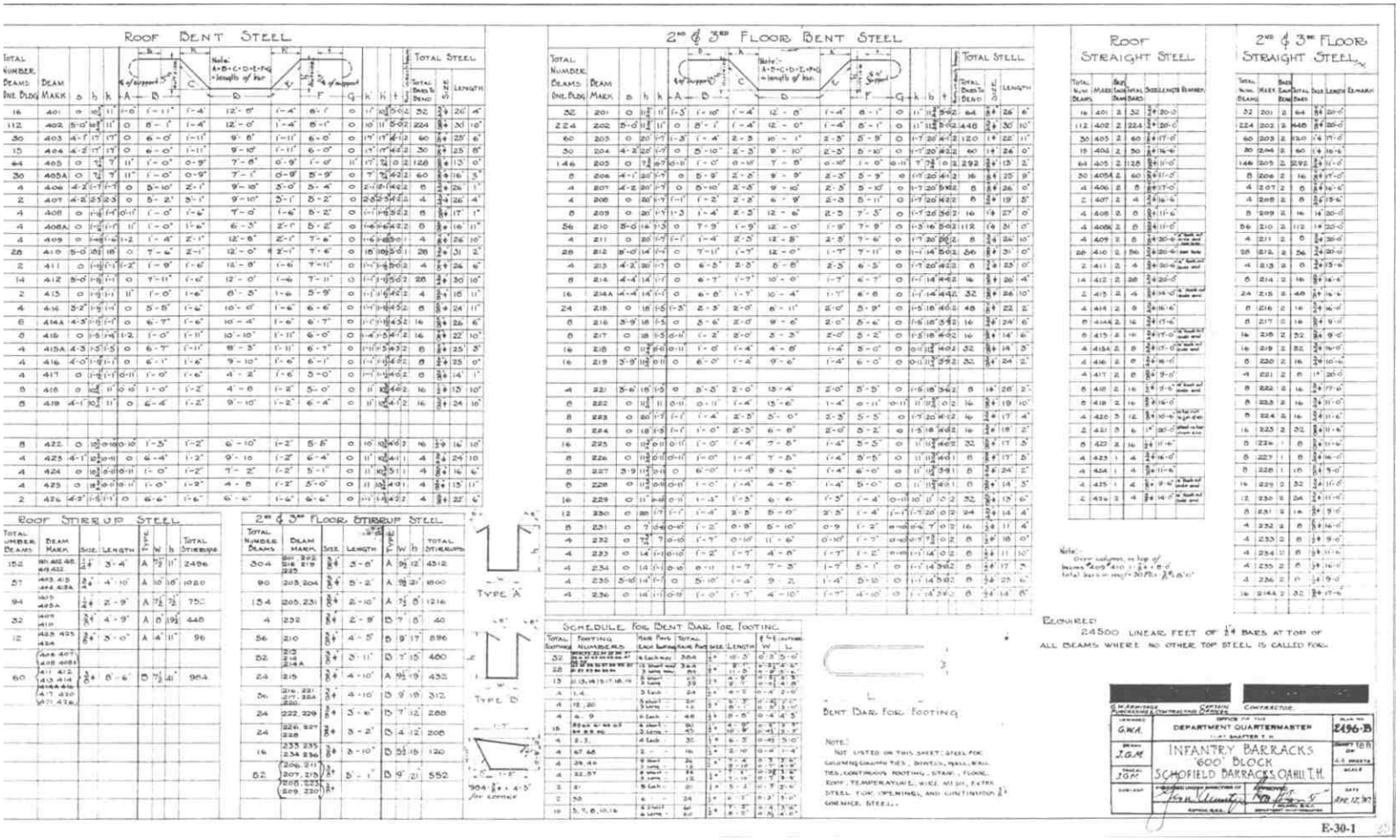
Sections



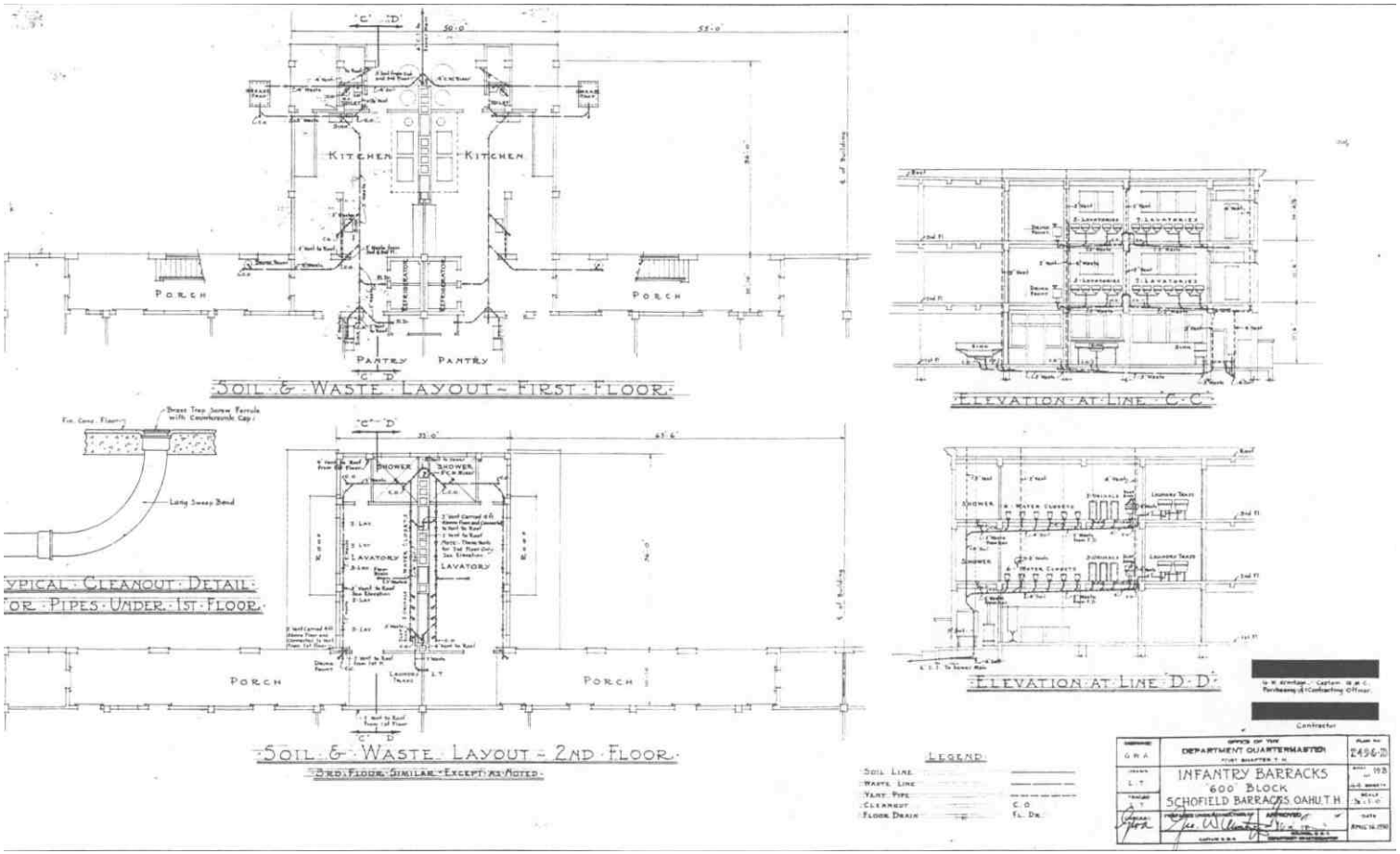
Column Schedule



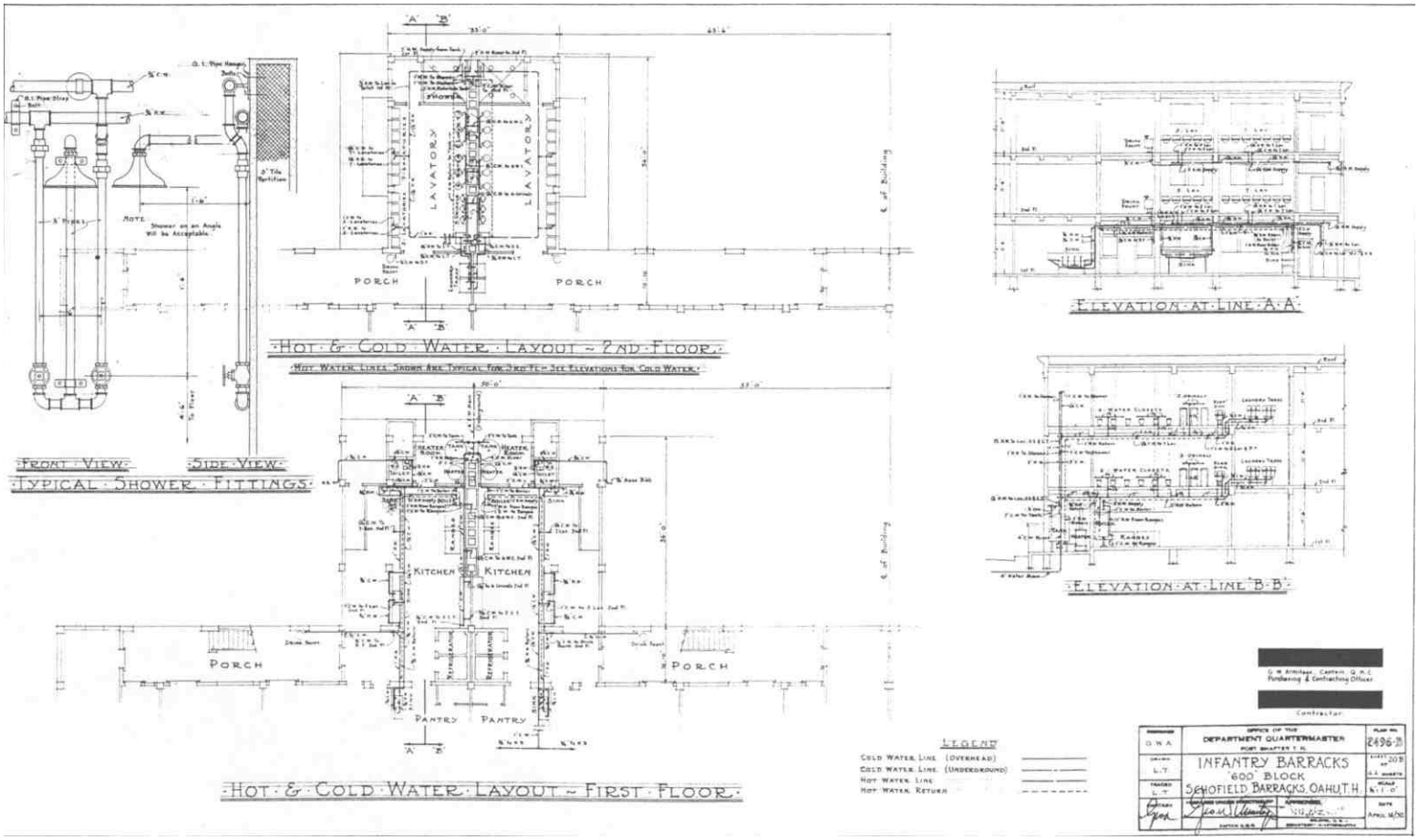
Stairs Section and Detail



Materials Schedule



Soil and Waste Detail



Water Pipe Layout

STRUCTURAL CONDITION ASSESSMENT REPORT

for

QUAD F – BUILDINGS 649, 650, 651, AND 652

SCHOFIELD BARRACKS HISTORIC DISTRICT
SCHOFIELD BARRACKS MILITARY RESERATION
OAHU ISLAND, HAWAII

Prepared for

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1833 Kalakaua Avenue, Suite 1008
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1631 Liliha Street, Suite 1B
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February 2001

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Attachment

Structural Calculations

A. PURPOSE

The purpose of this report is to provide a structural condition assessment of the existing structures of Quad F in accordance with the current code requirements including gravity and lateral loads

B. DESCRIPTION OF STRUCTURE

General

Quad F consists of four three-story buildings which are buildings 649, 650, 651 and 652. The basic structural systems of these buildings are best described as below:

Superstructure including roof:	Cast-in-place reinforced concrete slabs, beams, girders and columns.
Foundations:	Cast-in-place reinforced concrete spread footings.
Gravity load carrying system:	Reinforced concrete slabs, beams, girders, columns and footings.
Lateral resisting system:	Reinforced concrete moment frames, not a shear-wall system.

In addition to the above descriptions, the high roof area above the original auditorium (now used as a gymnasium) of building 649 is made up of reinforced concrete slab on wide flange structural steel purlins supported by structural steel trusses.

Based on the original record structural drawings, the CMU exterior and interior walls are neither bearing nor shear walls. They are simply used as enclosures and partitions.

History

Buildings of Quad F were originally constructed in 1931. Although the Quad has undergone interior modernization in the 1970's and various interior alteration and renovations, it appears that no significant structural deviations were found when compared to the original record structural drawings.

The basic design loads specified on the original drawings were:

Gravity loads:

Dead load: 150 pounds per square foot.

Live load: 50 pounds per square foot.

Based on the available original structural drawings, lateral loads were not specified.

It is uncertain at this point that building codes were existed at the time of construction of quad F. Further researches are pending to verify if building codes were existed at that time. The current governing code for design and construction in Hawaii is 1997 UBC code.

C. SCOPE OF INVESTIGATION

Collected Data

The available structural drawings are the original record drawings traced back to April 1930. The subsequent various interior alteration and renovation drawings dated back to the 1970's are basically non-structural drawings. These drawings are available at the Department of Public Work of Wheeler Army Airfield, Oahu, Hawaii. Subsurface soil investigation report is unavailable at this point.

Survey

The purpose of field survey is to observe the structural conditions of the existing structures and to compare the available drawings with the existing structures. Several field observations have been taken place since the walk-through meeting at Quad F on November 6, 2000. The field survey is limited to visual observations of the readily accessible structural systems and their elements. The foundation system is not part of the observation. Due to the suspected existence of asbestos in the existing suspended ceiling, most of the concrete slab soffits are inaccessible for observation.

D. DISCUSSION OF FINDINGS

Field Survey

Based on field observations, it appears that there are no visually noticeable structural defects in the existing structures. The basic structural systems of the existing structures are generally in consistent with the available original record drawings. However, sheet 17-A (dated April 15, 1930) of the original record structural drawings specifies the concrete compressive strength of 650 psi for slabs and beams and 600 psi for columns and foundations. By today's standard, the specified concrete compressive strength on the original drawings is far below the 3,000 psi. which is generally regarded as the minimum compressive strength for structural concrete. It appears that concrete in the existing structures may have much higher compressive strength than the 650 psi, and/or 600 psi specified on the drawings.

Summary of Structural Analysis

A structural analysis is performed based on the following assumptions:

a) Materials:

1) Concrete compressive strength:

Slabs and beams:	650 psi
Foundation and Columns:	600 psi

2) Reinforced steel yield strength: 40,000 psi

b) Load resisting system:

1) Gravity load carrying system: Reinforced concrete slabs, beams and columns

2) Lateral load resisting system: Reinforced concrete moment frames.

c) Due to the limited scope of this project, the structural foundation and the subsurface soil condition are assumed not to be a governing factor to determine the structural capacity.

d) Applicable code and standards: 1997 UBC Code and ACI 318-99

e) Loads

1) Live loads: Per 1997 UBC

2) Seismic Loads: Per 1997 UBC

3) Wind Loads: Per 1997 UBC

The result of structural calculations based on the above assumptions is summarized in the chart below:

Summary of Percentage Overstress for The Most Critical Structural Elements
Under Load Combinations with Seismic Force

Building Number	Typical Cross Frame				Typical Longitudinal Frame			
	Column		Beam		Column		Beam	
	Axial	Moment	Moment	Shear	Axial	Moment	Moment	Shear
649	46%	110%	225%	64%	30%	200%	158%	85%
650, 651 652	40%	147%	170%	170%	40%	148%	170%	73%

Refer to the attached structural calculation for additional information.

E. CONCLUSIONS

The structural calculations indicated that the existing structures of Quad F would be substantially overstressed if the structures were subject to loads combined with seismic force. It is therefore concluded that without strengthening the existing structures, Quad F structures would not meet the current code requirements.

F. RECOMMENDATIONS

According to the field survey, it is likely that the concrete compressive strength in the existing structures of Quad F would be much higher than 600 psi. Therefore, the actual capacity of the structures would be substantially higher.

In order to better preserve the historic buildings, the followings are recommended:

a) Verify the actual concrete compressive strength by taking concrete samples from the existing structures and perform compressive strength tests. Reassess the capacity of the existing structures based on the actual concrete compressive strength.

b) Upgrade the existing structures to meet current code requirements. There are different ways to upgrade the existing structures, given below as reference are a few options for the upgrading:

   1) Replace some of the non-structural CMU walls with new designed reinforced CMU shear walls as the new lateral resisting system.

   2) Introduce some structural steel braced frame as the new lateral resisting system.

   3) Combinations of the above.

c) It is very important to have a subsurface soil investigation done to determine the soil condition underneath the existing structures. The subsurface soil condition will play a substantial role for assessing the capacity of the existing structure and the design of a new lateral resisting system.

G. FINAL STATEMENT AND LIMITED CONDITIONS

This report has been prepared for the purpose of providing an opinion regarding the structural condition of the existing structures based on the current adopted code requirements. Furthermore, the scope of this report is limited to review of the available record drawings, perform field visual observations and provide structural analysis of the existing structures based on the available drawings. No physical testing or sampling were performed as they are not part of the scope of this report. This report does not cover the investigation of subsurface soil condition, analysis of the existing foundation and design of new

Attachment

Structural Calculations

STRUCTURAL ANALYSIS

FOR THE

EXISTING BUILDINGS No. 649, 650, 651 & 652

AT
SCHOFIELD BARRACKS, OAHU

February, 2001

INDEX OF CALCULATION PAGE

1. BASIC OF DESIGN 4

2. FLAT LOADS 5

3. ANALYSIS OF BUILDING NO. 649 7

4. ANALYSIS OF BUILDINGS 650, 651 & 652 13

5. COMPUTER ANALYSIS PRINTOUT 20

1. BASIC OF DESIGN

CODE:	**UBC 1997**	(THE BUILDING WAS DESIGNED AT 1930)			
LIVE LOAD:	ROOF	20 psf			
	FLOOR	50 psf			
WIND:	SPEED	80 mph	EXPOSE C	I =	1.00
SEISMIC:	ZONE	2B		I =	1.00
MATERIAL:	CONCRETE FOUNDATION			600 psi	
	CMU EXTERIOR NON-STRUCTURAL WALL				
	CONCRETE COLUMNS			600 psi	
	CONCRETE SLABS, BEAMS & GIRDERS			650 psi	
	REINFORCING STEEL		Fy =	40 ksi	

BUILDING INFORMATION

BUILDING WAS CONSTRUCTED AROUND 1930.

EXISTING CMU WALL		T =	8.0 " THICK, TYPICAL	
WALL LENGTH	1st FL	H =	11.5 ft	
	2nd FL	H =	11.5 ft	
	3rd FL	H =	11.25 ft	
	High Roof	H =	13.25 ft	(BUILDING NO. 649 ONLY)

NUMBER OF MOMENT FRAME

BLDG NO. 649	n =	20 frames
BLDG NO. 650, 651 & 652	n =	17 frames

EXISTING BUILDINGS No. 649, 650, 651 & 652

BY X Y PAGE 5

PROJECT DATE 2/4/2001

2. FLAT LOADS

ROOF DEAD LOAD	ROOFING		5 psf
	CONCRETE ROOF 4"		50 psf
	FRAMING & MISCELLANEOUS		25 psf
		DL =	80 psf
ROOF LIVE LOAD		LL =	20 psf
FLOOR DEAD LOAD	FLOOR FINISH		5 psf
	CONCRETE SLAB 6"		75 psf
	PARTITION		20 psf
	CONC. FRAME & MISC.		30 psf
		DL =	130 psf
FLOOR LIVE LOAD		LL =	50 psf

WIND LOAD 80 MPH EXPOSE C

MID ROOF HIGH 36 ft

WIND PRESSURE p = qs * Ce * Cq * K = 16.4 CqCe

PRIMARY FRAME - PROJECTED AREA METHOD

HORIZ.	Cq = 1.3	ROOF	Ce =	1.31	p =	27.9 psf
		3RD FL WALL		1.23		26.2 psf
		2ND FL WALL		1.13		24.1 psf
		1ST FL WALL		1.06		22.6 psf
UPLIFT	Cq = 0.7	ROOF	Ce =	1.31	p =	15.0 psf

BUILDING NO. 649

	Front - Back DIRECTION		Side DIRECTION	
	AREA	LATERAL P	AREA	LATERAL P
ROOF	1350 sf	37.7 kips	808 sf	22.6 kips
3RD FL WALL	4106 sf	107.6 kips	686 sf	18.0 kips
2ND FL WALL	4198 sf	101.0 kips	702 sf	16.9 kips
1ST FL WALL	4198 sf	94.8 kips	702 sf	15.8 kips
		341.0 kips		**73.3** kips

BUILDING NO. 650, 651 & 652

	Front - Back DIRECTION		Side DIRECTION	
	AREA	LATERAL P	AREA	LATERAL P
ROOF	0 sf	0.0 kips	0 sf	0.0 kips
3RD FL WALL	3600 sf	94.3 kips	810 sf	21.2 kips
2ND FL WALL	3680 sf	88.6 kips	828 sf	19.9 kips
1ST FL WALL	3680 sf	83.1 kips	828 sf	18.7 kips
		266.0 kips		**59.8** kips

2. FLAT LOADS (CONTINUE)

SEISMIC LOAD

UBC 97 BASE SHEAR V = 2.5 * Ca * I * W / R = 0.08 W

			Ca =	0.28
			Z =	0.2
ROOF DEAD LOAD	Wrf =	80 psf	I =	1.0
FLOOR DEAD LOAD	Wfl =	130 psf	R =	8.5
CMU WALL WEIGHT	Wwall =	64 psf		

BUILDING NO. 649

LEVEL	AREA	WEIGHT
HIGH ROOF	5000 sf	400 kips
EXTERIOR CMU WALL	4050	259
ROOF	25550	1635
EXTERIOR CMU WALL	9585	613
3rd FLOOR	25550	3322
EXTERIOR CMU WALL	9798	627
2nd FLOOR	25550	3322
EXTERIOR CMU WALL	9798	627
BUILDING WEIGHT	W =	10805 kips

UBC 97 SEISMIC BASE SHEAR V = 890 kips **SEISMIC LOAD GOVERNS**

BUILDING NO. 650, 651 & 652

LEVEL	AREA	WEIGHT
ROOF	26748	2140
EXTERIOR CMU WALL	11599	742
3rd FLOOR	26748	3477
EXTERIOR CMU WALL	11857	759
2nd FLOOR	26748	3477
EXTERIOR CMU WALL	11857	759
BUILDING WEIGHT	W =	11354 kips

UBC 97 SEISMIC BASE SHEAR V = 935 kips **SEISMIC LOAD GOVERNS**

3. ANALYSIS OF BUILDING NO. 649

LATERAL FORCE V = 890 kips

VERTICAL DISTRIBUTION OF FORCE

Fx = V * (Wx * Hx) / (W*H)

LEVEL	Wx	Hx	Wx * Hx	Fx
HIGH ROOF	530 kips	47.50 ft	25156	96.4
ROOF	2072	34.25	70950	271.9
3rd FLOOR	3942	23.00	90660	347.5
2nd FLOOR	3949	11.50	45409	174.0
			232175	889.8 kips

TOTAL MOMENT FRAME n = 20

ASSUME ALL FRAME HAVE THE SAME RIGIDITY

SUMMARY OF ANALYSIS - TYPICAL CROSS FRAME

MAX. LOAD	Axial P	Moment M	Shear V
Ground Floor	Column 16 x 16		
Dead Load 'DL'	152.6 kip	10.0 k-ft	2.0 kip
Live Load 'LL'	36.0	3.0	1.0
Seismic Load 'E'	34.8	106.1	9.2
1.4 DL * 1.1	235.0	15.4	3.1
(1.2DL+1.6LL+0.5Lr) * 1.1	264.8	18.5	4.4
(1.2 DL + 1.0 E) * 1.1	239.7	129.9	12.7
Reinforcing steel	8 #7	ties #3 @ 6.0	
Capacity	179 kips	63 k-ft	
3rd Floor	Column 12 x 12		
Dead Load 'DL'	35.1 kip	16.7 k-ft	6.0 kip
Live Load 'LL'	6.0	4.0	1.3
Seismic Load 'E'	3.2	17.8	4.9
1.4 DL * 1.1	54.1	25.7	9.2
(1.2DL+1.6LL+0.5Lr) * 1.1	56.9	29.1	10.2
(1.2 DL + 1.0 E) * 1.1	49.8	41.6	13.3
Reinforcing steel	8 #5	ties #3 @ 6.0	
Capacity	96 kips	23 k-ft	

3. ANALYSIS OF BUILDING NO. 649 (continue)

SUMMARY OF ANALYSIS - TYPICAL CROSS FRAME

MAX. LOAD	Axial P	Moment +M	Moment -M	Shear V
2nd Floor	Beam	12 x 17		
Dead Load 'DL'	0.0 kip	19.5 k-ft	32.6 k-ft	10.3 kip
Live Load 'LL'	0.0	6.0	10.0	3.1
Seismic Load 'E'	5.5	0.0	115.6	20.0
1.4 DL * 1.1	0.0	30.0	50.2	15.9
(1.2DL+1.6LL+0.5Lr) * 1.1	0.0	36.3	60.6	19.1
(1.2 DL + 1.0 E) * 1.1	6.1	25.7	170.2	35.6
Reinforcing steel		4 #7	4 #7	#3 @ 6 stirrups
Capacity		52.3	52.3	21.8
Roof	Beam 10 x 10			
Dead Load 'DL'	0.0 kip	11.6 k-ft	19.1 k-ft	6.0 kip
Live Load 'LL'	0.0	2.3	3.9	1.3
Seismic Load 'E'	14.8	0.0	17.8	2.95
1.4 DL * 1.1	0.0	17.9	29.4	9.2
(1.2DL+1.6LL+0.5Lr) * 1.1	0.0	19.4	32.1	10.2
(1.2 DL + 1.0 E) * 1.1	16.3	15.3	44.8	11.2
Reinforcing steel		4 #6	2+2 #6+4	#3 @ 6 stirrups
Capacity		6.0 k-ft	11.0 k-ft	11.0 kips

Beam Capacity C = T = 40 As a = 40 As / (0.85 * f'c * b)

f'c = 650 psi a = 72.40 As /b

Moment 0.9Mn = 0.9 * (40 As) *(d - a/2)

Shear 0.85Vc = 21.7 b *d lbs

0.85Vs = 7.48 d / s kips = Av * fy * d / s *0.85

3. ANALYSIS OF BUILDING NO. 649 (continue)

SUMMARY OF ANALYSIS - TYPICAL CENTER FRAME

MAX. LOAD	Axial P	Moment M	Shear V
Ground Floor	Column 16 x 16		
Dead Load 'DL'	173.1 kip	12.1 k-ft	2.3 kip
Live Load 'LL'	41.1	3.4	0.7
Seismic Load 'E'	30.3	105.6	9.2
1.4 DL * 1.1	266.6	18.6	3.5
(1.2DL+1.6LL+0.5Lr) * 1.1	300.8	22.0	4.3
(1.2 DL + 1.0 E) * 1.1	261.8	132.2	13.1
Reinforcing steel	8 #7	ties #3 @ 6.0	
Capacity	179 kips	63 k-ft	
3rd Floor	Column 12 x 12		
Dead Load 'DL'	58.2 kip	10.9 k-ft	4.2 kip
Live Load 'LL'	11.1	2.5	0.9
Seismic Load 'E'	8.3	40.1	10.9
1.4 DL * 1.1	89.6	16.8	6.5
(1.2DL+1.6LL+0.5Lr) * 1.1	96.4	18.8	7.1
(1.2 DL + 1.0 E) * 1.1	86.0	58.5	17.5
Reinforcing steel	8 #5	ties #3 @ 6.0	
Capacity	96 kips	23 k-ft	

3. ANALYSIS OF BUILDING NO. 649 (continue)

SUMMARY OF ANALYSIS - TYPICAL CENTER FRAME

MAX. LOAD	Axial P	Moment +M	Moment -M	Shear V
2nd Floor	Beam	12 x 17		
Dead Load 'DL'	1.0 kip	19.8 k-ft	33.4 k-ft	10.7 kip
Live Load 'LL'	0.5	6.0	10.5	3.1
Seismic Load 'E'	7.9	0.0	111.3	19.4
1.4 DL * 1.1	1.5	30.5	51.4	16.5
(1.2DL+1.6LL+0.5Lr) * 1.1	2.2	36.7	62.6	19.6
(1.2 DL + 1.0 E) * 1.1	10.1	26.1	166.5	35.5
Reinforcing steel		4 #7	4 #7	#3 @ 6 stirrups
Capacity		52.3	52.3	21.8
Roof	Beam 10 x 10			
Dead Load 'DL'	2.7 kip	2.9 k-ft	10.9 k-ft	4.2 kip
Live Load 'LL'	0.6	0.7	2.5	0.9
Seismic Load 'E'	11.2	0.0	45.2	7.87
1.4 DL * 1.1	4.2	4.5	16.8	6.5
(1.2DL+1.6LL+0.5Lr) * 1.1	4.6	5.1	18.8	7.1
(1.2 DL + 1.0 E) * 1.1	15.9	3.8	64.1	14.2
Reinforcing steel		4 #6	2+2 #6+4	#3 @ 6 stirrups
Capacity		6.0 k-ft	11.0 k-ft	11.0 kips

Beam Capacity C = T = 40 As a = 40 As / (0.85 * f'c * b)

f'c = 650 psi a = 72.40 As /b

Moment 0.9Mn = 0.9 * (40 As) *(d - a/2)

Shear 0.85Vc = 21.7 b *d lbs

0.85Vs = 7.48 d / s kips = Av * fy * d / s *0.85

3. ANALYSIS OF BUILDING NO. 649 (continue)

SUMMARY OF ANALYSIS - TYPICAL LONGITUDINAL FRAME

MAX. LOAD	Axial P	Moment M	Shear V
Ground Floor	Column 16 x 16		
Dead Load 'DL'	128.4 kip	8.9 k-ft	2.0 kip
Live Load 'LL'	36.7	2.4	0.2
Seismic Load 'E'	35.5	162.6	14.1
1.4 DL * 1.1	197.8	13.7	3.1
(1.2DL+1.6LL+0.5Lr) * 1.1	234.1	16.0	3.0
(1.2 DL + 1.0 E) * 1.1	208.6	190.6	18.2
Reinforcing steel	8 #7	ties #3 @ 6.0	
Capacity	179 kips	63 k-ft	
3rd Floor	Column 12 x 12		
Dead Load 'DL'	30.9 kip	6.9 k-ft	0.2 kip
Live Load 'LL'	6.1	1.5	0.3
Seismic Load 'E'	3.4	47.6	7.9
1.4 DL * 1.1	47.5	10.6	0.3
(1.2DL+1.6LL+0.5Lr) * 1.1	51.5	11.8	0.7
(1.2 DL + 1.0 E) * 1.1	44.4	61.5	8.9
Reinforcing steel	8 #5	ties #3 @ 6.0	
Capacity	96 kips	23 k-ft	

3. ANALYSIS OF BUILDING NO. 649 (continue)

SUMMARY OF ANALYSIS - TYPICAL LONGITUDINAL FRAME

MAX. LOAD	Axial P	Moment +M	Moment -M	Shear V
2nd Floor	Beam	12 x 24		
Dead Load 'DL'	2.5 kip	41.0 k-ft	76.8 k-ft	23.2 kip
Live Load 'LL'	0.8	13.7	26.2	7.7
Seismic Load 'E'	41.0	0.0	148.9	26.8
1.4 DL * 1.1	3.8	63.2	118.2	35.8
(1.2DL+1.6LL+0.5Lr) * 1.1	4.7	78.2	147.5	44.3
(1.2 DL + 1.0 E) * 1.1	48.3	54.2	265.1	60.1
Reinforcing steel		4 #7	4 #7	#3 @ 6 stirrups
Capacity		102.7	102.7	32.4
Roof	Beam	12 x 17		
Dead Load 'DL'	1.9 kip	26.4 k-ft	40.3 k-ft	14.2 kip
Live Load 'LL'	0.5	5.6	10.2	3.015
Seismic Load 'E'	8.0	0.0	28.4	5.389
1.4 DL * 1.1	3.0	40.7	62.0	21.9
(1.2DL+1.6LL+0.5Lr) * 1.1	3.5	44.8	71.2	24.0
(1.2 DL + 1.0 E) * 1.1	11.4	34.9	84.4	24.7
Reinforcing steel		4 #6	2+2 #6+4	#3 @ 6 stirrups
Capacity		48.5 k-ft	40.9 k-ft	21.8 kips

Beam Capacity C = T = 40 As a = 40 As / (0.85 * f'c * b)

f'c = 650 psi a = 72.40 As /b

Moment 0.9Mn = 0.9 * (40 As) *(d - a/2)

Shear 0.85Vc = 21.7 b *d lbs

0.85Vs = 7.48 d / s kips = Av * fy * d / s *0.85

4. ANALYSIS OF BUILDINGS 650, 651 & 652

LATERAL FORCE V = 935 kips

VERTICAL DISTRIBUTION OF FORCE

Fx = V * (Wx * Hx) / (W*H)

LEVEL	Wx	Hx	Wx * Hx	Fx
ROOF	2511 kips	34.25 ft	86002	346.7
3rd FLOOR	4228	23.00	97240	392.0
2nd FLOOR	4236	11.50	48715	196.4
			231956	935.1 kips

TOTAL MOMENT FRAME n = 17

ASSUME ALL FRAME HAVE THE SAME RIGIDITY

SUMMARY OF ANALYSIS - TYPICAL CROSS FRAME

MAX. LOAD	Axial P	Moment M	Shear V
Ground Floor	Column 16 x 16		
Dead Load 'DL'	136.5 kip	9.9 k-ft	0.9 kip
Live Load 'LL'	40.6	3.6	0.3
Seismic Load 'E'	12.3	130.0	11.3
1.4 DL * 1.1	210.2	15.2	1.4
(1.2DL+1.6LL+0.5Lr) * 1.1	251.6	19.4	1.7
(1.2 DL + 1.0 E) * 1.1	193.7	156.1	13.6
Reinforcing steel	8 #7	ties #3 @ 6.0	
Capacity	179 kip	63 k-ft	
3rd Floor	Column 12 x 12		
Dead Load 'DL'	33.0 kip	15.6 k-ft	9.0 kip
Live Load 'LL'	6.8	4.0	2.2
Seismic Load 'E'	2.4	15.6	3.9
1.4 DL * 1.1	50.8	24.0	13.9
(1.2DL+1.6LL+0.5Lr) * 1.1	55.5	27.6	15.8
(1.2 DL + 1.0 E) * 1.1	46.2	37.7	16.2
Reinforcing steel	8 #5	ties #3 @ 6.0	
Capacity	96 kips	23 k-ft	

4. ANALYSIS OF BUILDINGS 650, 651 & 652 (continue)

SUMMARY OF ANALYSIS - TYPICAL CROSS FRAME

MAX. LOAD	Axial P	Moment +M	Moment -M	Shear V
2nd Floor	Beam	12 x 21		
Dead Load 'DL'	3.9 kip	38.1 k-ft	70.2 k-ft	24.9 kip
Live Load 'LL'	1.4	13.2	24.6	8.7
Seismic Load 'E'	9.3	0.0	124.0	13.9
1.4 DL * 1.1	6.0	58.7	108.1	38.3
(1.2DL+1.6LL+0.5Lr) * 1.1	7.6	73.5	136.0	48.2
(1.2 DL + 1.0 E) * 1.1	15.4	50.3	229.1	48.2
Reinforcing steel		4 #8	4 #8	#3 @ 6 stirrups
Capacity		85.0	85.0	27.9
Roof	Beam	12 x 21		
Dead Load 'DL'	4.5 kip	29.3 k-ft	46.1 k-ft	16.8 kip
Live Load 'LL'	1.3	6.2	9.8	3.6
Seismic Load 'E'	18.0	0.0	16.0	2.31
1.4 DL * 1.1	6.9	45.1	71.0	25.9
(1.2DL+1.6LL+0.5Lr) * 1.1	8.2	49.6	78.1	28.5
(1.2 DL + 1.0 E) * 1.1	25.7	38.7	78.5	24.7
Reinforcing steel		4 #7	4 #7	#3 @ 6 stirrups
Capacity		81.1 k-ft	81.1 k-ft	16.7 kips

Beam Capacity C = T = 40 As a = 40 As / (0.85 * f'c * b)

f'c = 650 psi a = 72.40 As /b

Moment 0.9Mn = 0.9 * (40 As) *(d - a/2)

Shear 0.85Vc = 21.7 b *d lbs

0.85Vs = 7.48 d / s kips = Av * fy * d / s *0.85

4. ANALYSIS OF BUILDINGS 650, 651 & 652 (continue)

SUMMARY OF ANALYSIS - TYPICAL LONGITUDINAL FRAME

MAX. LOAD	Axial P	Moment M	Shear V
Ground Floor	Column 16 x 16		
Dead Load 'DL'	113.6 kip	9.8 k-ft	0.9 kip
Live Load 'LL'	27.0	3.0	0.3
Seismic Load 'E'	19.4	175.1	15.2
1.4 DL * 1.1	174.9	15.1	1.3
(1.2DL+1.6LL+0.5Lr) * 1.1	197.5	18.3	1.6
(1.2 DL + 1.0 E) * 1.1	171.2	205.6	17.9
Reinforcing steel	8 #7	ties #3 @ 6.0	
Capacity	179 kips	63 k-ft	
3rd Floor	Column 12 x 12		
Dead Load 'DL'	14.7 kip	10.4 k-ft	0.2 kip
Live Load 'LL'	2.9	2.1	0.0
Seismic Load 'E'	0.5	26.3	2.3
1.4 DL * 1.1	22.6	16.0	0.3
(1.2DL+1.6LL+0.5Lr) * 1.1	24.5	17.5	0.3
(1.2 DL + 1.0 E) * 1.1	20.0	42.6	2.8
Reinforcing steel	8 #5	ties #3 @ 6.0	
Capacity	96 kips	23 k-ft	

4. ANALYSIS OF BUILDINGS 650, 651 & 652 (continue)

SUMMARY OF ANALYSIS - TYPICAL LONGITUDINAL FRAME

MAX. LOAD	Axial P	Moment +M	Moment -M	Shear V
2nd Floor	Beam	12 x 24		
Dead Load 'DL'	1.9 kip	16.0 k-ft	31.3 k-ft	9.1 kip
Live Load 'LL'	13.5	5.0	9.7	2.7
Seismic Load 'E'	13.1	0.0	114.3	1.3
1.4 DL * 1.1	2.9	24.6	48.1	14.1
(1.2DL+1.6LL+0.5Lr) * 1.1	26.3	29.8	58.4	16.9
(1.2 DL + 1.0 E) * 1.1	16.9	21.1	166.9	13.5
Reinforcing steel		4 # 7	4 # 7	# 3 @ 6 stirrups
Capacity		102.7	102.7	32.4
Roof	Beam	12 x 17		
Dead Load 'DL'	1.5 kip	13.6 k-ft	23.3 k-ft	6.7 kip
Live Load 'LL'	2.9	2.4	4.2	1.115
Seismic Load 'E'	2.3	0.0	19.7	5.1
1.4 DL * 1.1	2.4	20.9	35.9	10.4
(1.2DL+1.6LL+0.5Lr) * 1.1	7.2	22.1	38.1	10.8
(1.2 DL + 1.0 E) * 1.1	4.6	17.9	52.4	14.5
Reinforcing steel		4 #6	2+2 #6+4	#3 @ 6 stirrups
Capacity		48.5 k-ft	40.9 k-ft	21.8 kips

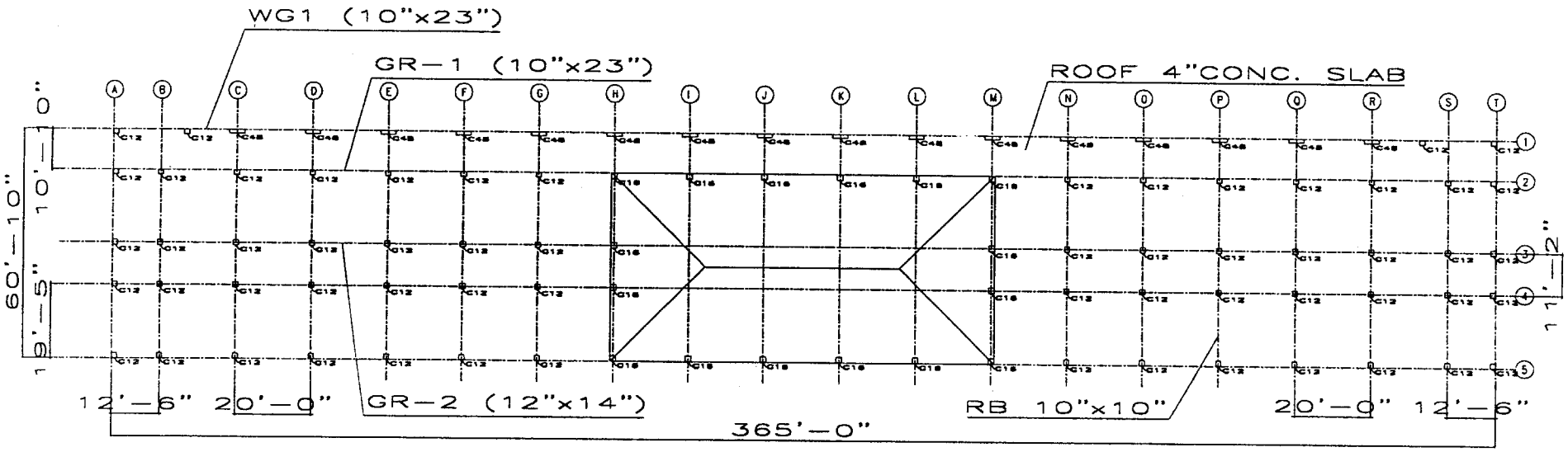
Beam Capacity C = T = 40 As a = 40 As / (0.85 * f'c * b)

f'c = 650 psi a = 72.40 As /b

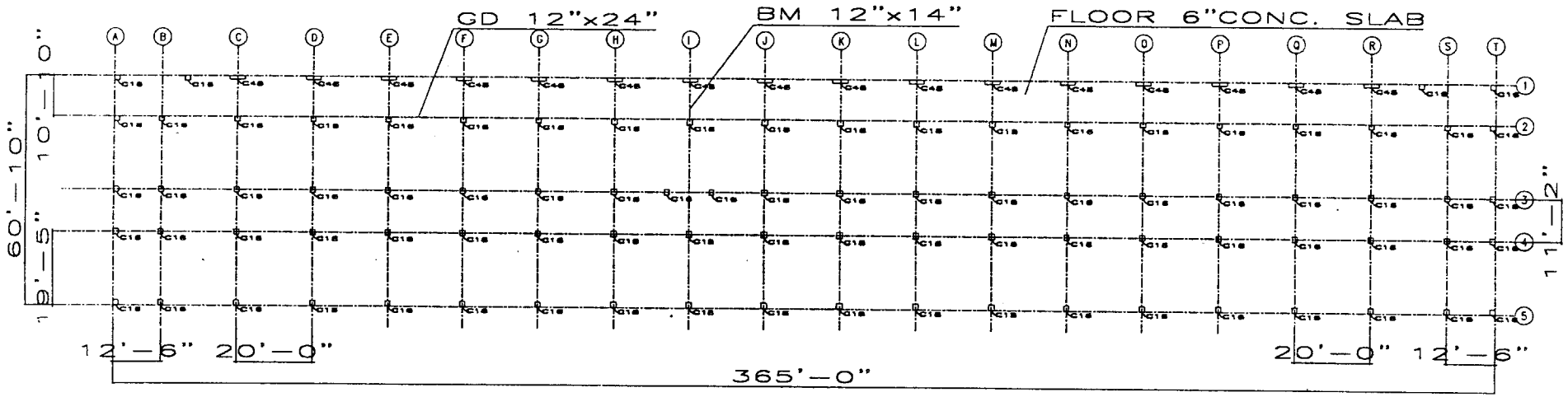
Moment 0.9Mn = 0.9 * (40 As) *(d - a/2)

Shear 0.85Vc = 21.7 b *d lbs

0.85Vs = 7.48 d / s kips = Av * fy * d / s *0.85

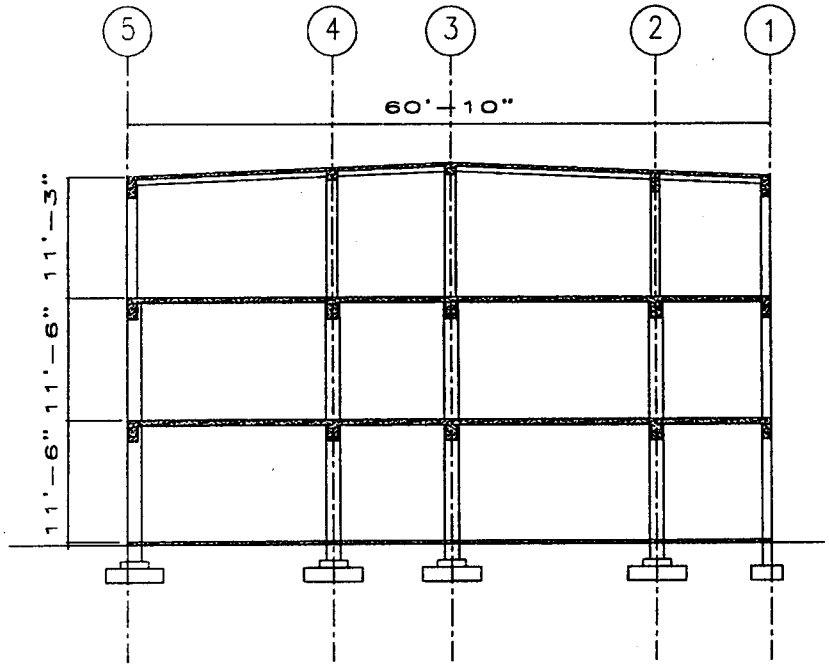


B ROOF PLAN

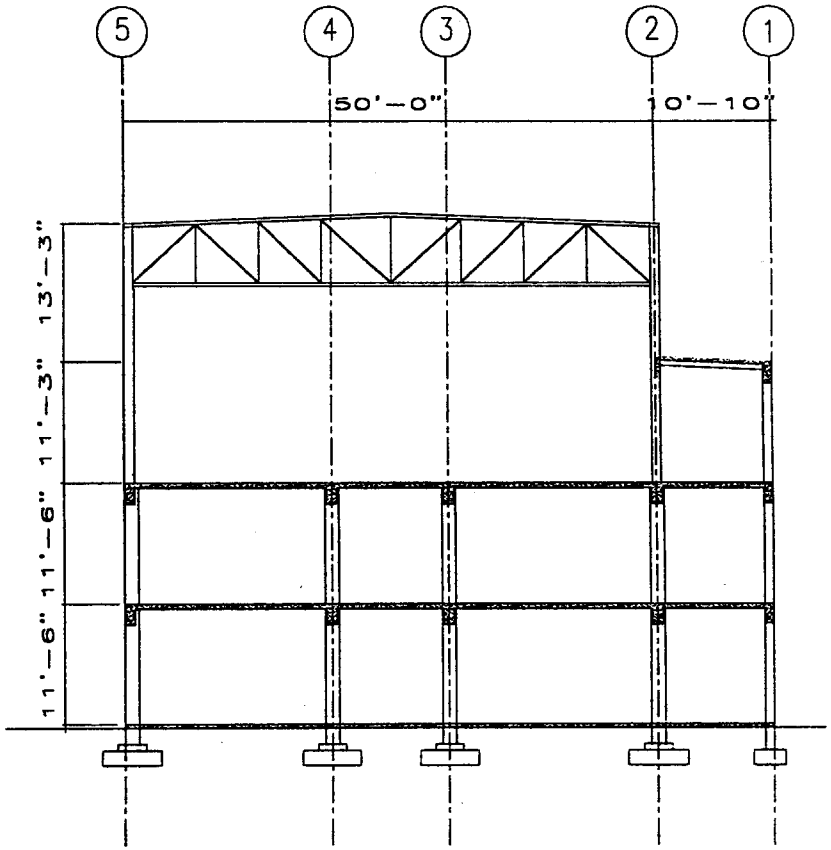


A FLOOR PLAN

BLDG NO. 649

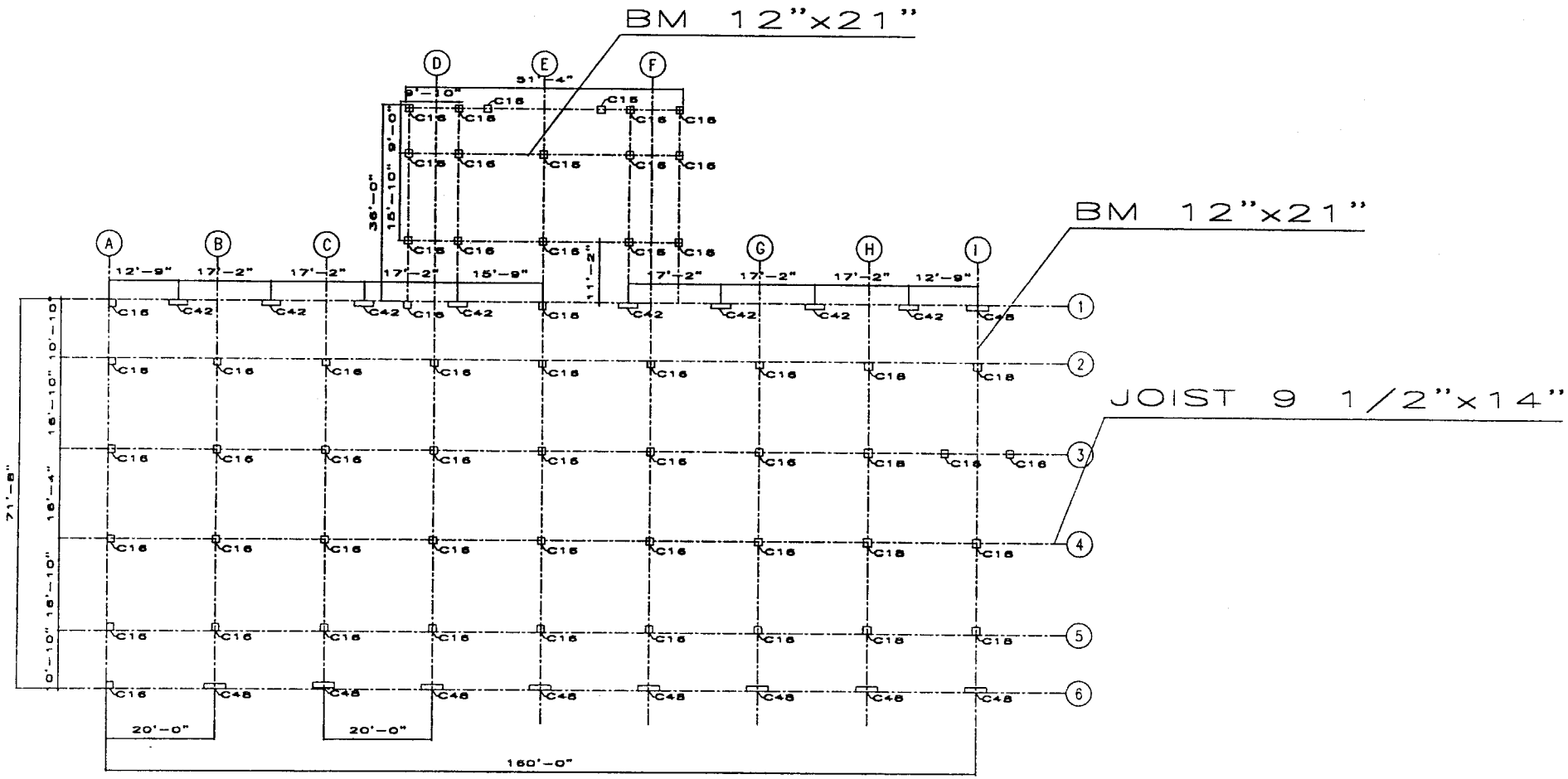


C TYPICAL CROSS SECTION



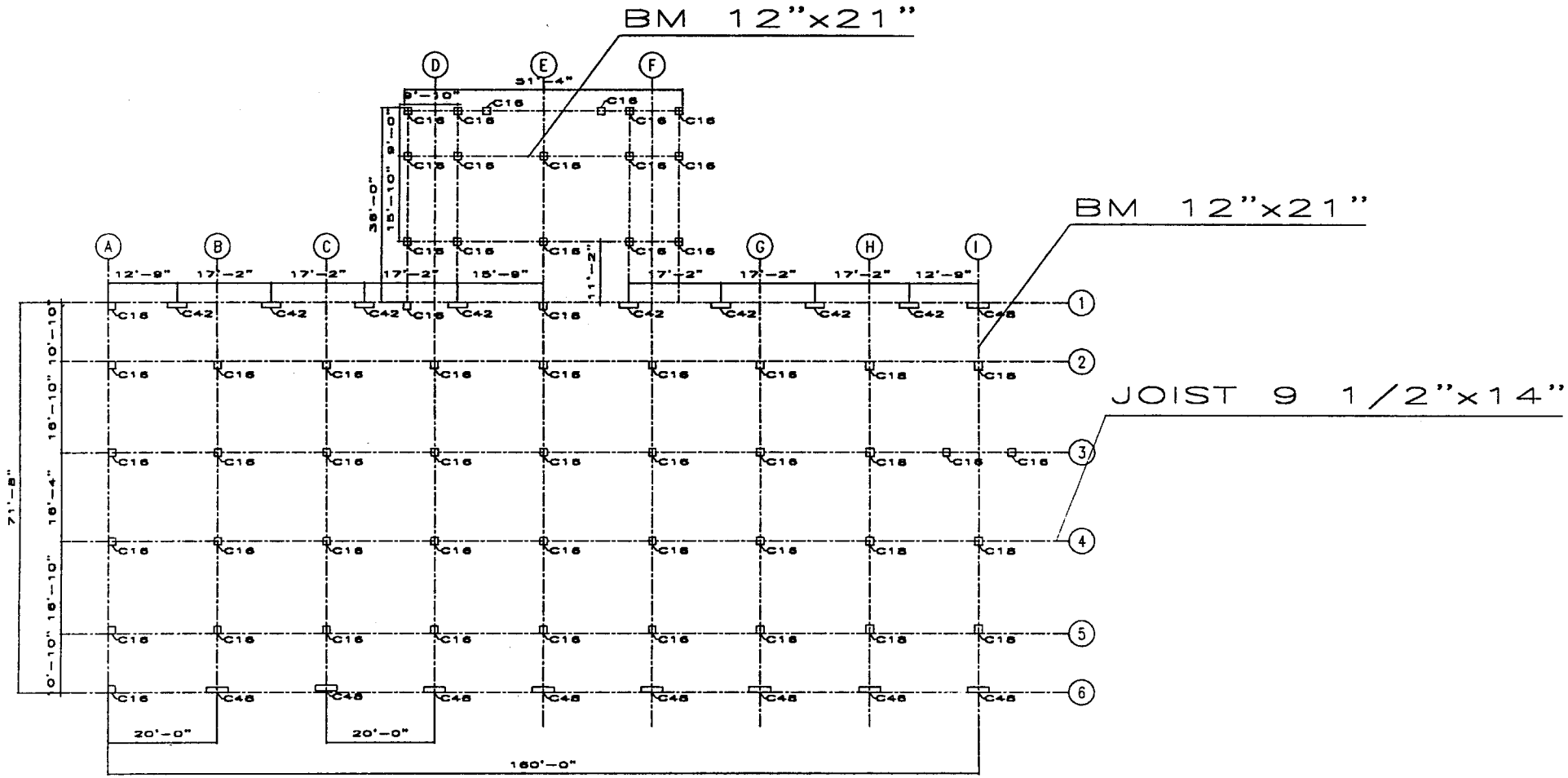
D TYPICAL CENTER SECTION

BLDG NO. 649



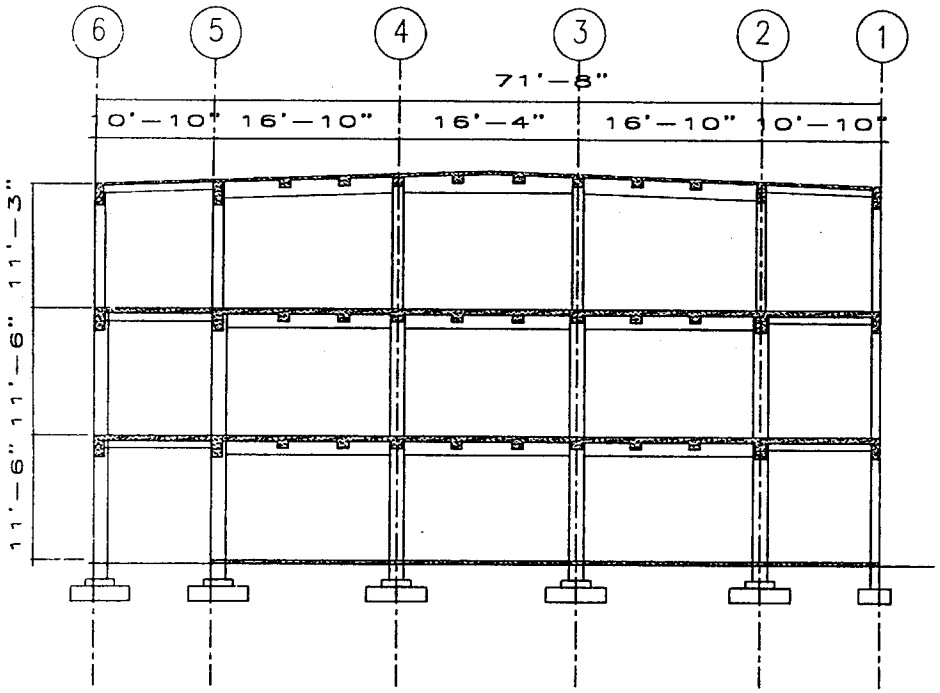
A HALF FLOOR PLAN

BLDG NO. 650, 651 & 652



A HALF ROOF PLAN

BLDG No. 650, 651 & 652



C TYPICAL CROSS SECTION
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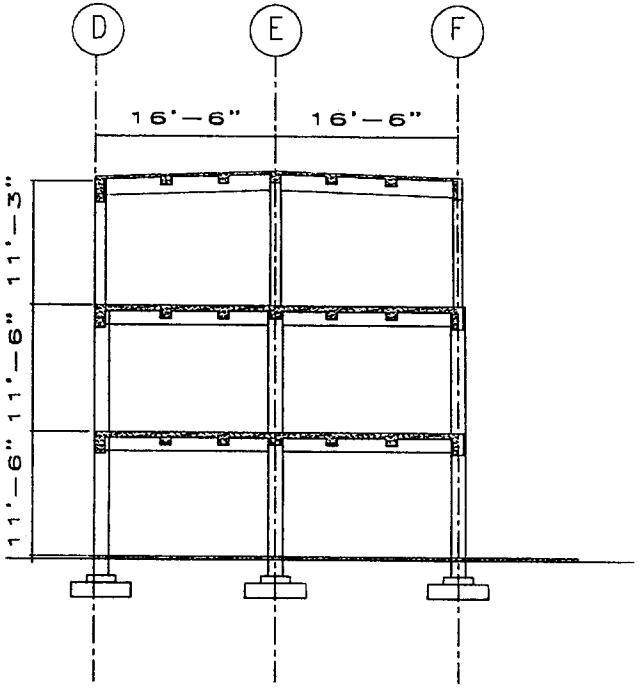


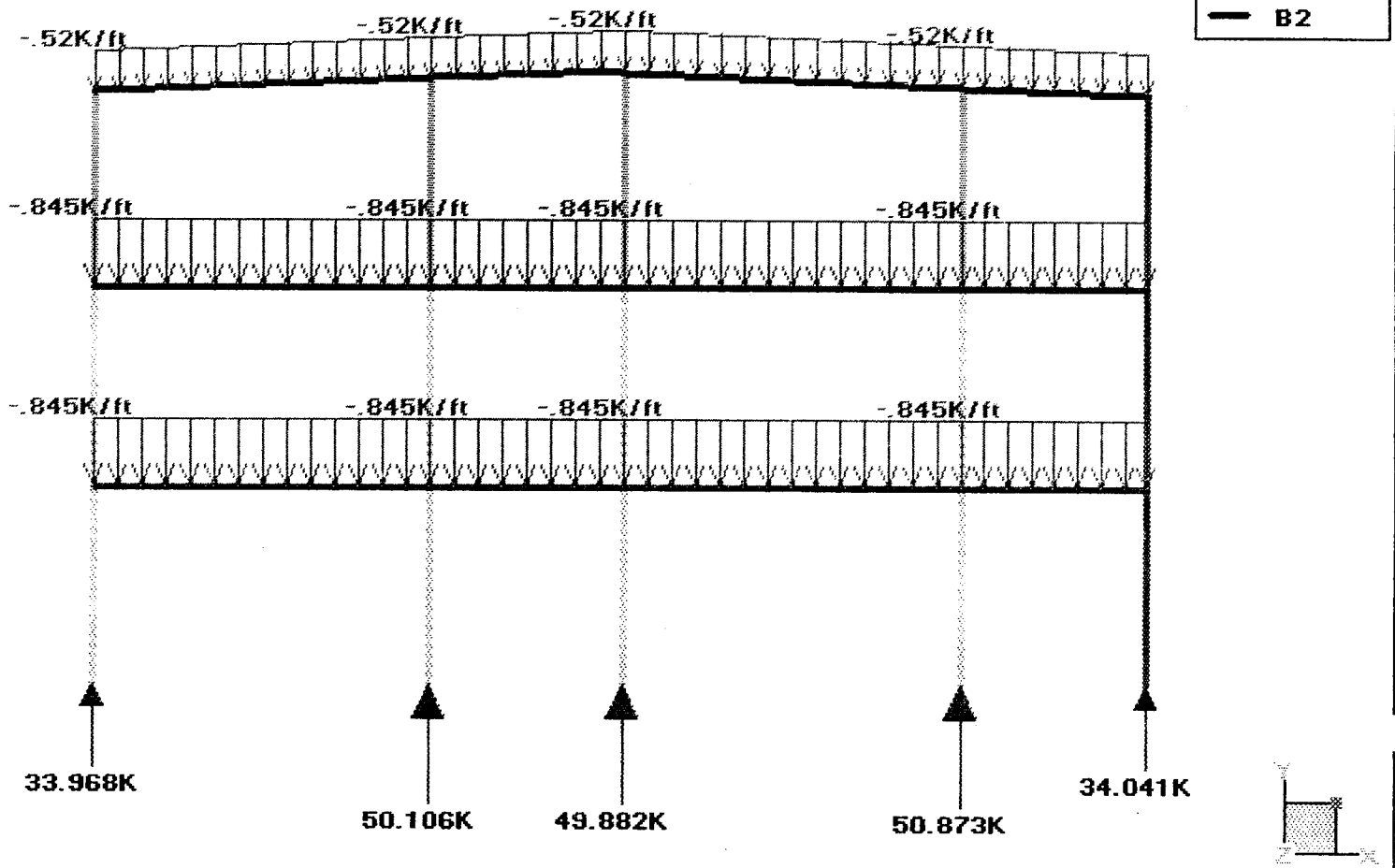
D TYPICAL CROSS SECTION
–

BLDG NO. 650, 651 & 652

BUILDING NO. 649

TYPICAL CROSS FRAME

Y Grav: -1

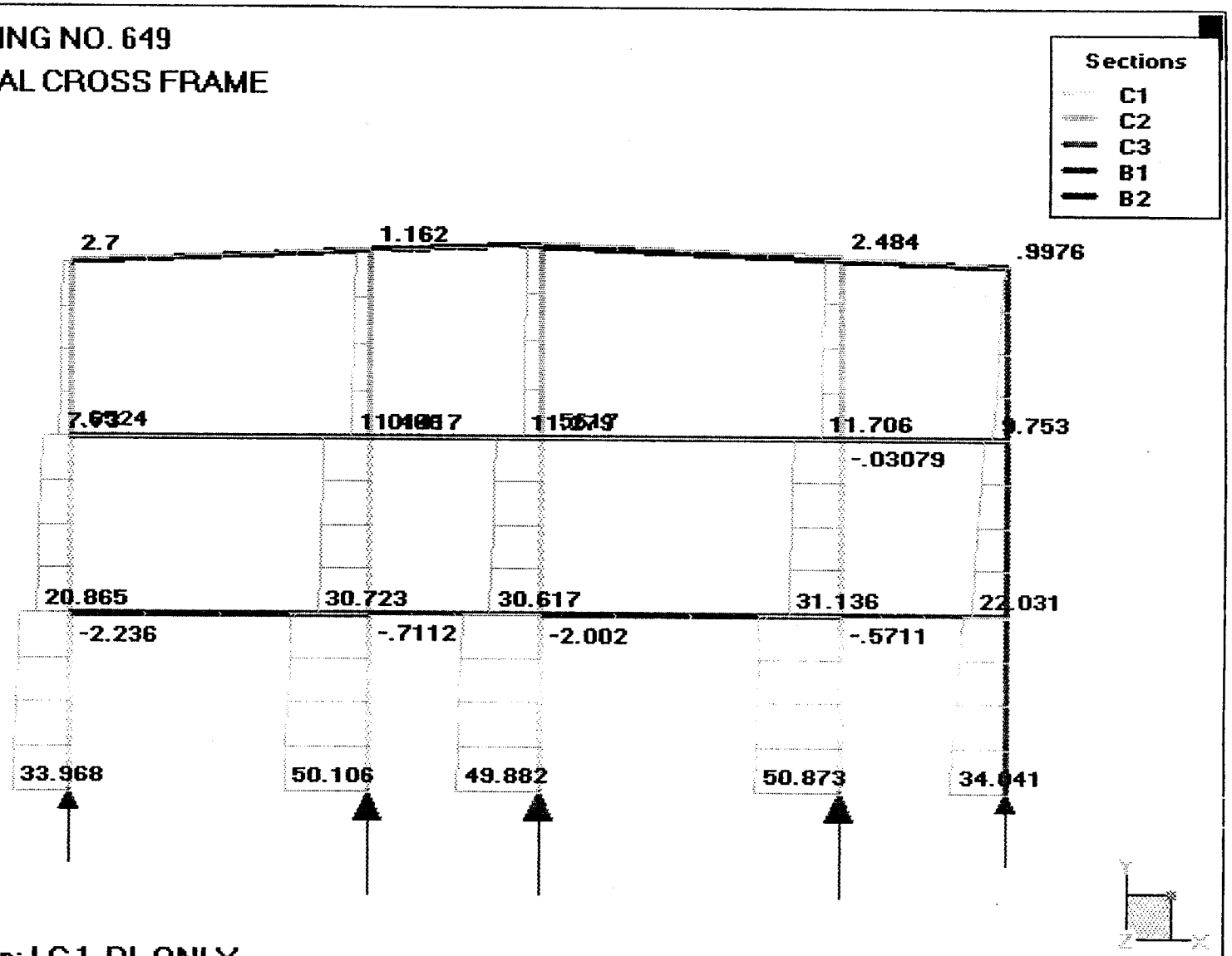


Solution: LC 1 DL ONLY

A1

BUILDING NO. 649

TYPICAL CROSS FRAME



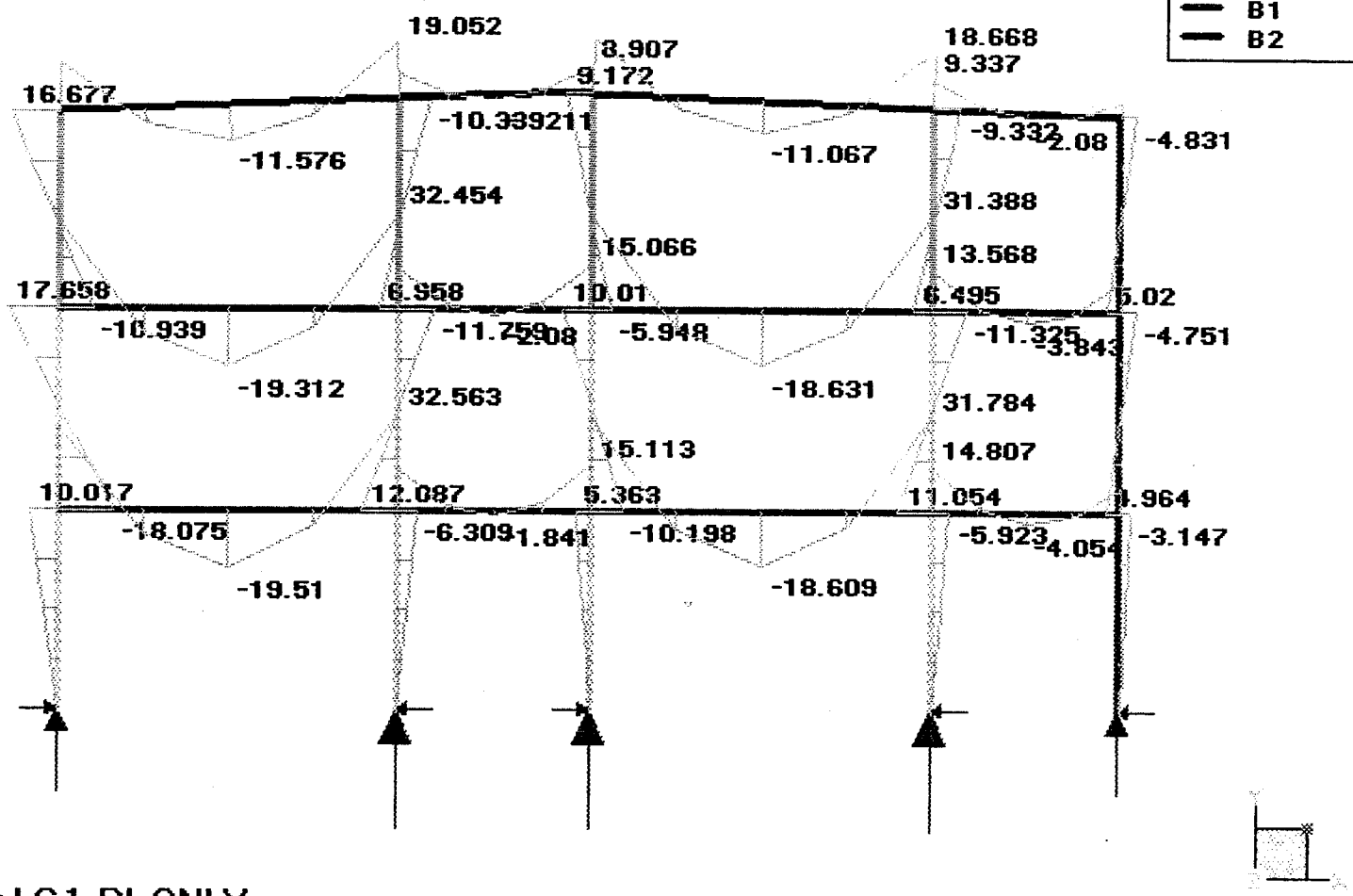
Solution: LC 1 DL ONLY

Member Axial Forces, K

A2

BUILDING NO. 649

TYPICAL CROSS FRAME



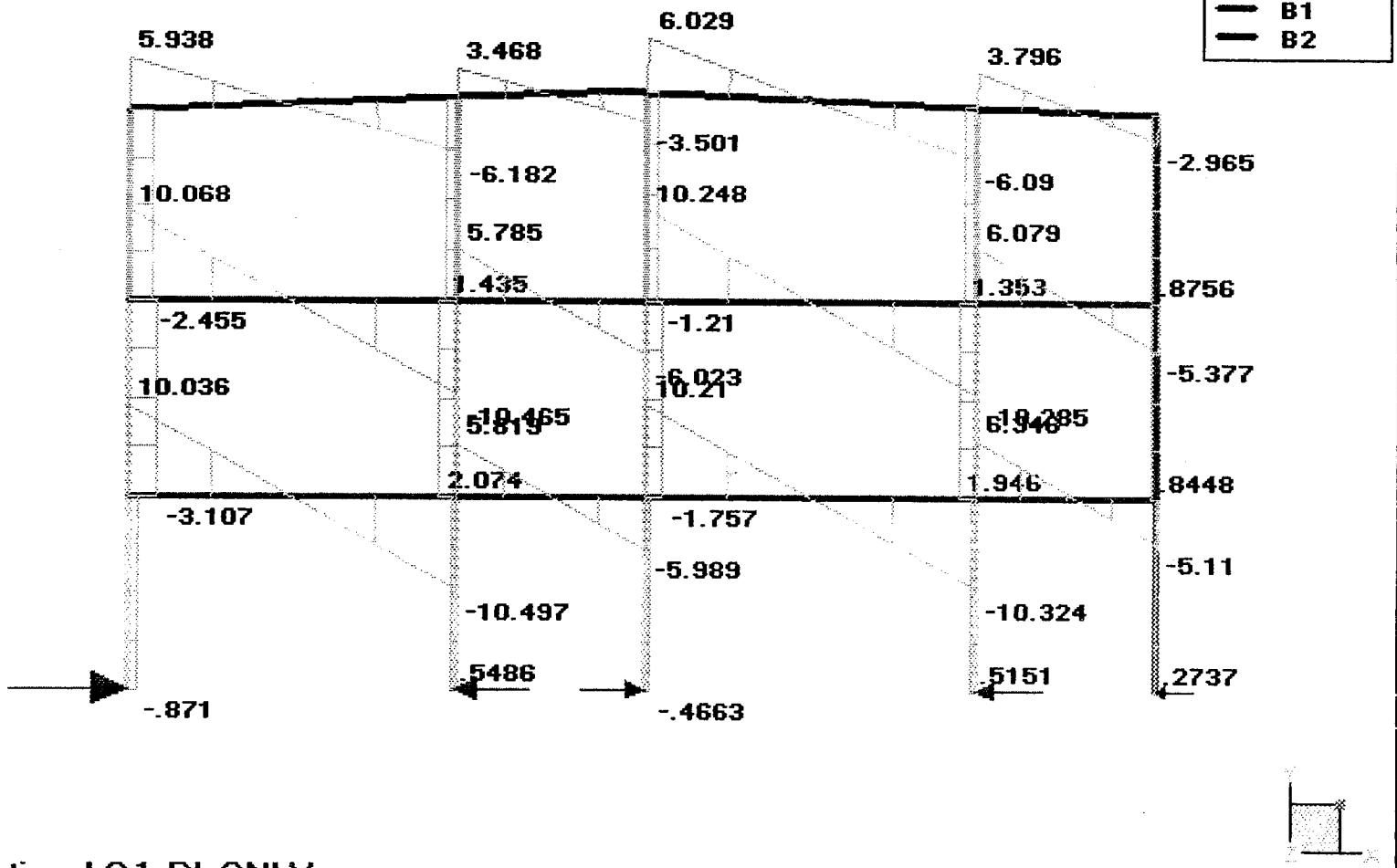
Solution: LC 1 DL ONLY

Member z Bending Moments, K-ft

A3

BUILDING NO. 649

TYPICAL CROSS FRAME



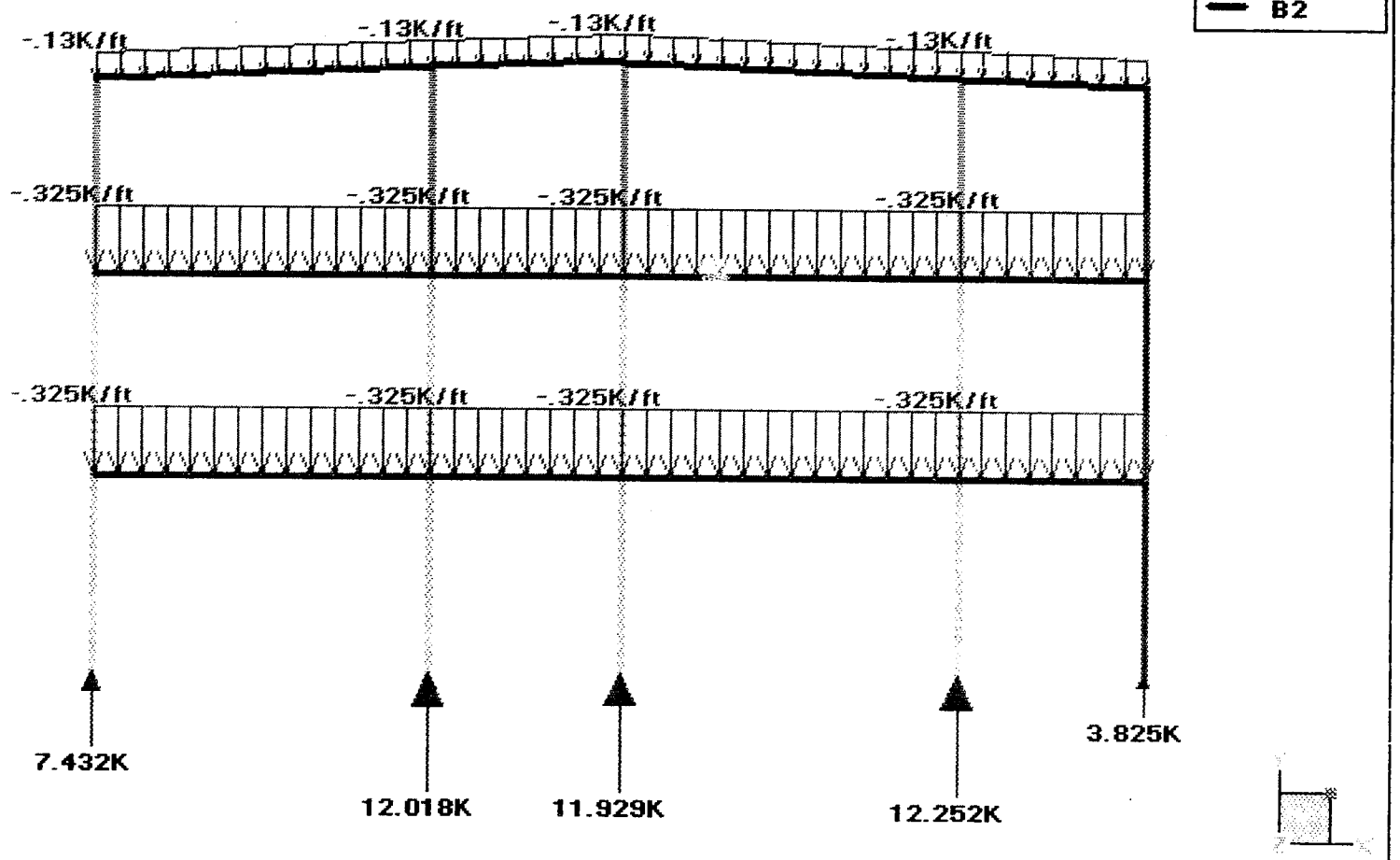
Solution: LC 1 DL ONLY

Member y Shear Forces, K

A4

BUILDING NO. 649

TYPICAL CROSS FRAME

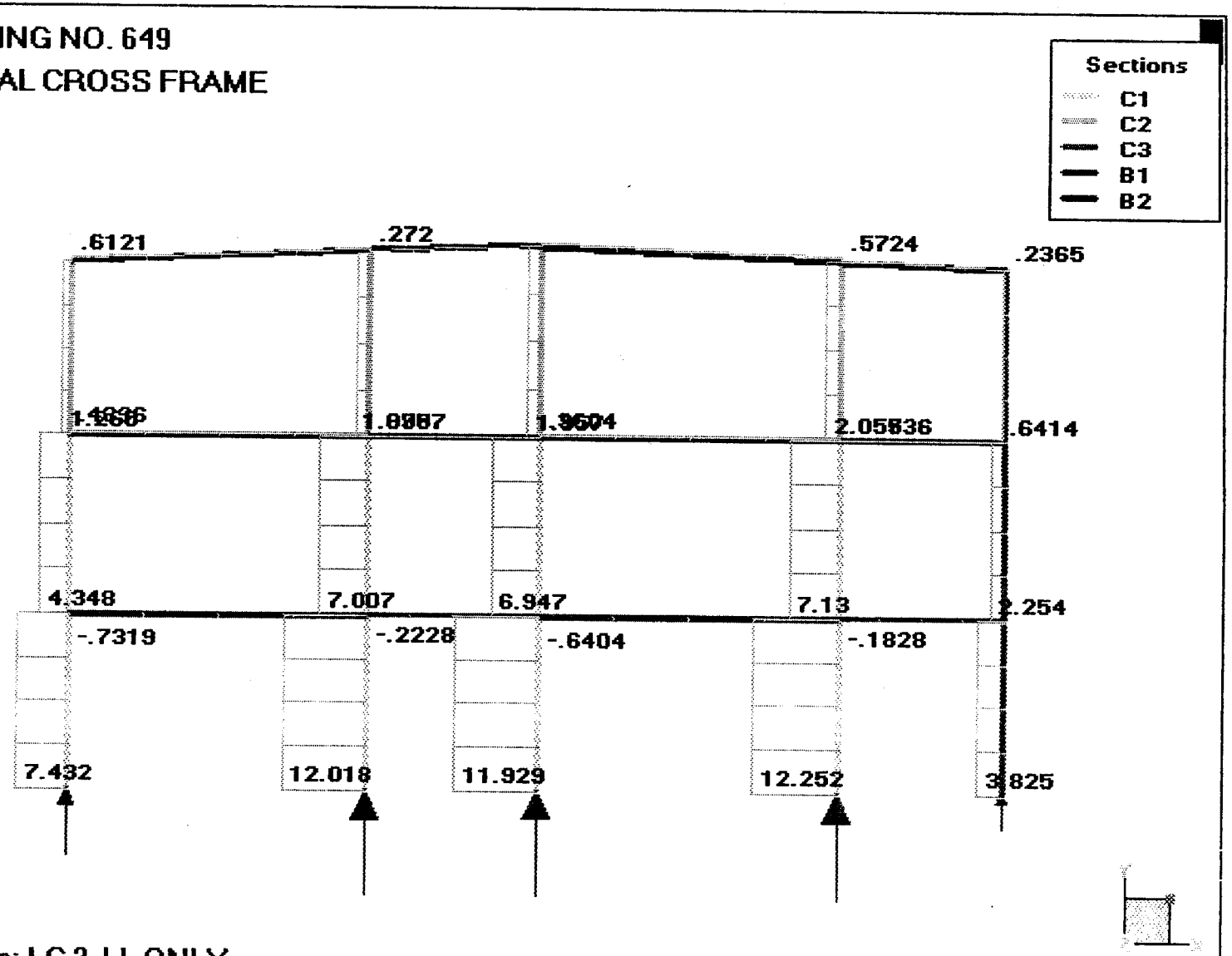


Solution: LC 2 LL ONLY

A5

BUILDING NO. 649

TYPICAL CROSS FRAME



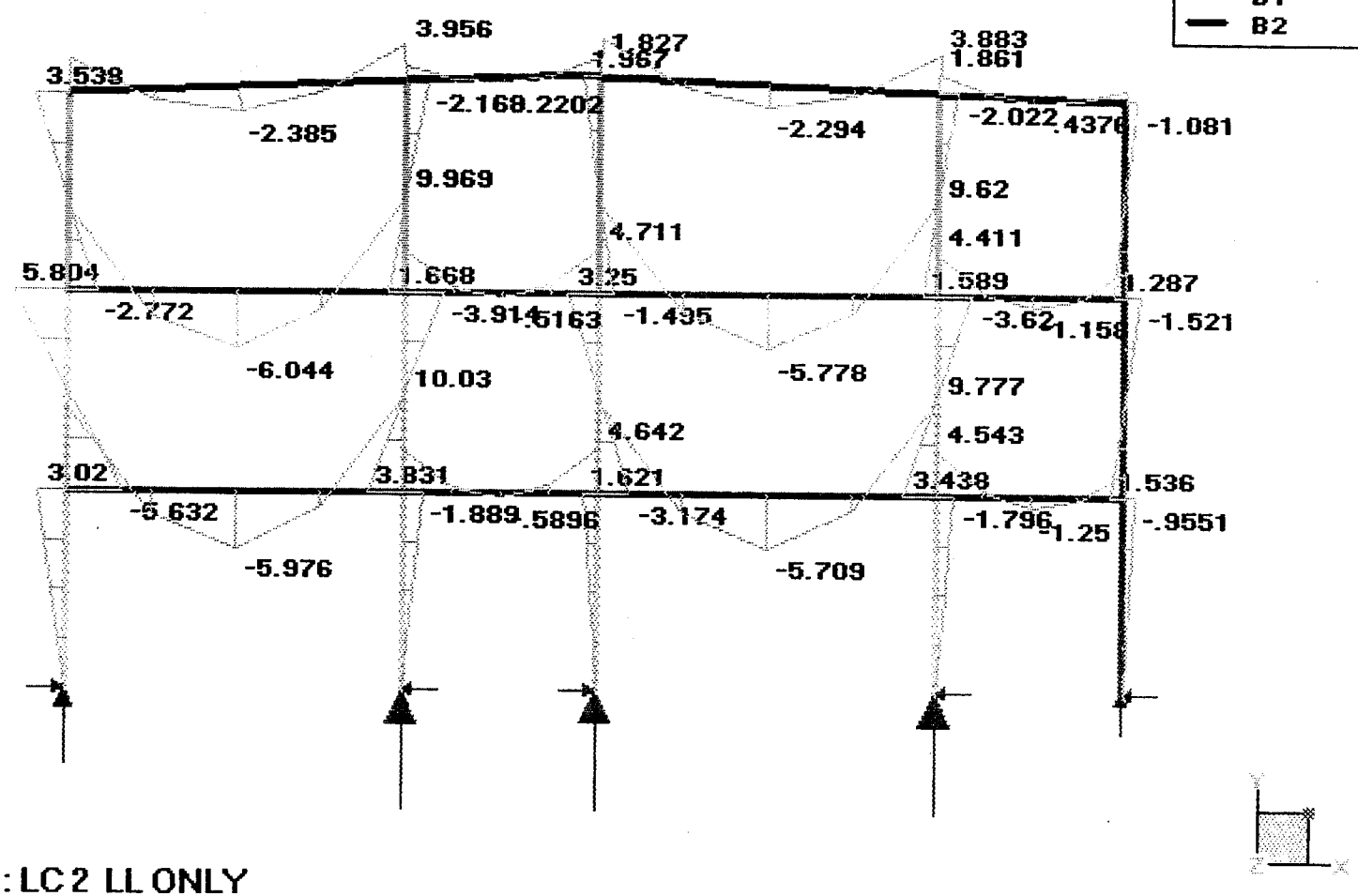
Solution: LC 2 LL ONLY

Member Axial Forces, K

A6

BUILDING NO. 649

TYPICAL CROSS FRAME



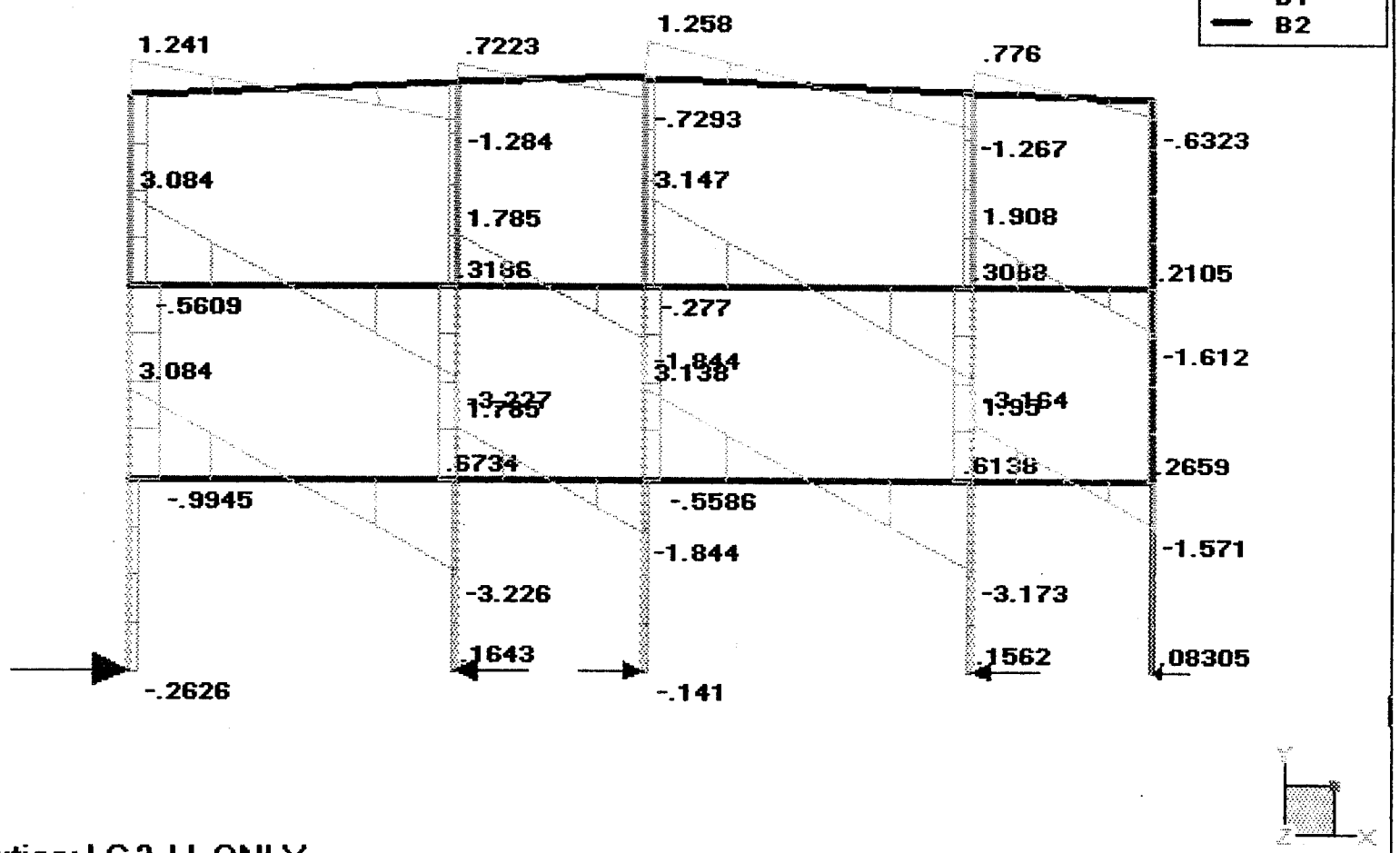
Solution: LC 2 LL ONLY

Member z Bending Moments, K-ft

A7

BUILDING NO. 649

TYPICAL CROSS FRAME

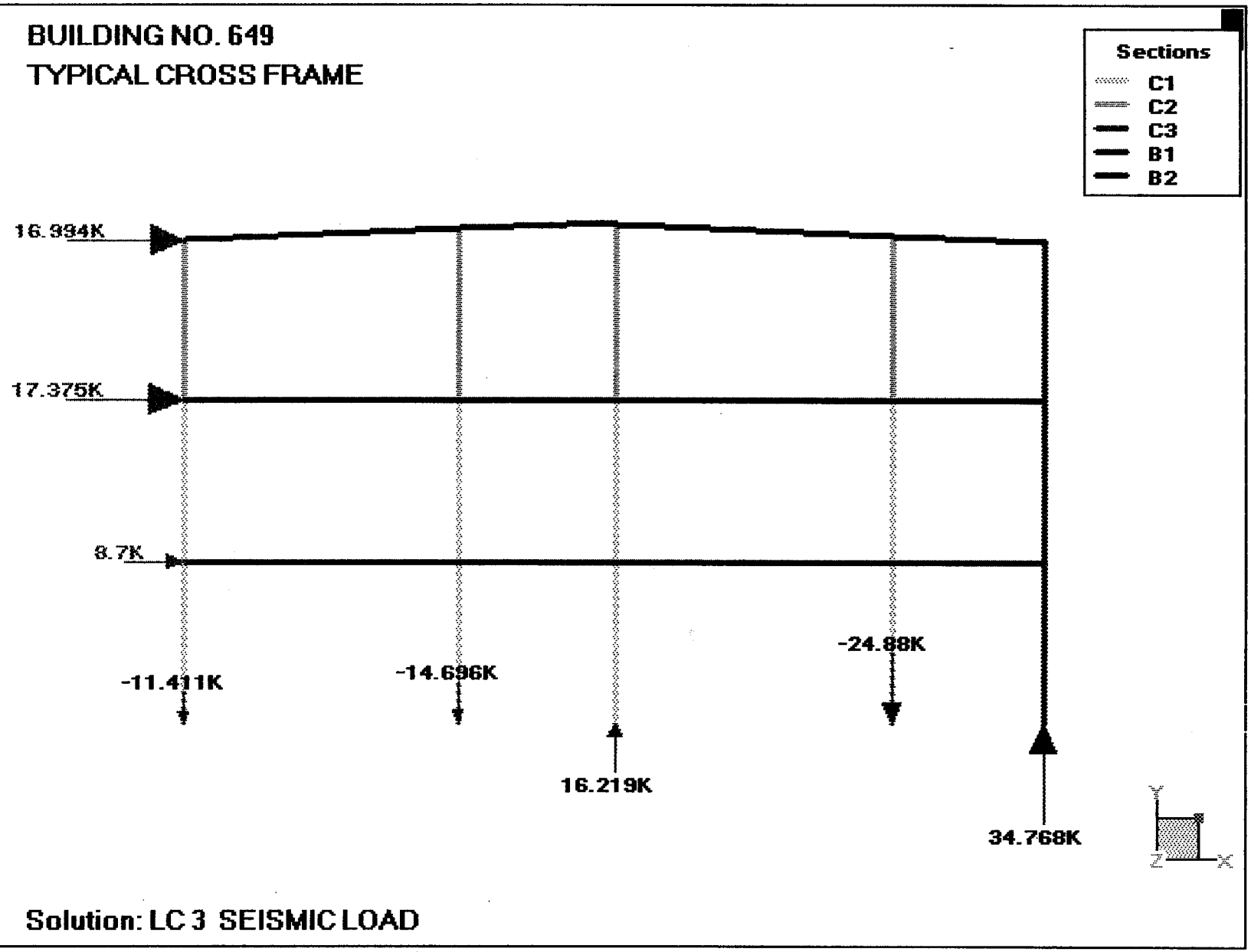


Solution: LC 2 LL ONLY

Member y Shear Forces, K

A8

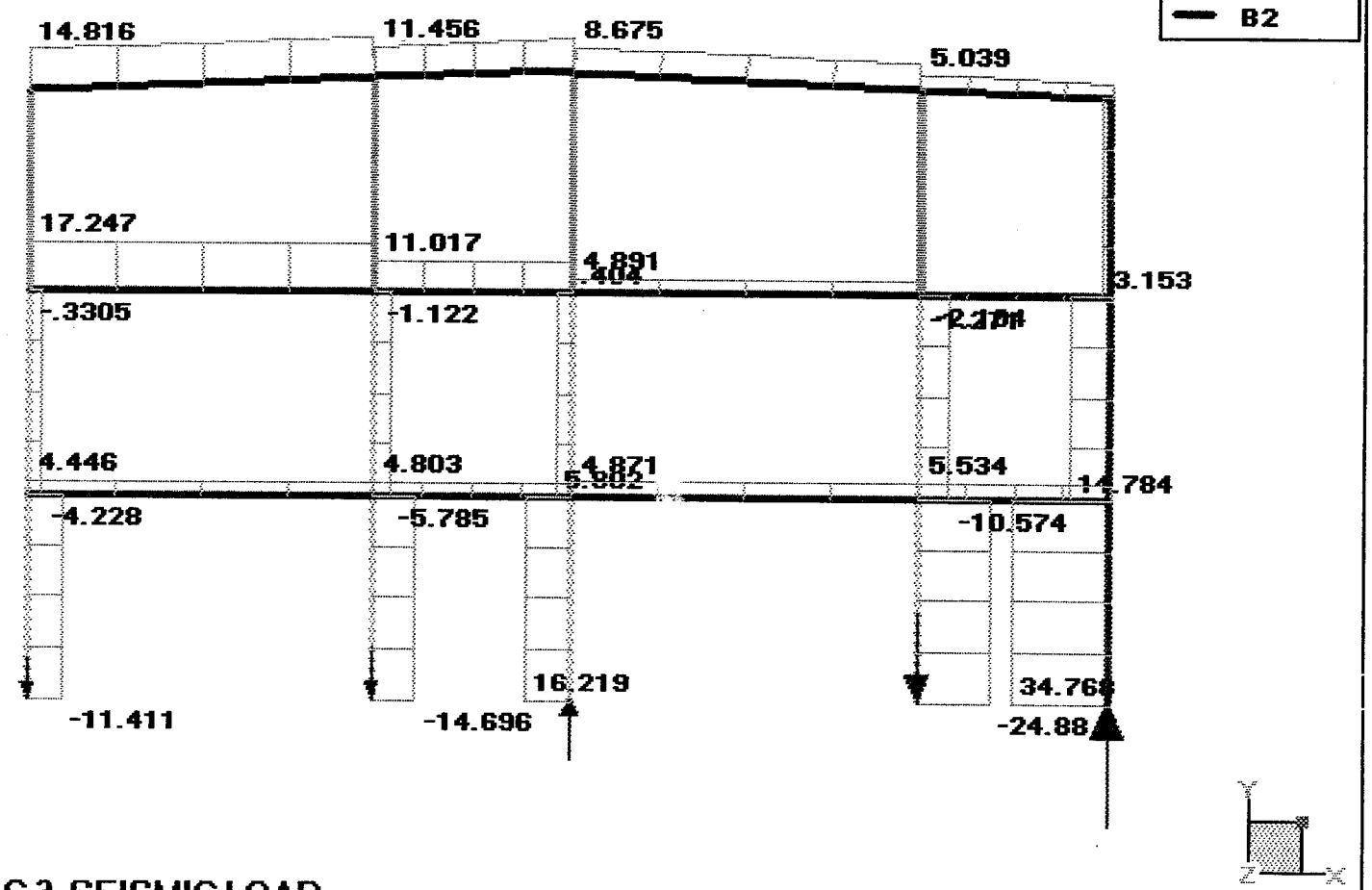
BUILDING NO. 649
TYPICAL CROSS FRAME



Solution: LC 3 SEISMIC LOAD

BUILDING NO. 649

TYPICAL CROSS FRAME



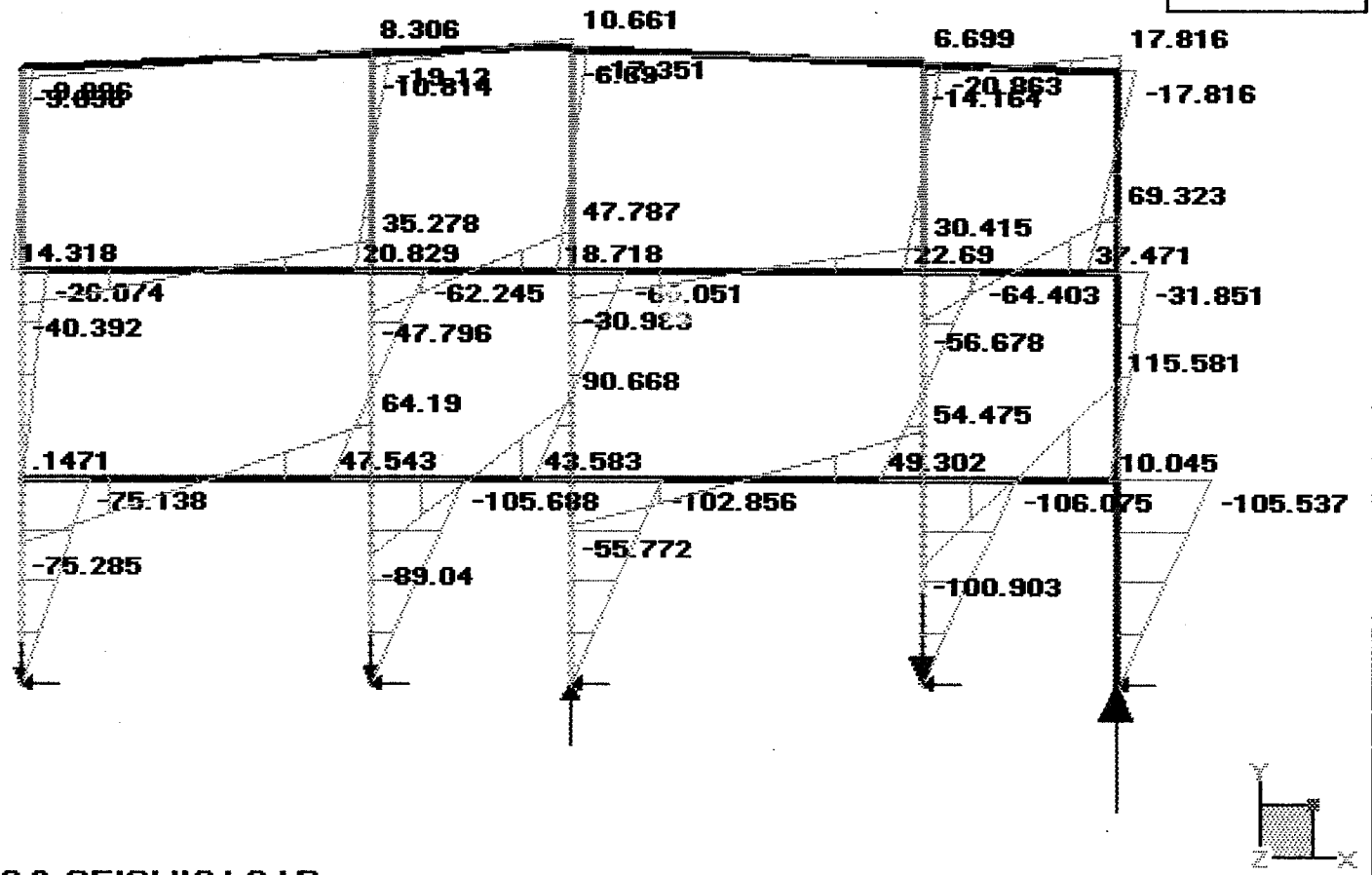
Solution: LC 3 SEISMIC LOAD

Member Axial Forces, K

A10

BUILDING NO. 649

TYPICAL CROSS FRAME



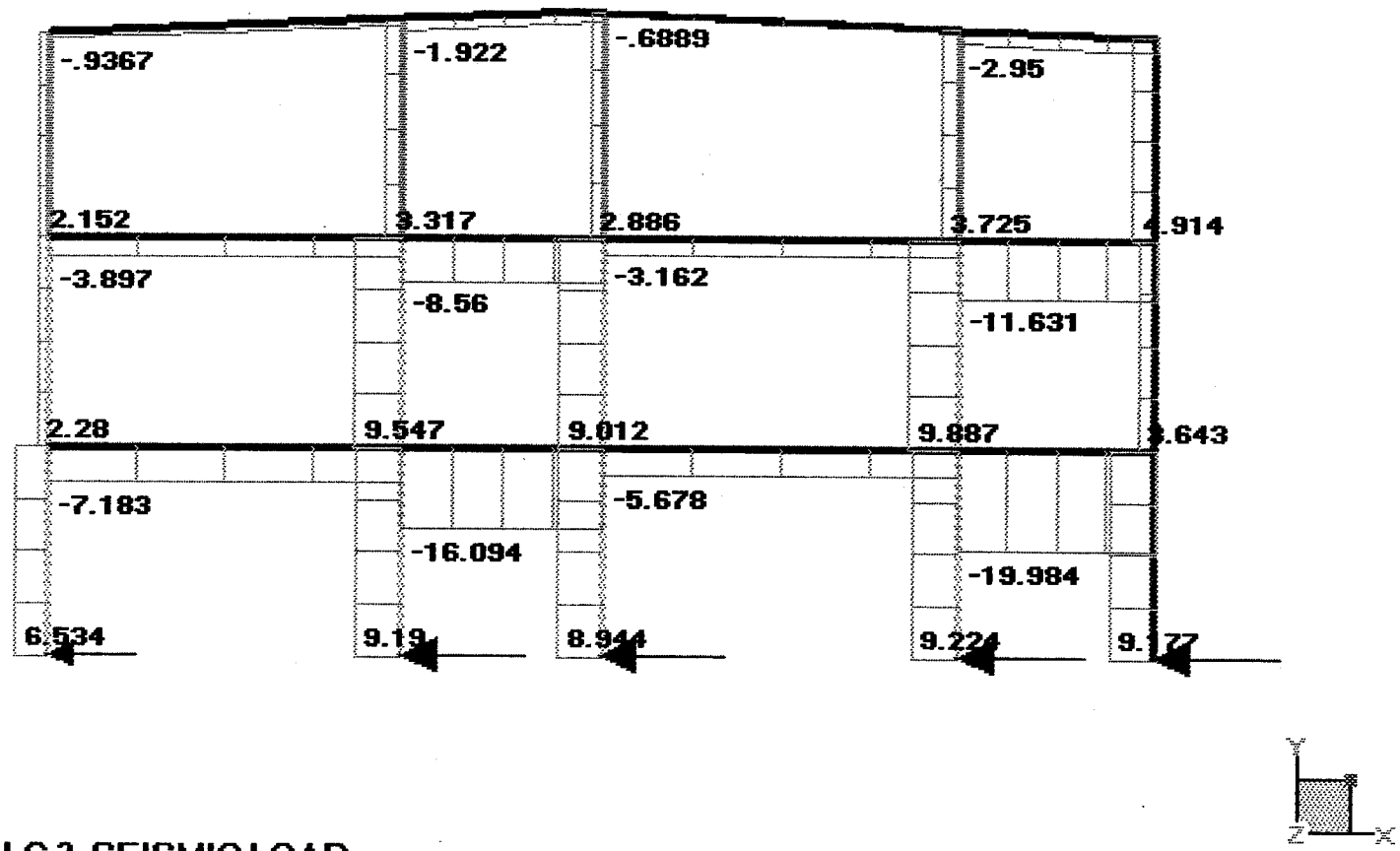
Solution: LC 3 SEISMIC LOAD

Member z Bending Moments, K-ft

A11

BUILDING NO. 649

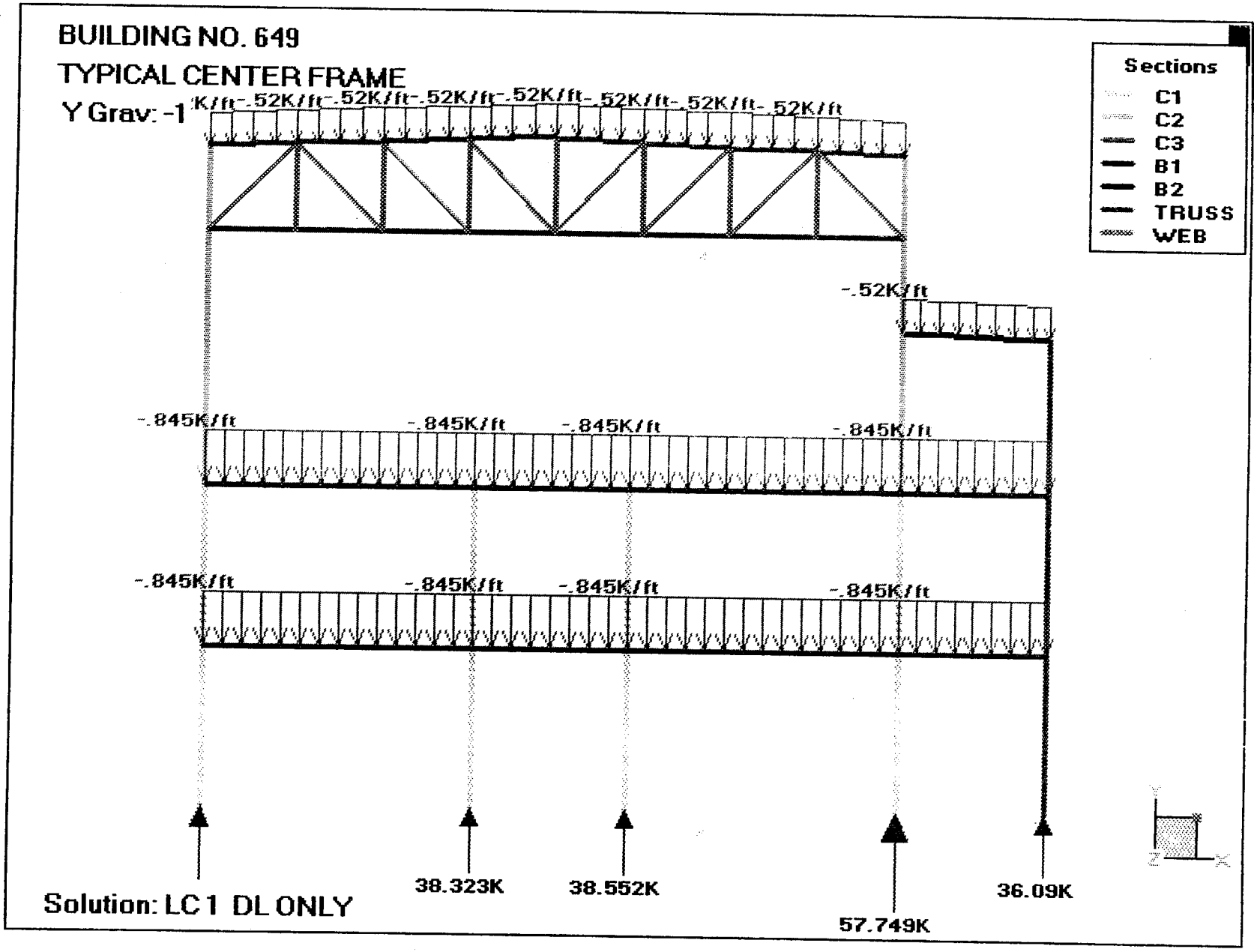
TYPICAL CROSS FRAME



Solution: LC 3 SEISMIC LOAD

Member y Shear Forces, K

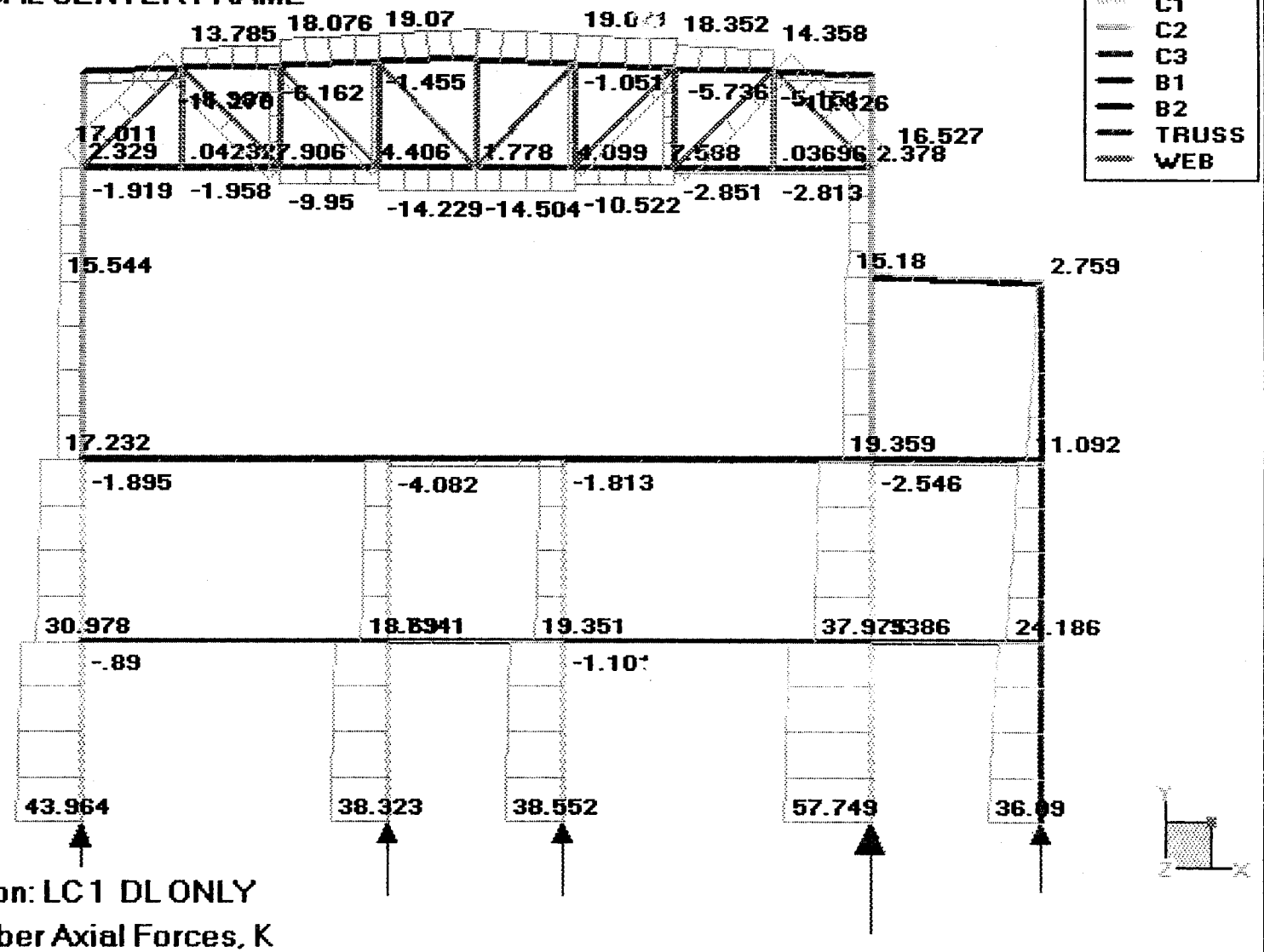
A12


BUILDING NO. 649
TYPICAL CENTER FRAME
Y Grav: -1
-.52K/ft
-.845K/ft
38.323K
38.552K
57.749K
36.09K
Solution: LC 1 DL ONLY
Sections
C1
C2
C3
B1
B2
TRUSS
WEB

A13

BUILDING NO. 649

TYPICAL CENTER FRAME



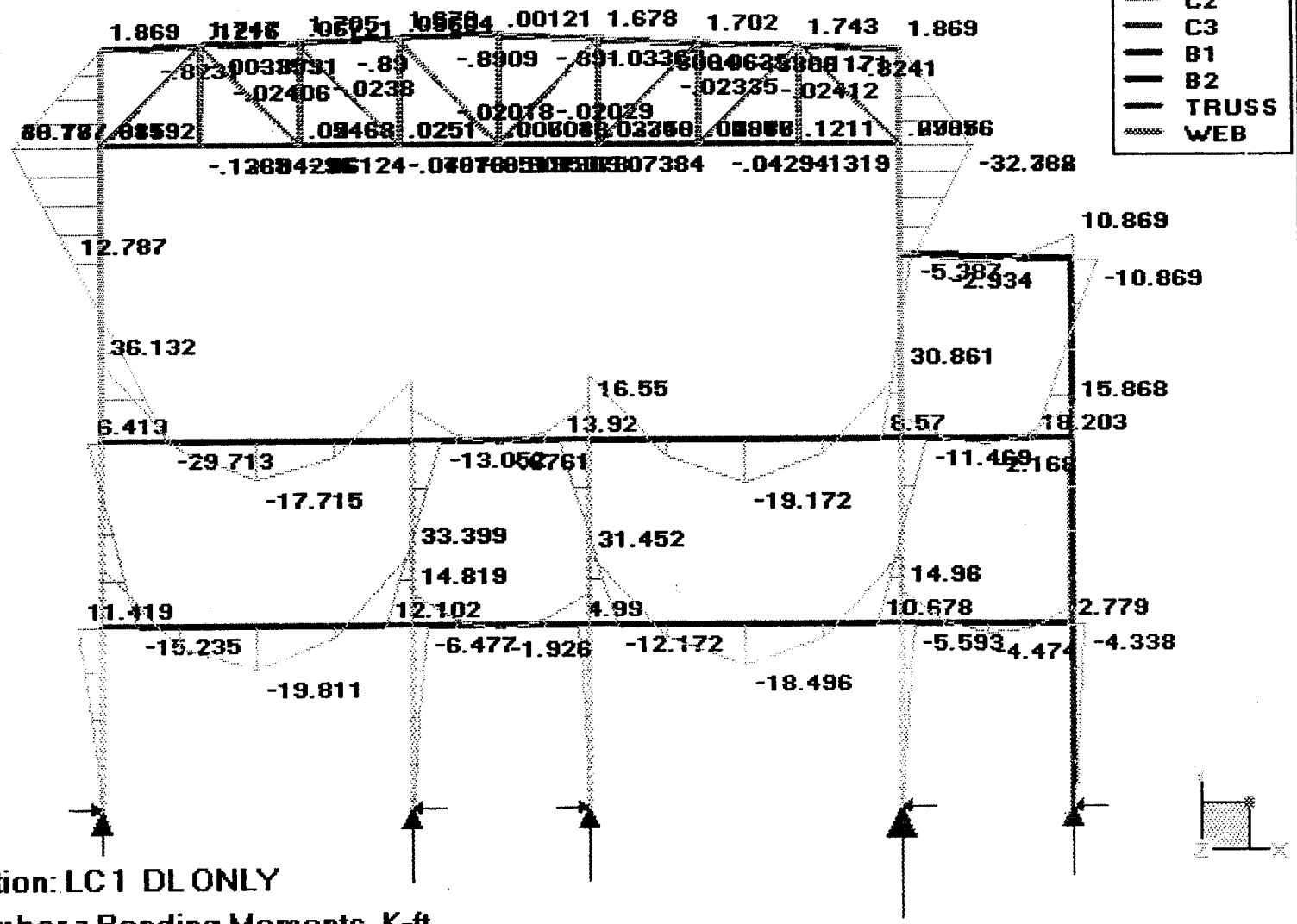
Solution: LC 1 DL ONLY

Member Axial Forces, K

A14

BUILDING NO. 649

TYPICAL CENTER FRAME



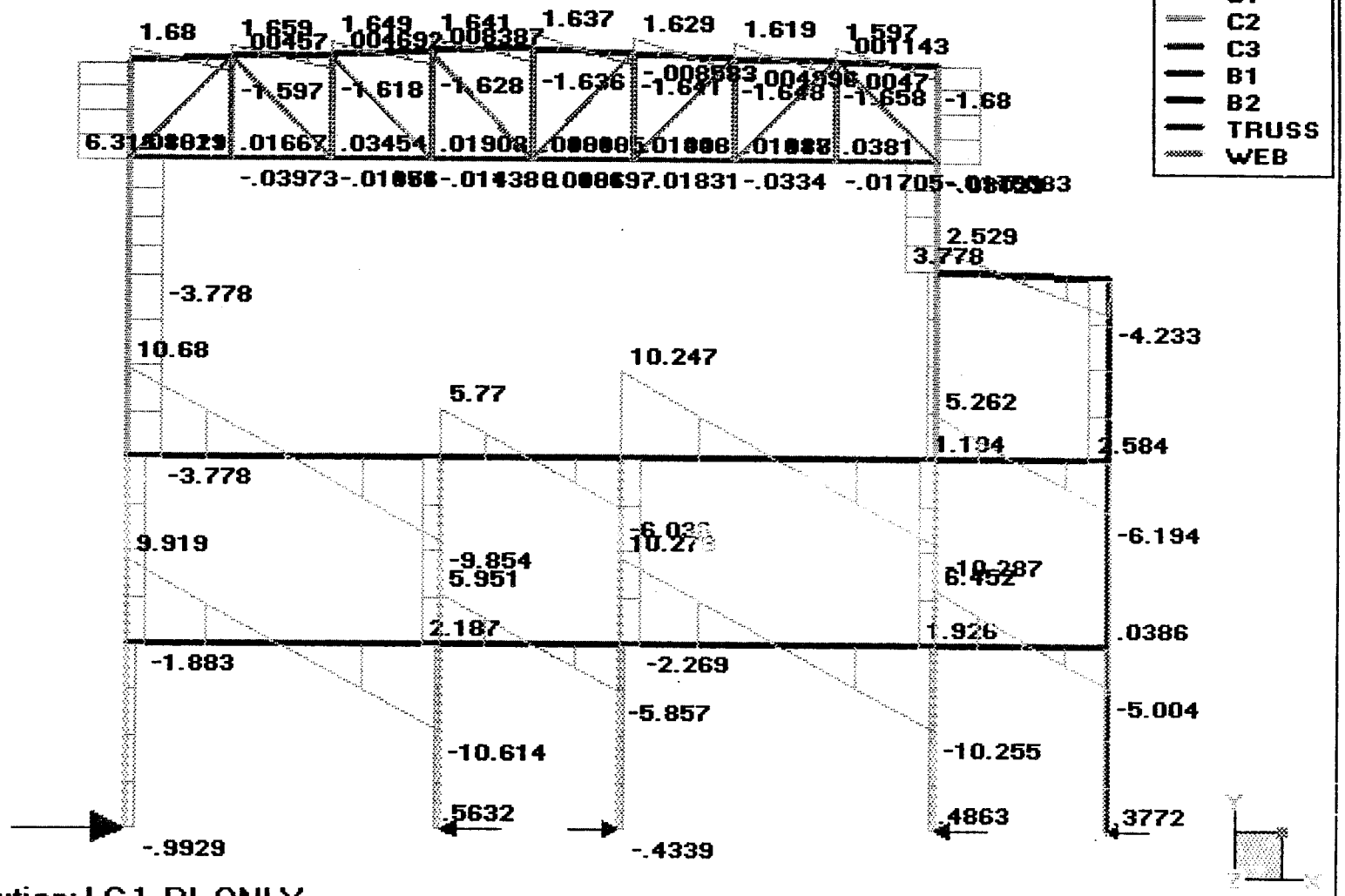
Solution: LC 1 DL ONLY

Member z Bending Moments, K-ft

A15

BUILDING NO. 649

TYPICAL CENTER FRAME



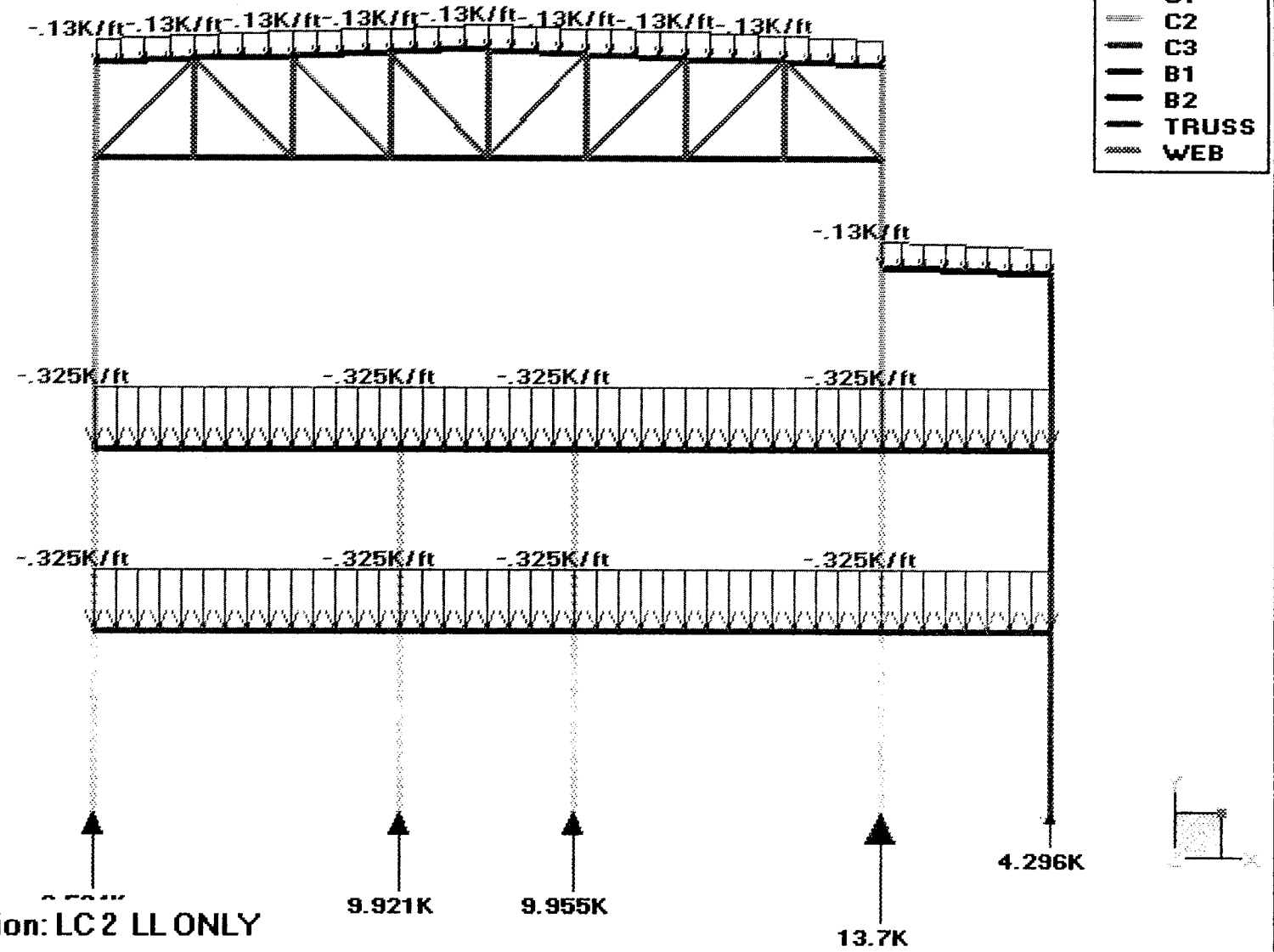
Solution: LC 1 DL ONLY

Member y Shear Forces, K

A16

BUILDING NO. 649

TYPICAL CENTER FRAME

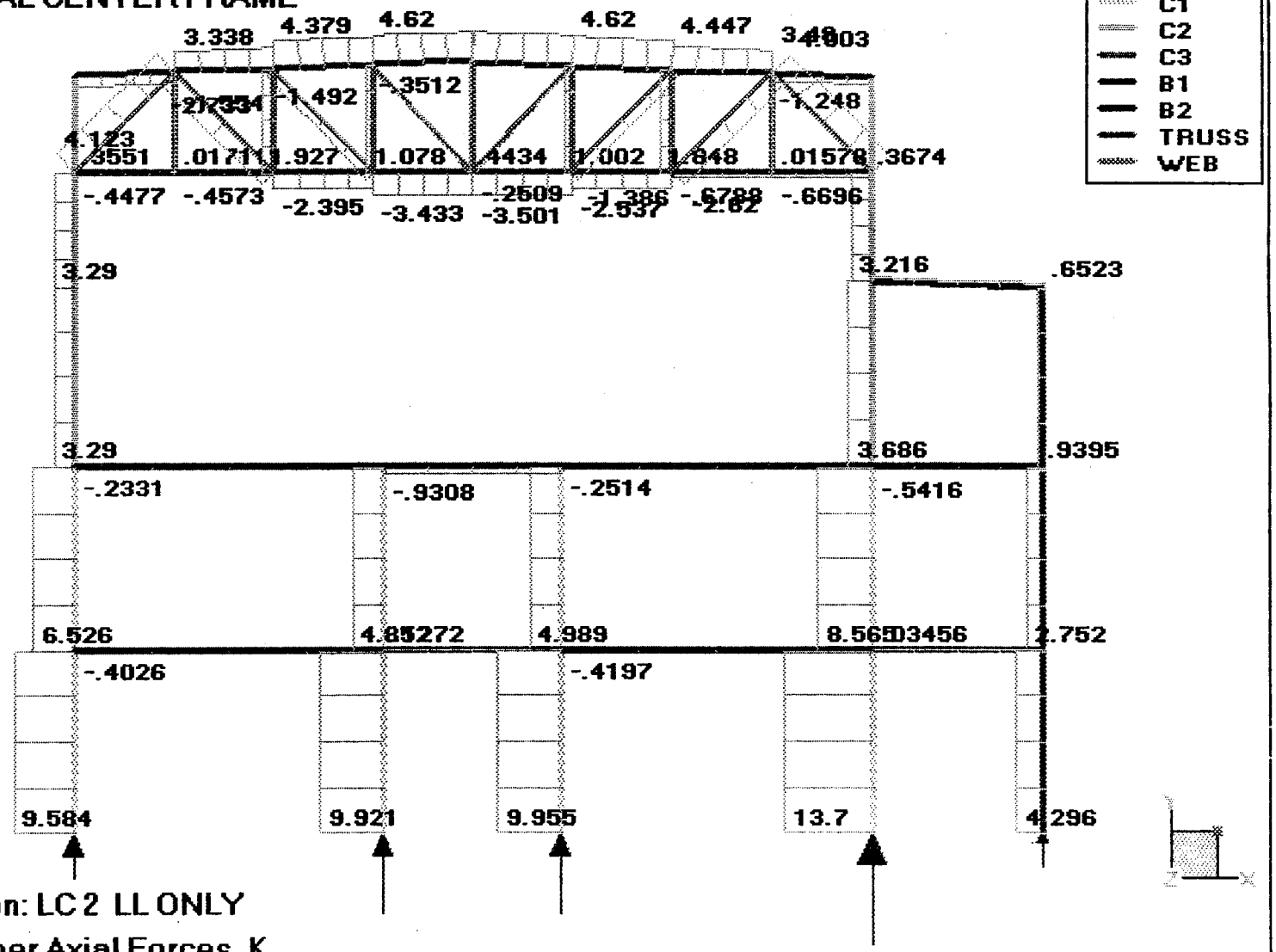


Solution: LC 2 LL ONLY

A17

BUILDING NO. 649

TYPICAL CENTER FRAME



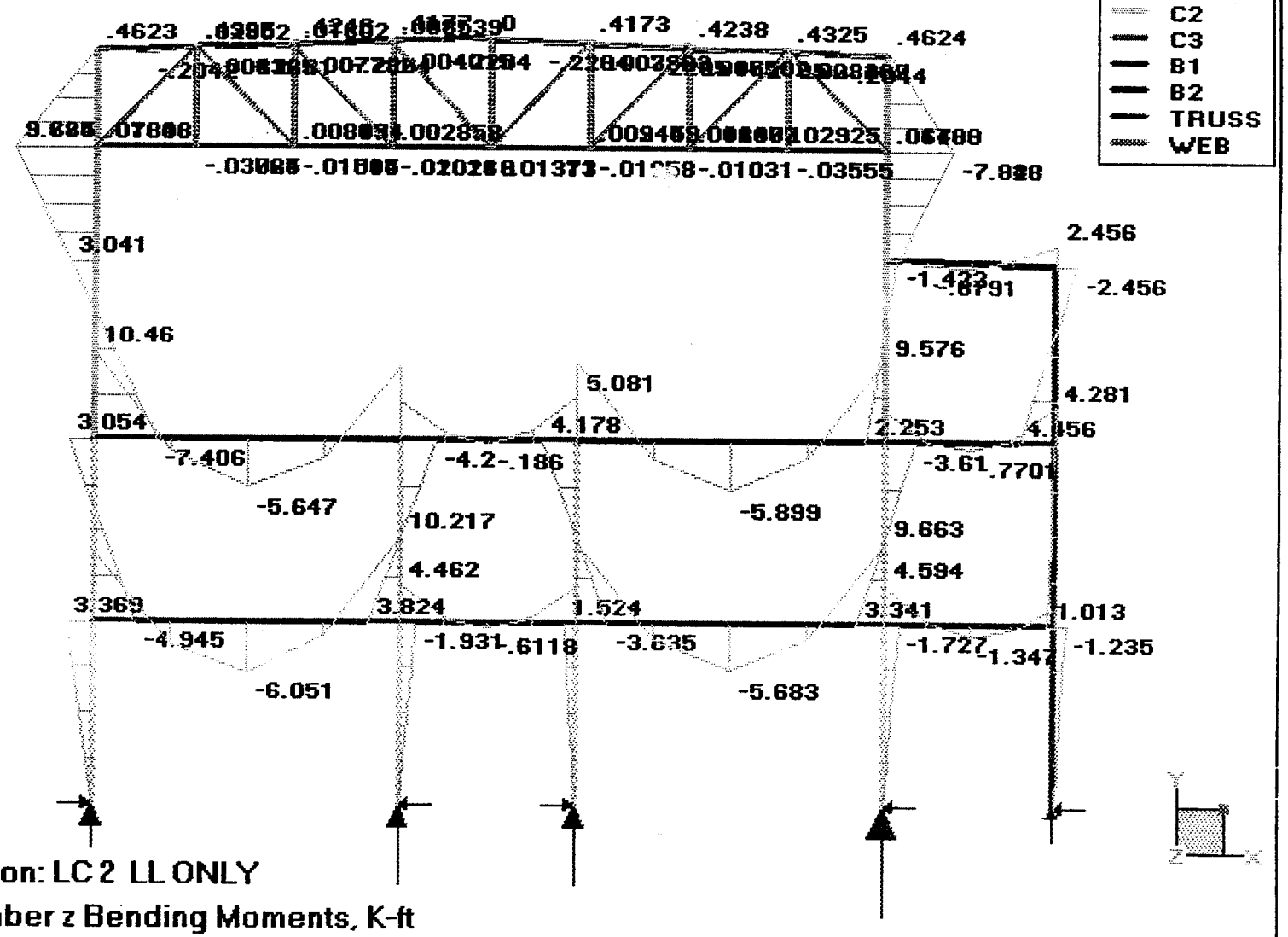
Solution: LC 2 LL ONLY

Member Axial Forces, K

A18

BUILDING NO. 649

TYPICAL CENTER FRAME



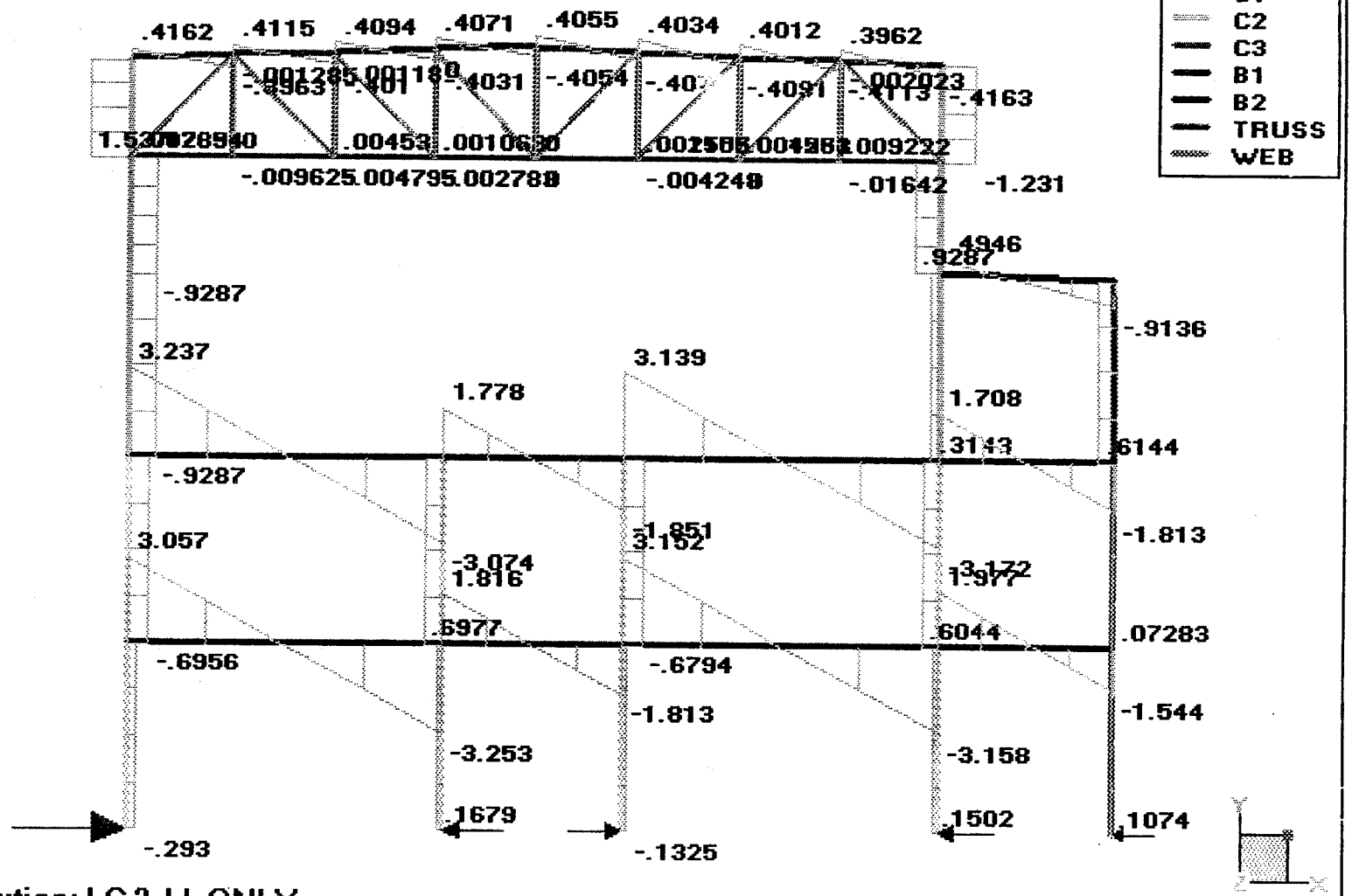
Solution: LC 2 LL ONLY

Member z Bending Moments, K-ft

A19

BUILDING NO. 649

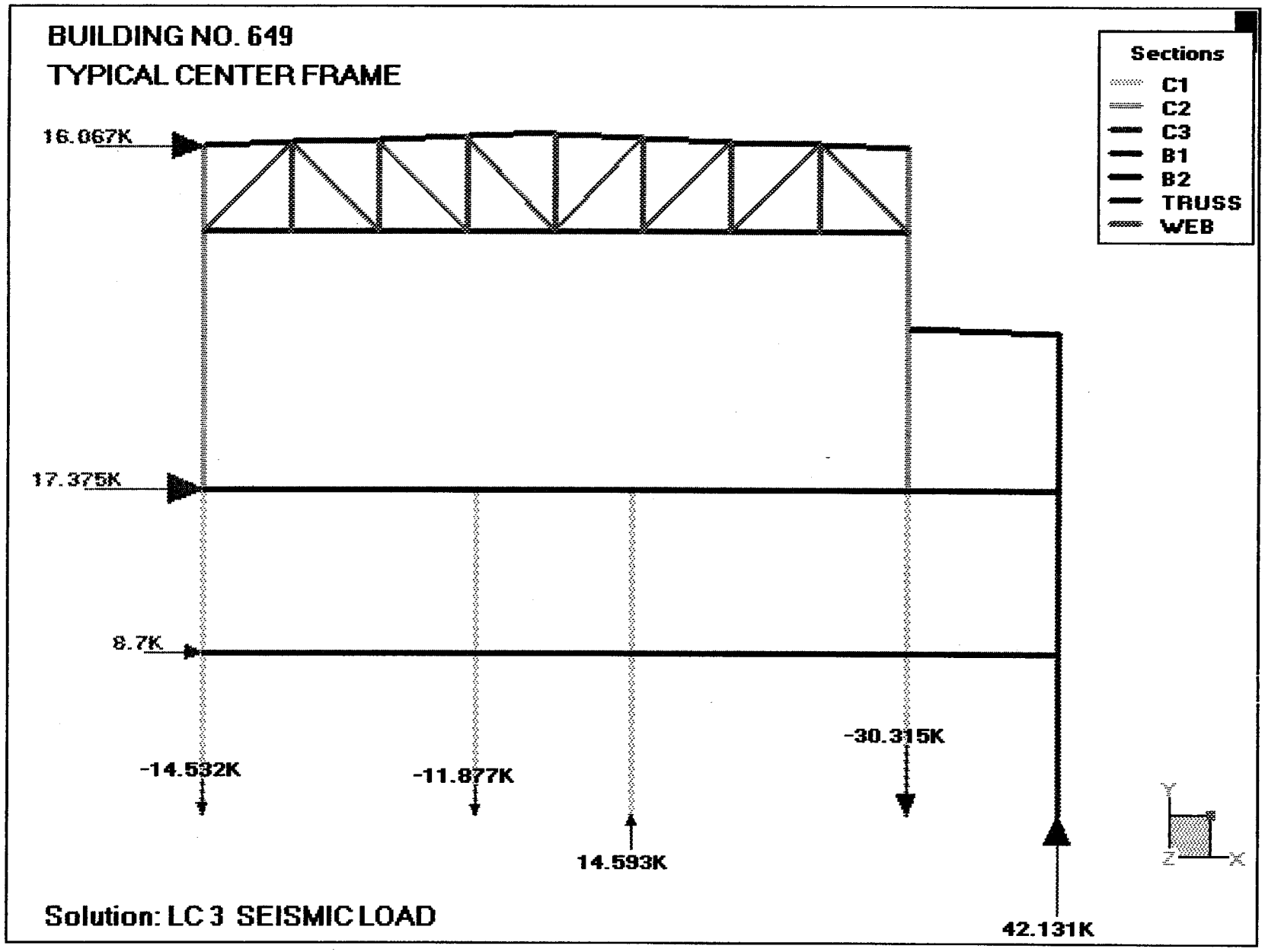
TYPICAL CENTER FRAME



Solution: LC 2 LL ONLY

Member y Shear Forces, K

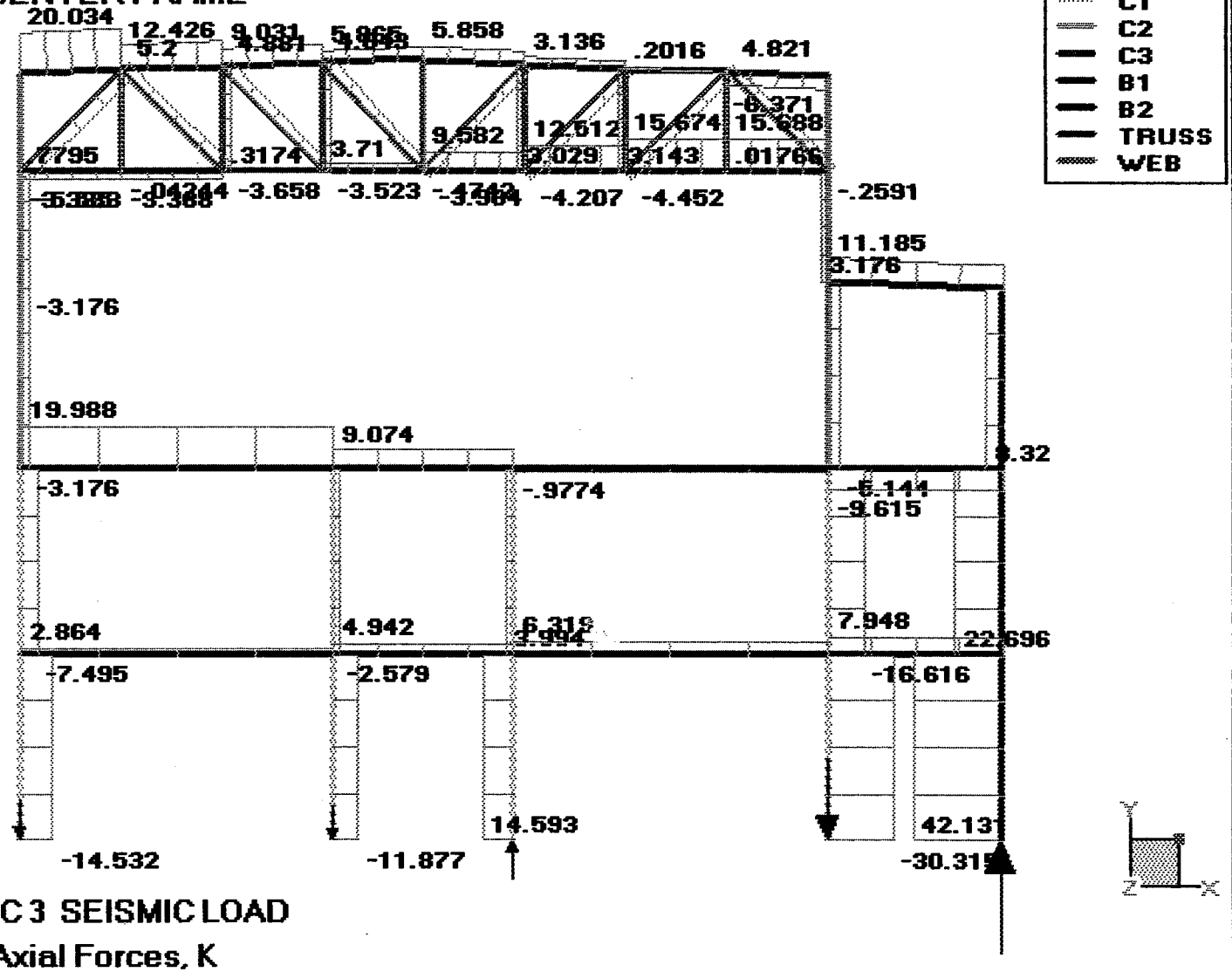
A20


BUILDING NO. 649
TYPICAL CENTER FRAME
Sections
C1
C2
C3
B1
B2
TRUSS
WEB
16.067K
17.375K
8.7K
-14.532K
-11.877K
14.593K
-30.315K
42.131K
Y
Z
X
Solution: LC 3 SEISMIC LOAD

A21

BUILDING NO. 649

TYPICAL CENTER FRAME



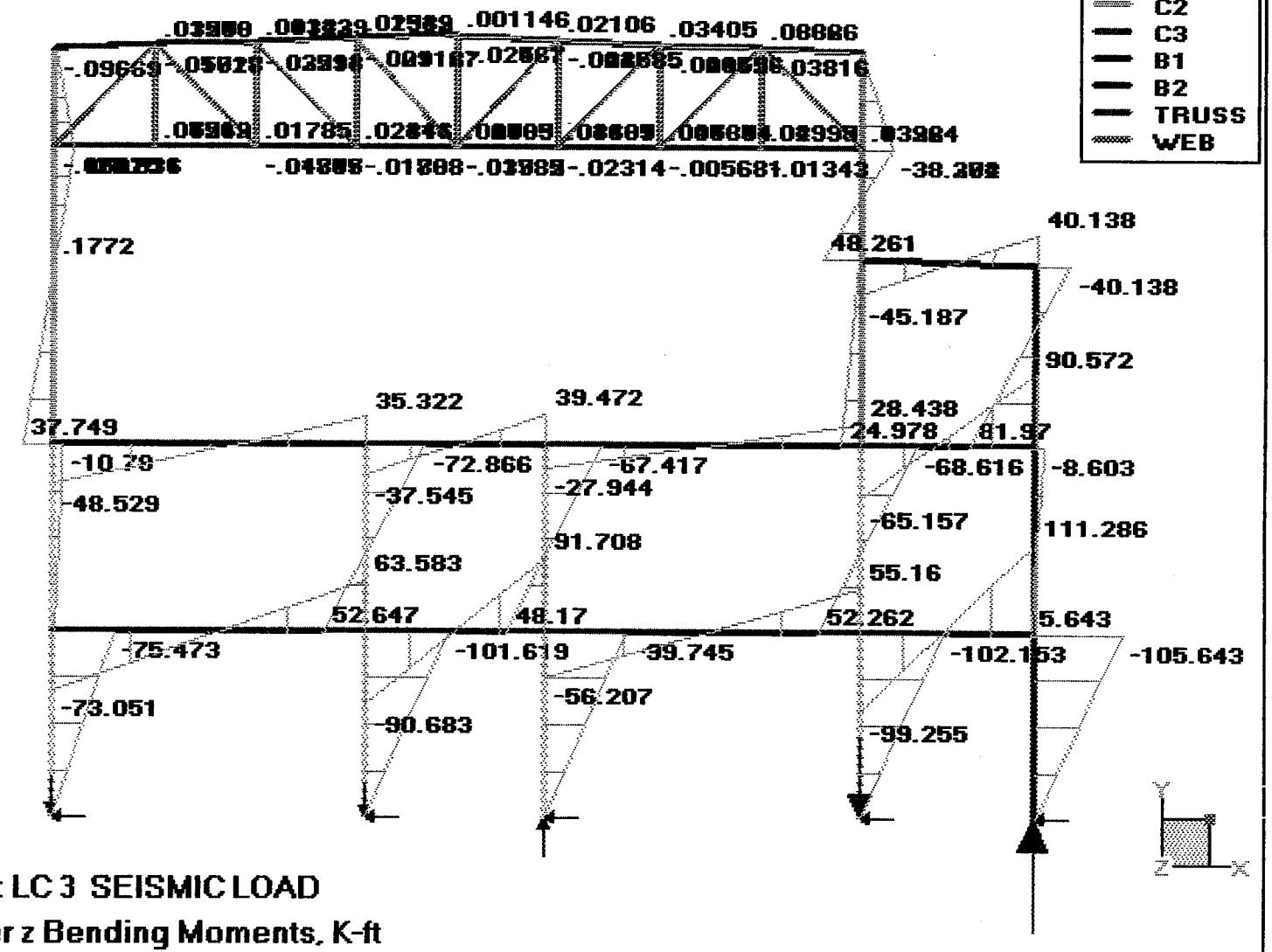
Solution: LC 3 SEISMIC LOAD

Member Axial Forces, K

A22

BUILDING NO. 649

TYPICAL CENTER FRAME



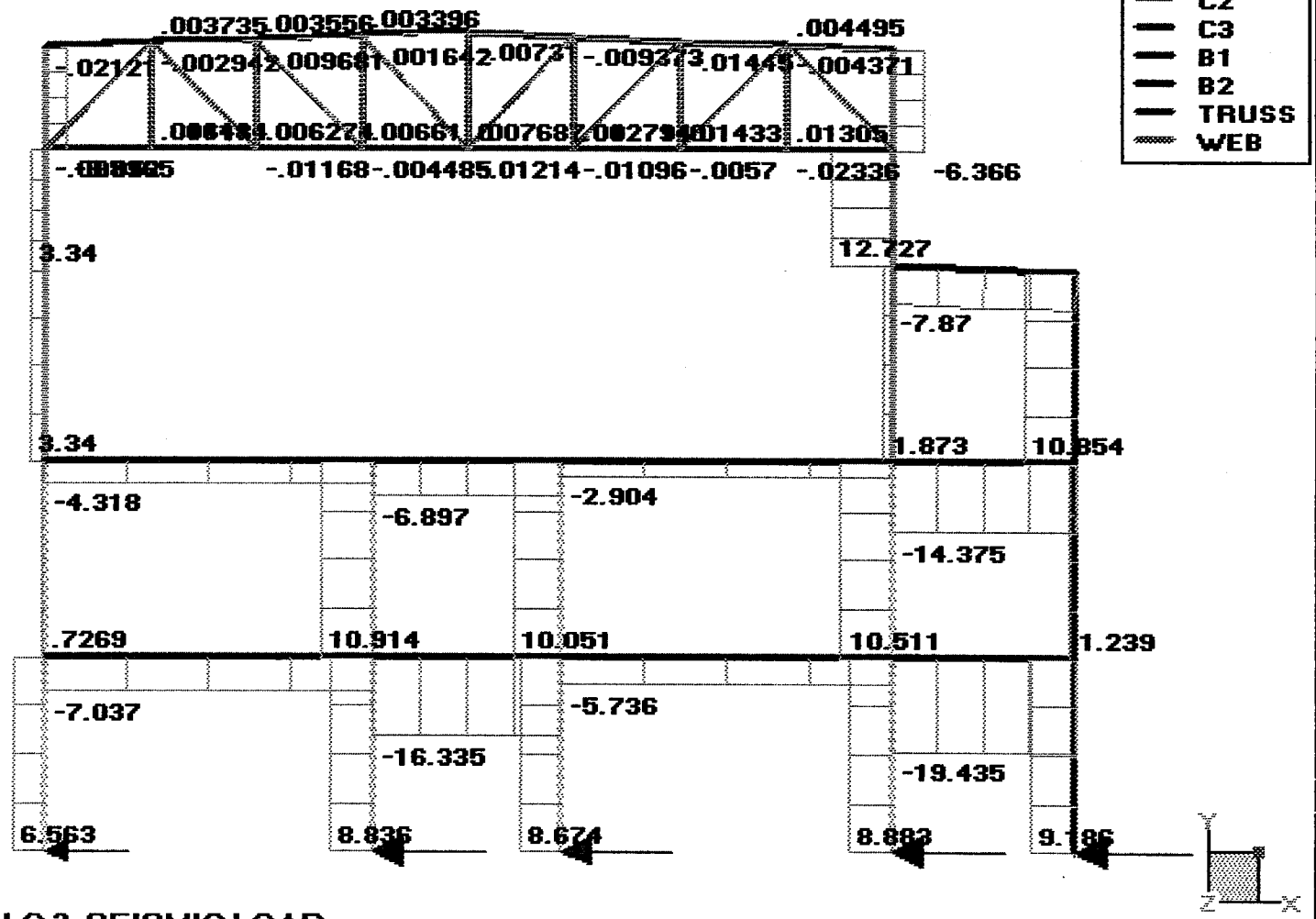
Solution: LC 3 SEISMIC LOAD

Member z Bending Moments, K-ft

A23

BUILDING NO. 649

TYPICAL CENTER FRAME



Solution: LC 3 SEISMIC LOAD

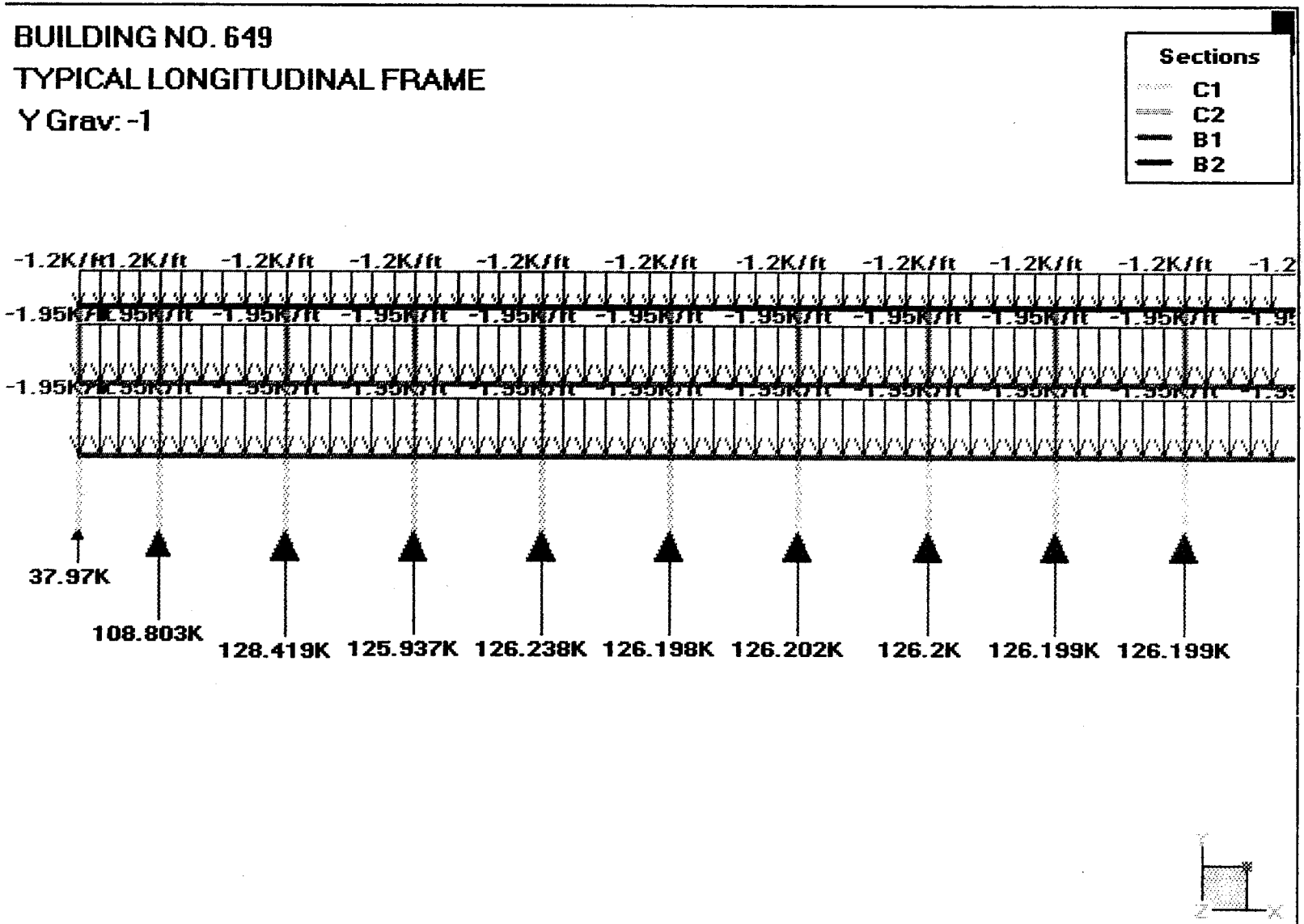
Member y Shear Forces, K

A24

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME

Y Grav: -1

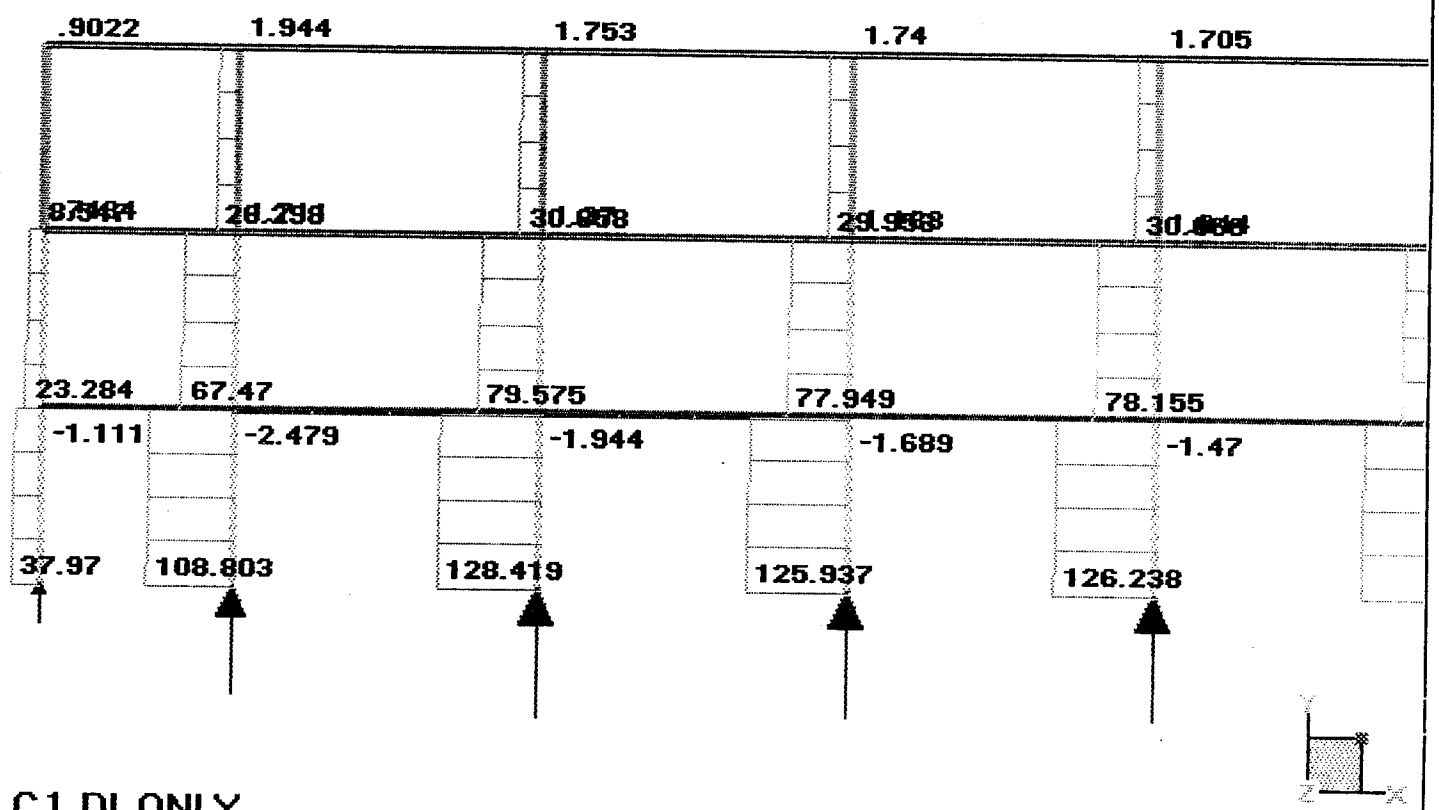


Solution: LC 1 DL ONLY

A25

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



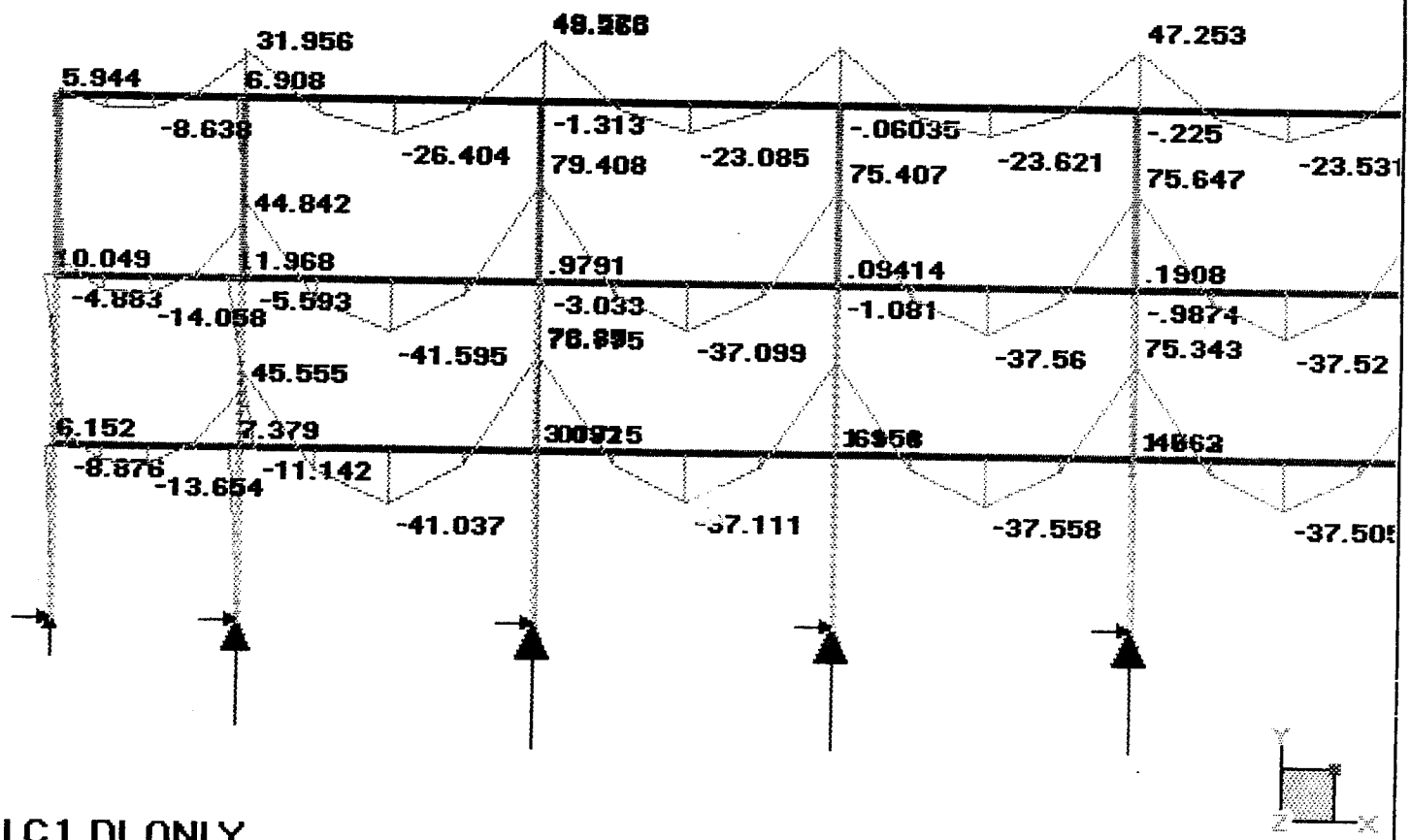
Solution: LC 1 DL ONLY

Member Axial Forces, K

A 26

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



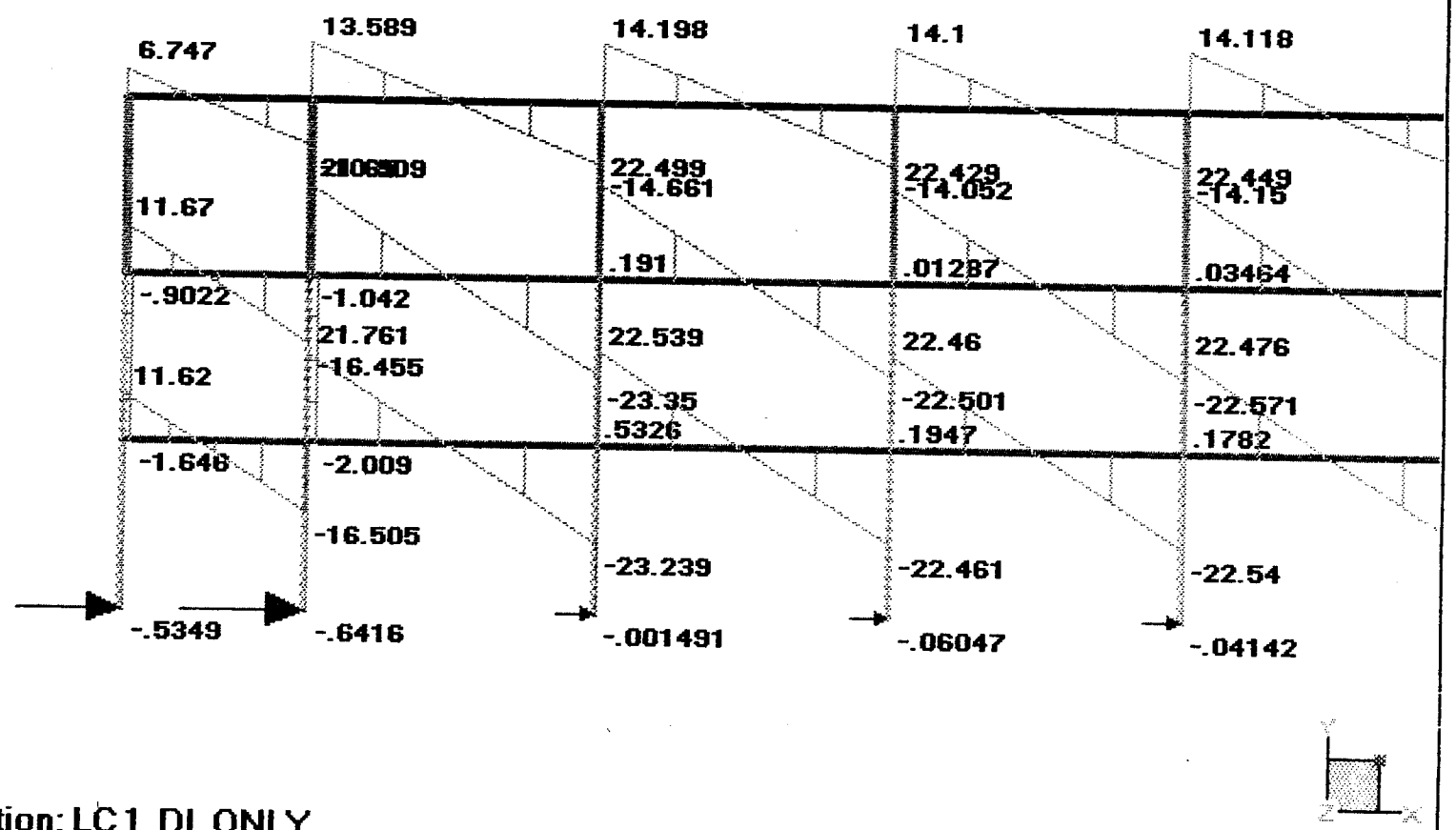
Solution: LC1 DL ONLY

Member z Bending Moments, K-ft

A27

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



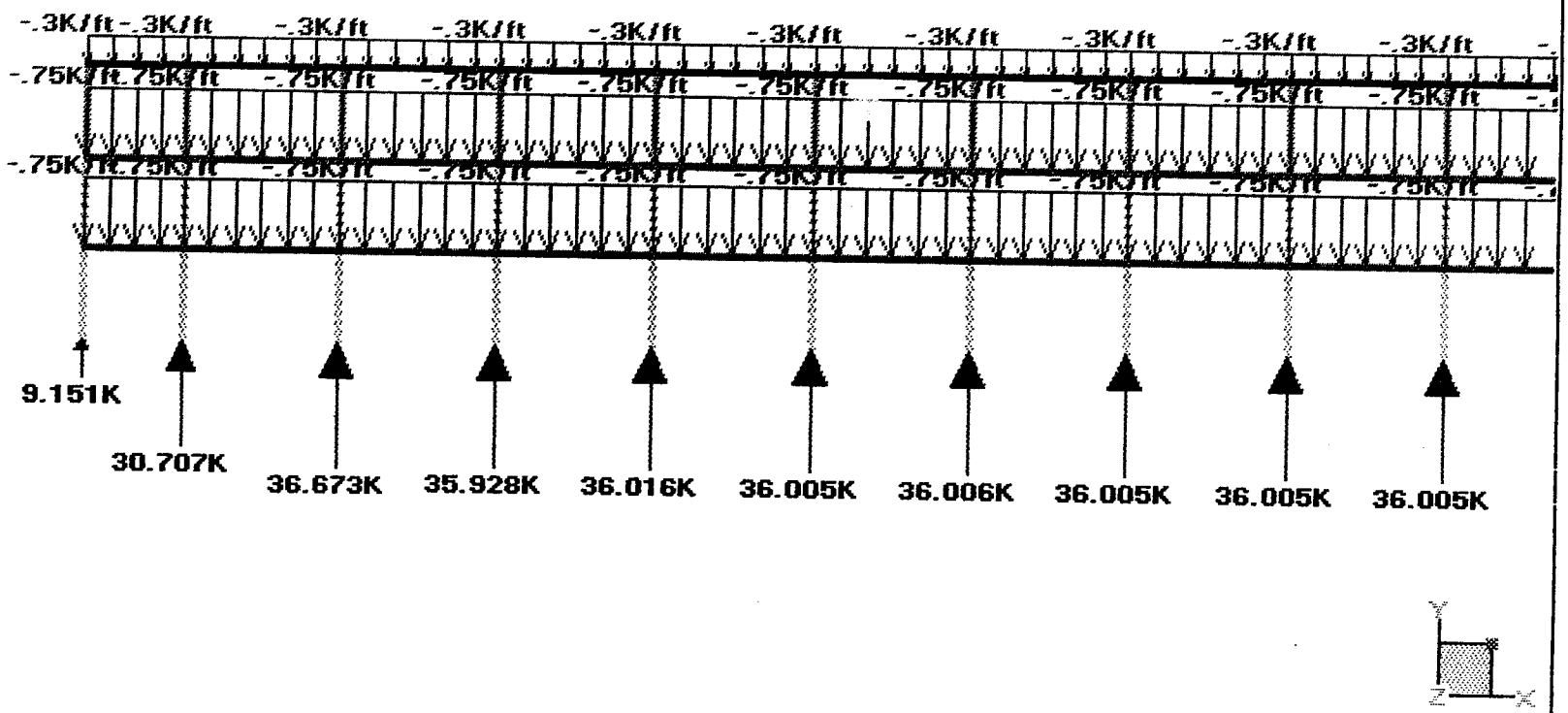
Solution: LC1 DL ONLY

Member y Shear Forces, K

A28

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME

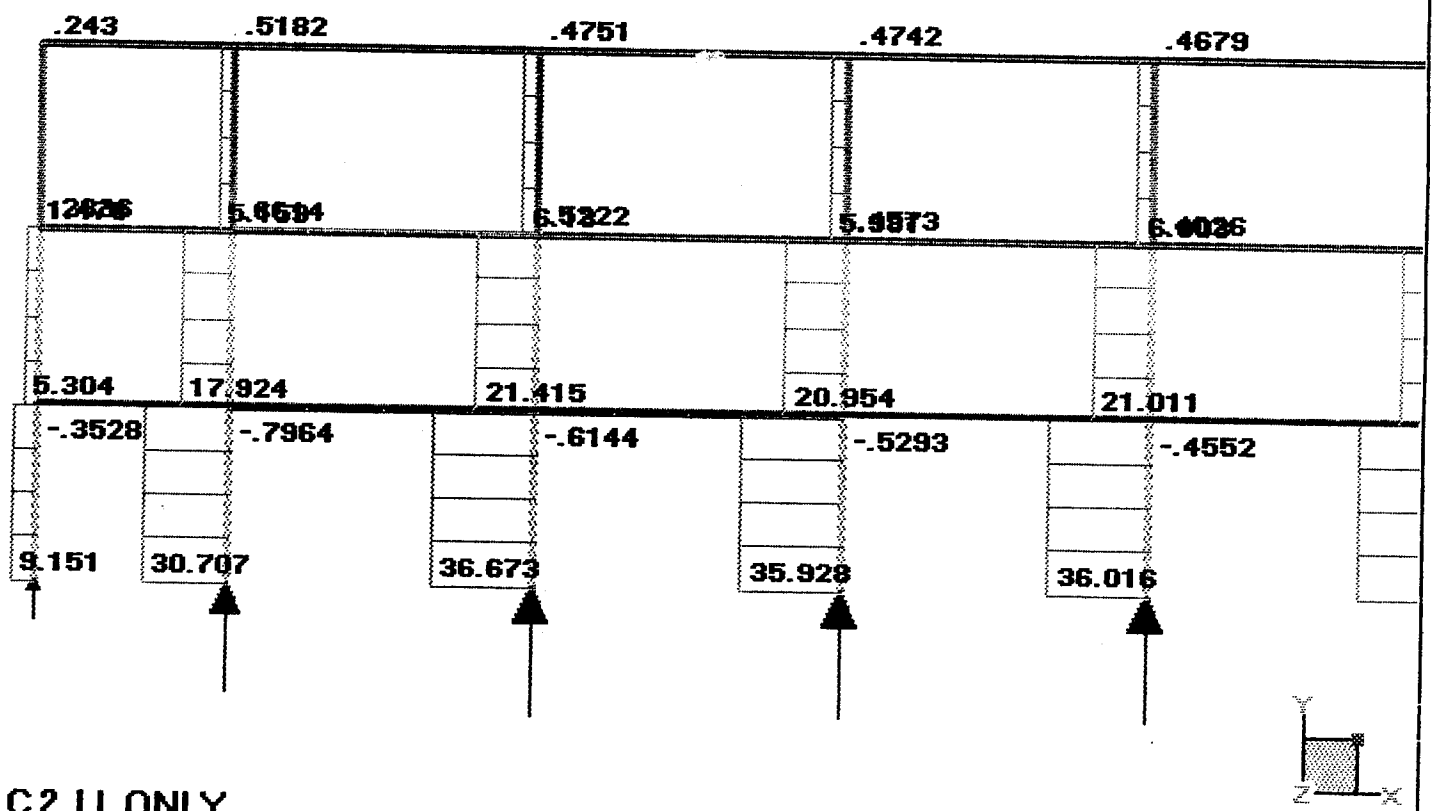


Solution: LC 2 LL ONLY

A29

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



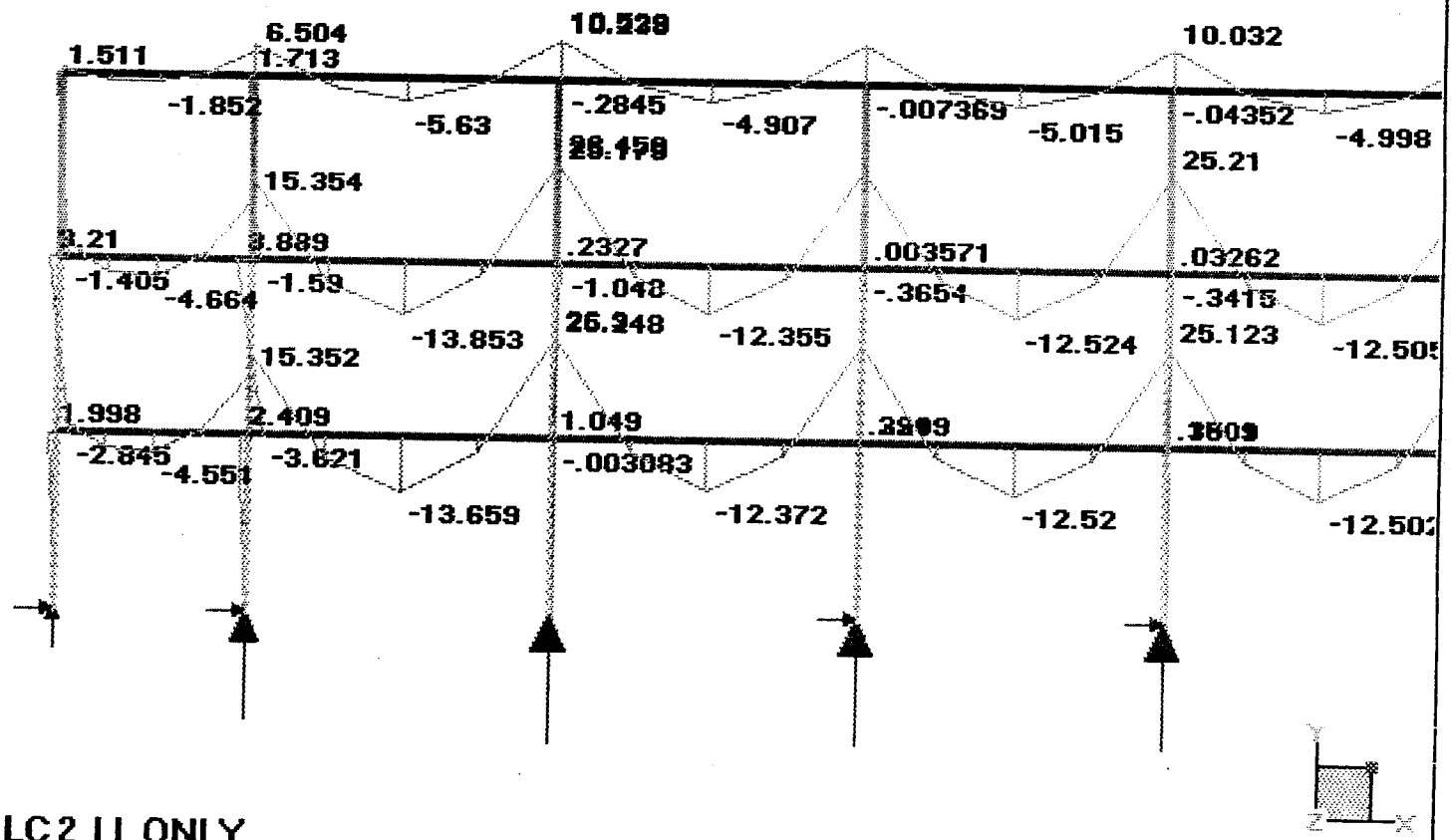
Solution: LC 2 LL ONLY

Member Axial Forces, K

A30

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



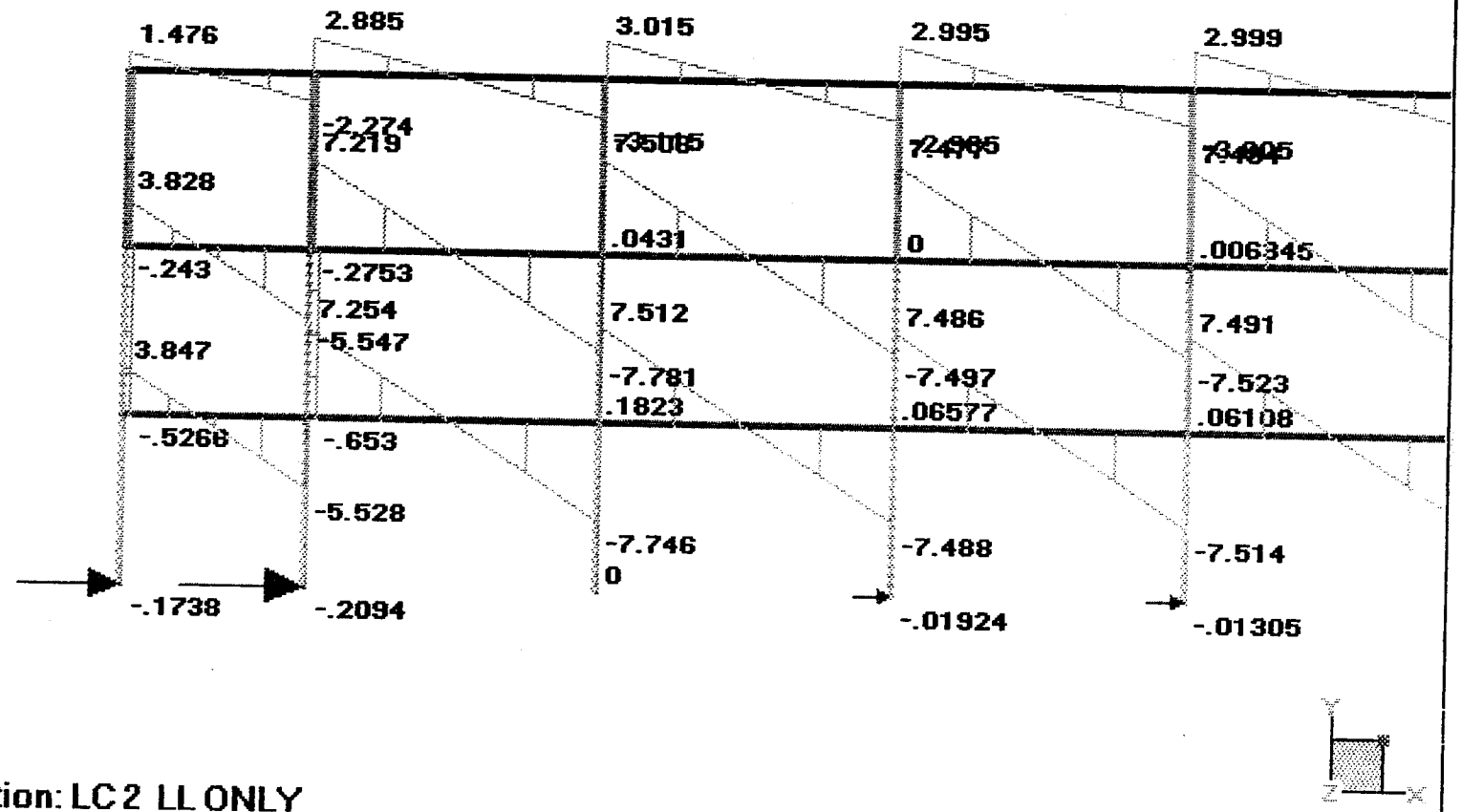
Solution: LC 2 LL ONLY

Member z Bending Moments, K-ft

A31

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



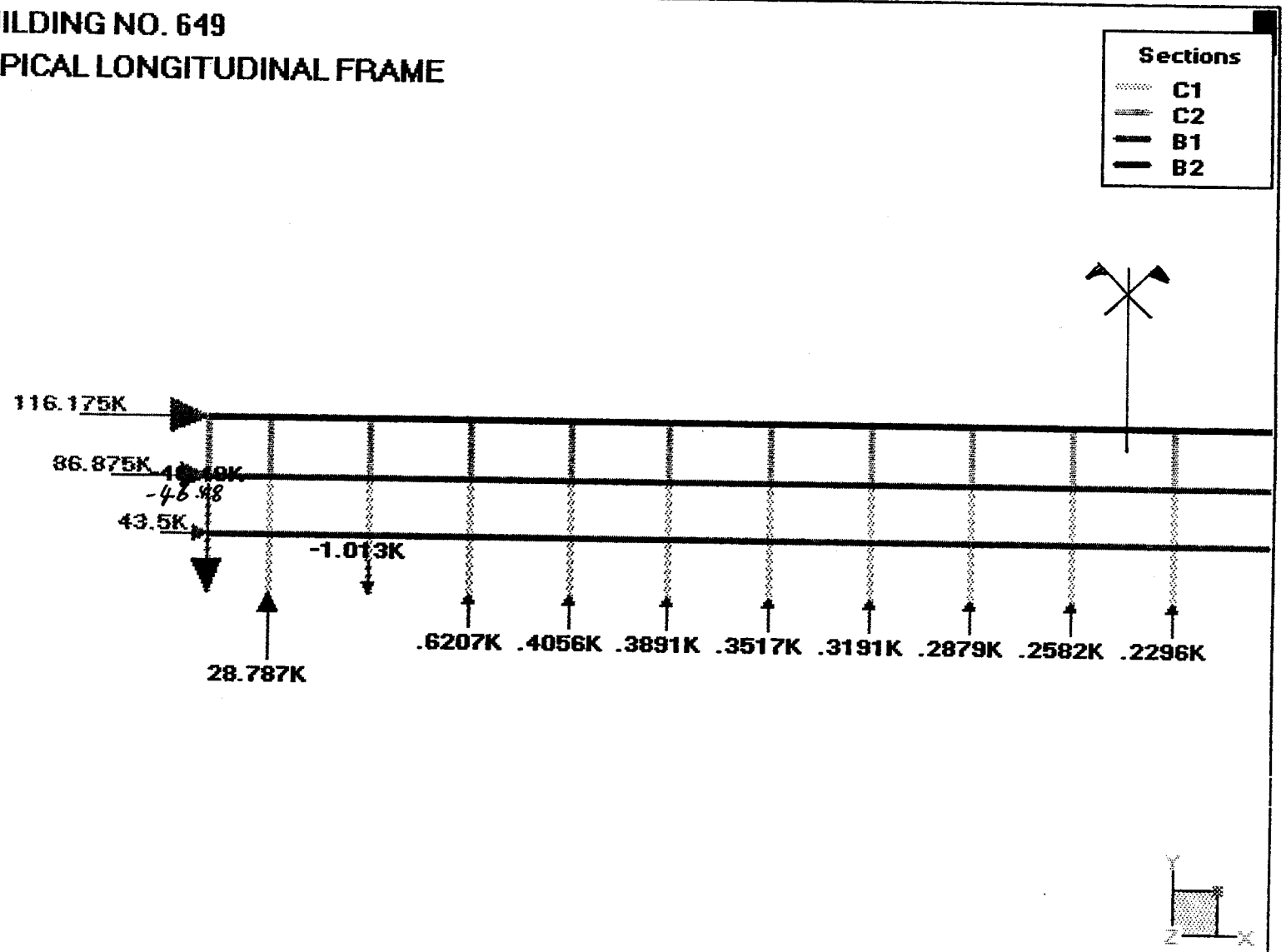
Solution: LC 2 LL ONLY

Member y Shear Forces, K

A32

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME

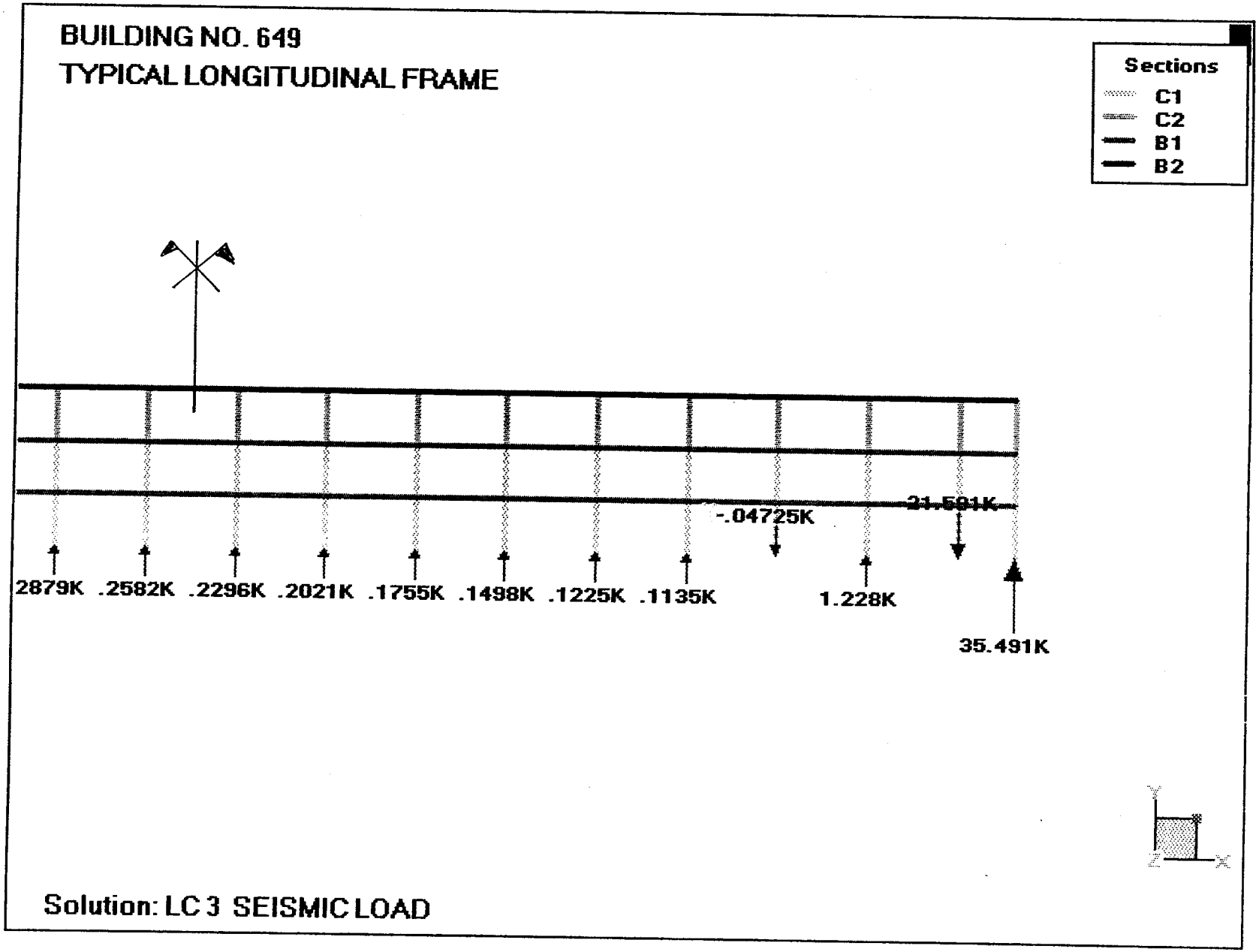


Solution: LC 3 SEISMIC LOAD

A33

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME

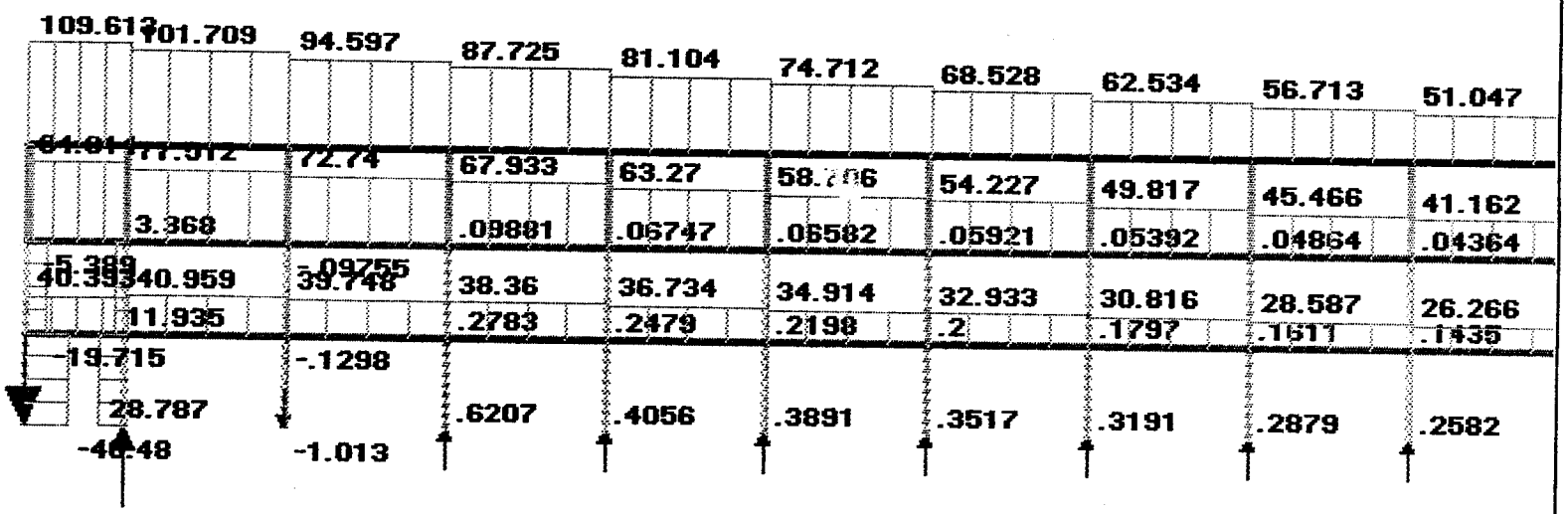


Solution: LC 3 SEISMIC LOAD

A34

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



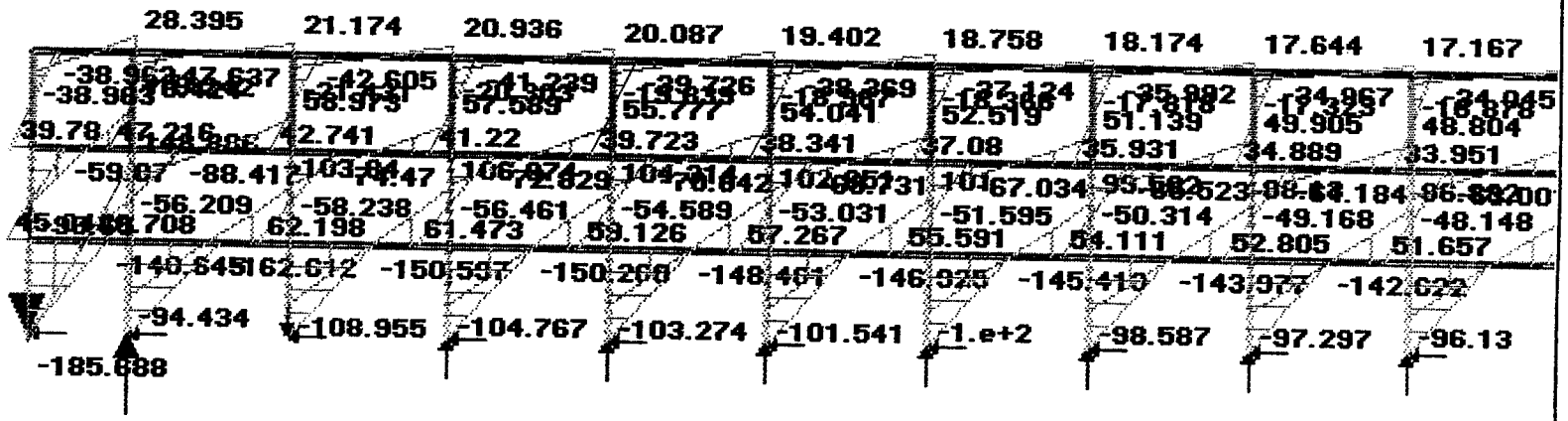
Solution: LC 3 SEISMIC LOAD

Member Axial Forces, K

A35

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



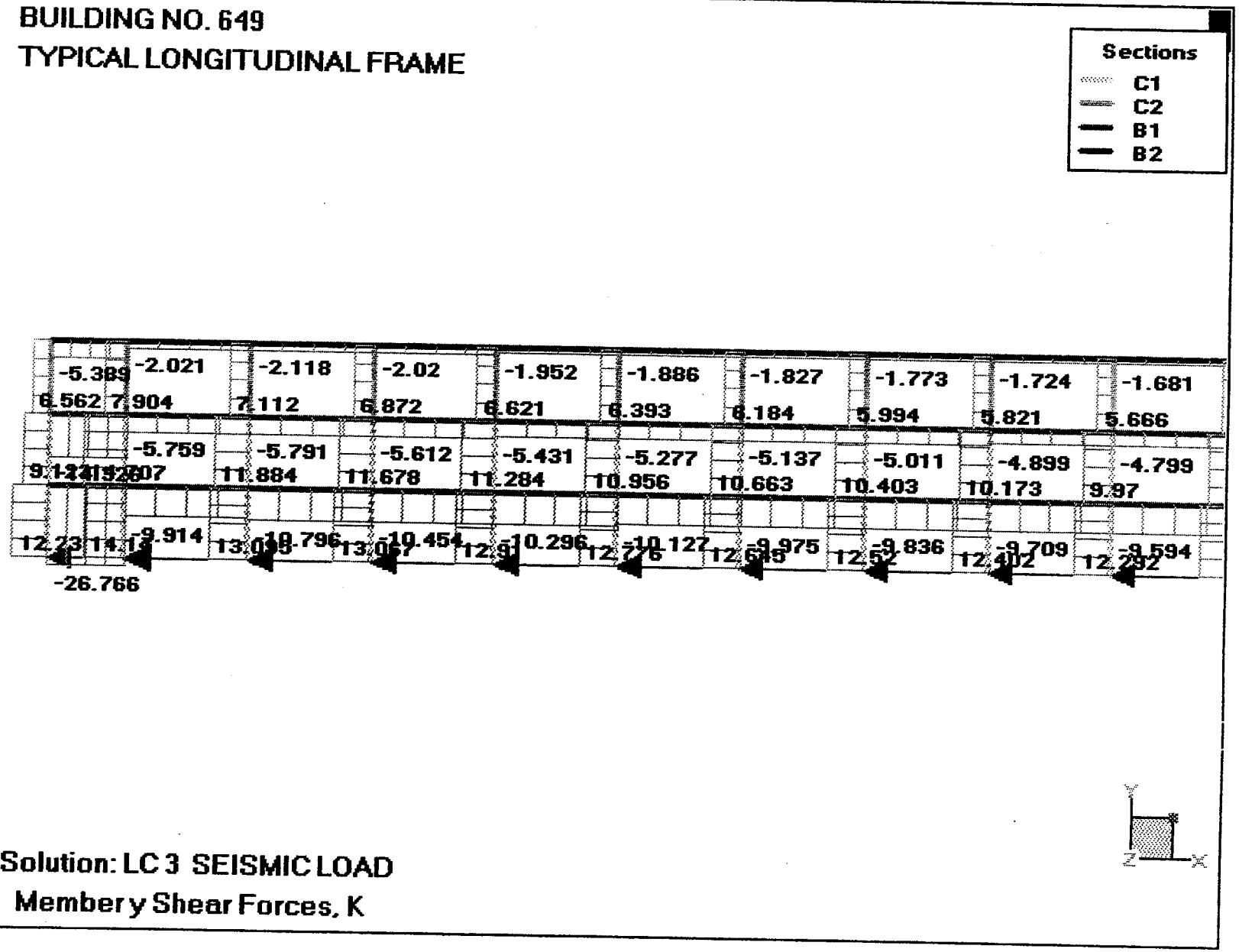
Solution: LC 3 SEISMIC LOAD

Member z Bending Moments, K-ft

A36

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



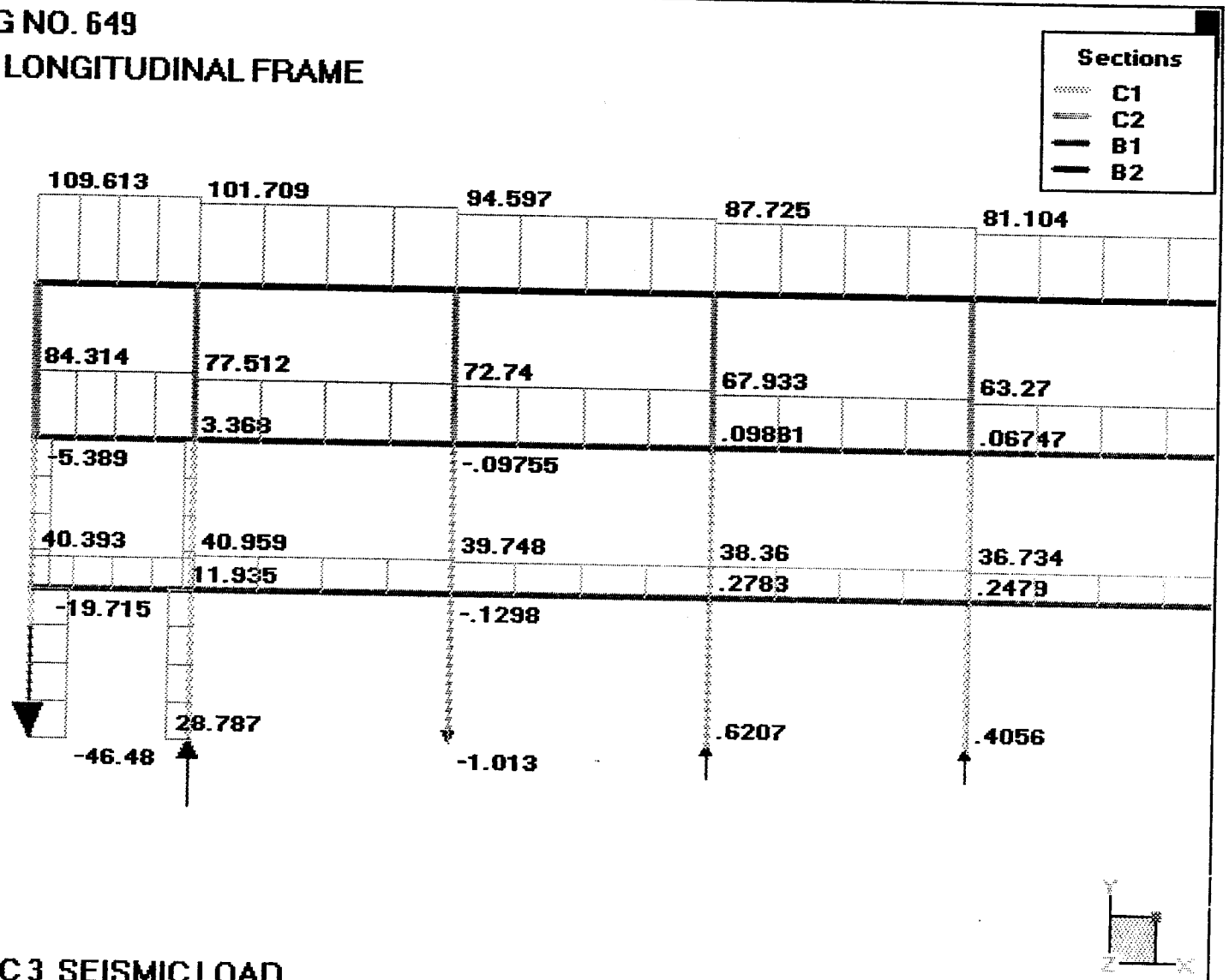
Solution: LC 3 SEISMIC LOAD

Member y Shear Forces, K

A37

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



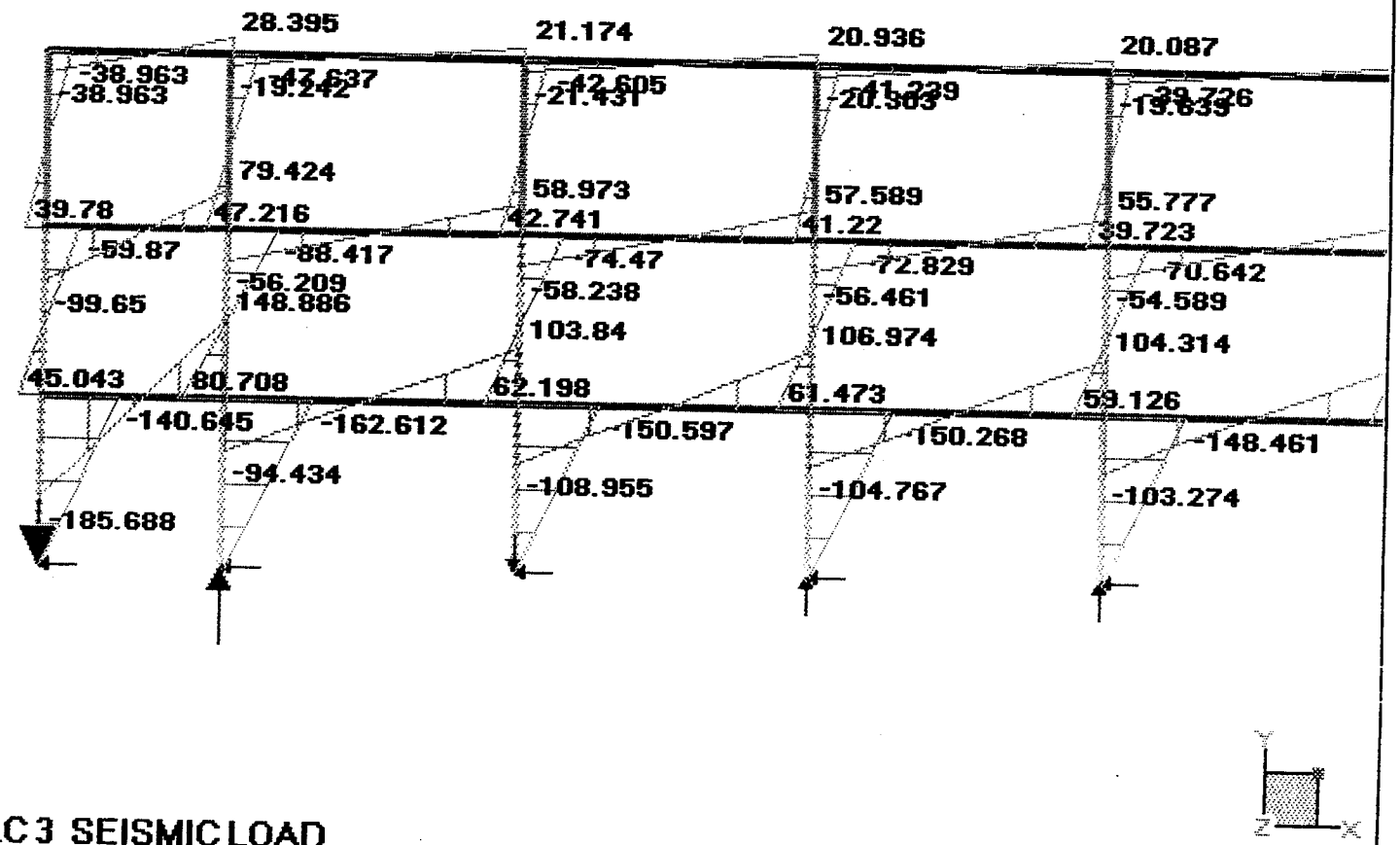
Solution: LC 3 SEISMIC LOAD

Member Axial Forces, K

A38

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



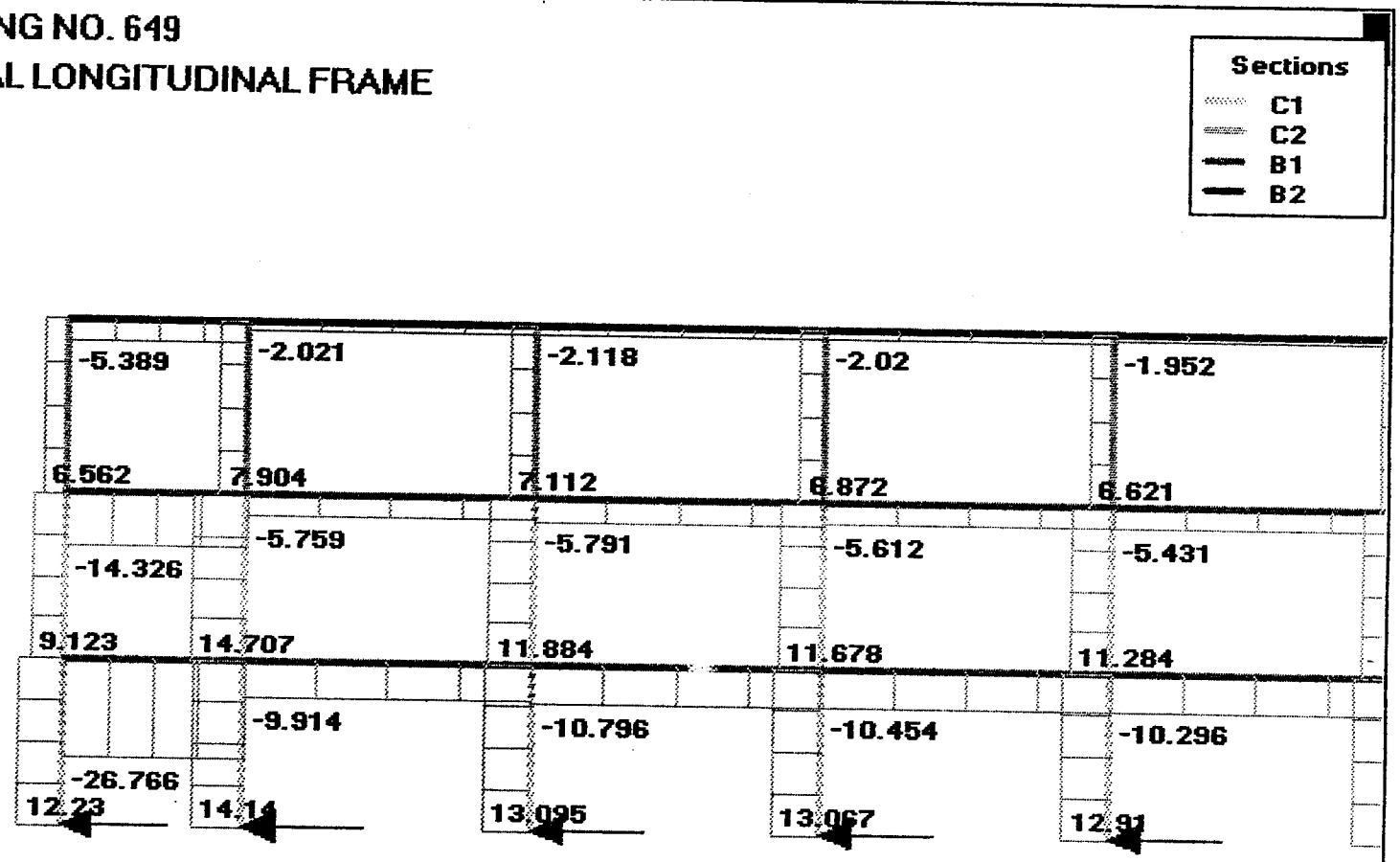
Solution: LC 3 SEISMIC LOAD

Member z Bending Moments, K-ft

A39

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



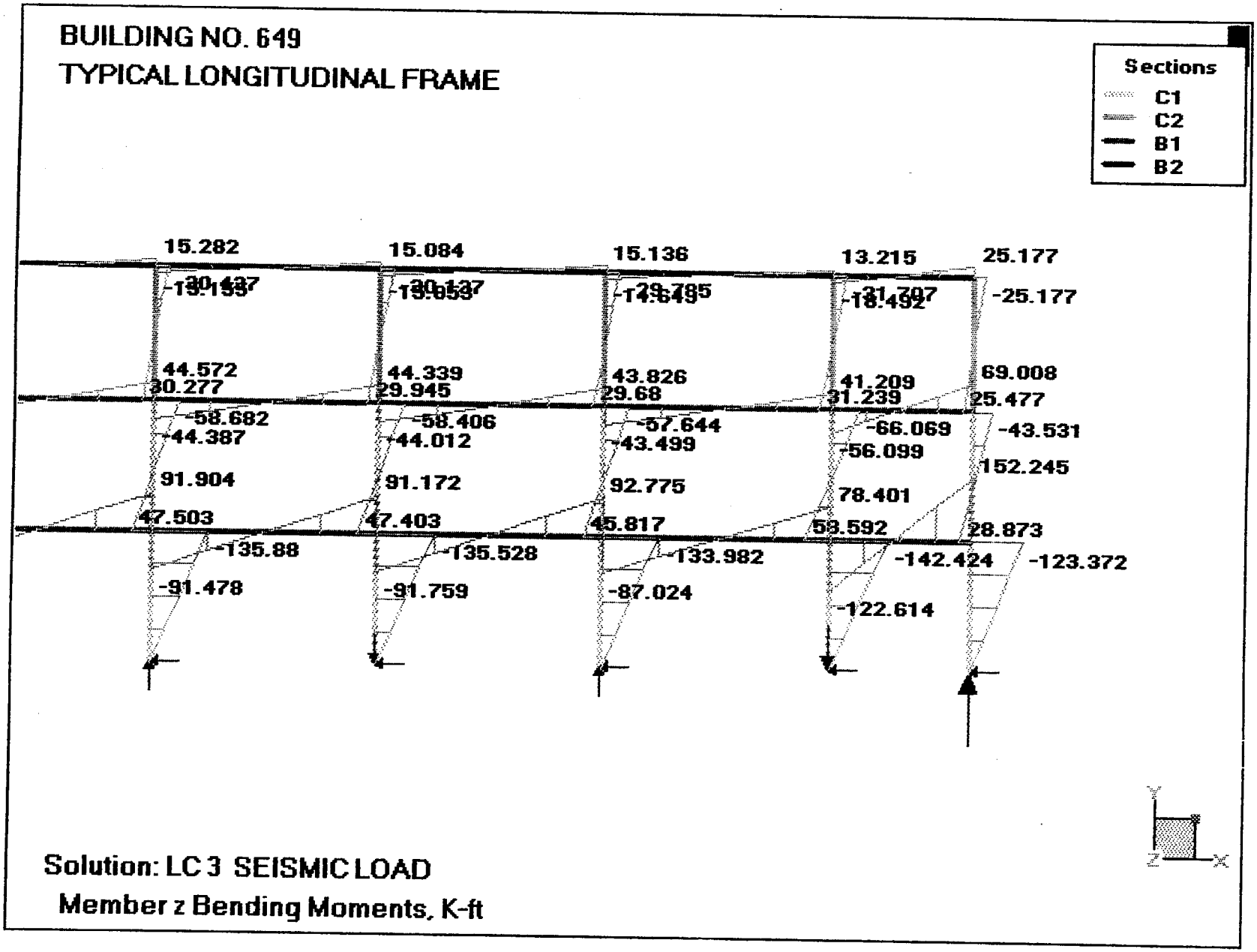
Solution: LC 3 SEISMIC LOAD

Member y Shear Forces, K

A40

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



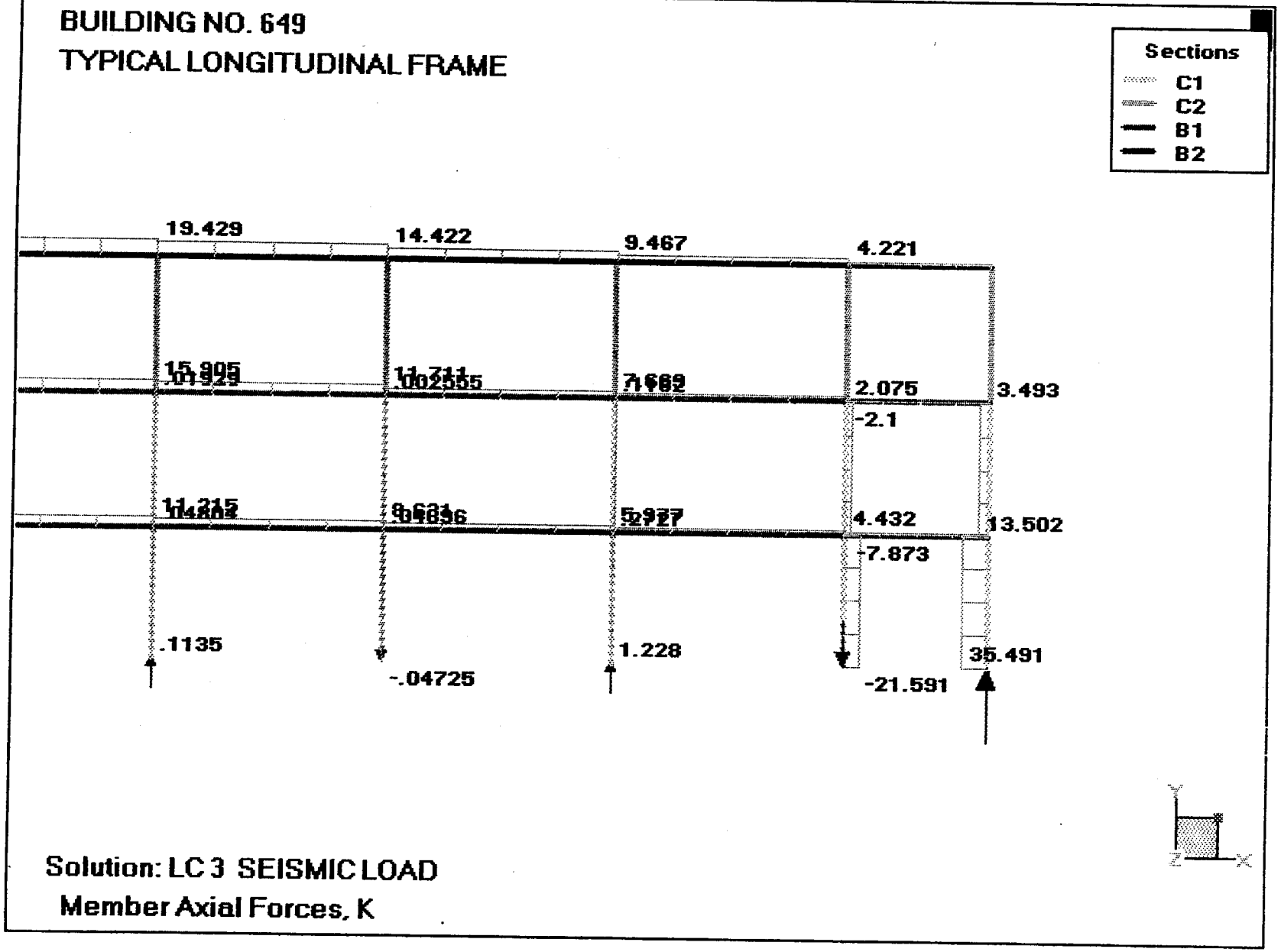
Solution: LC 3 SEISMIC LOAD

Member z Bending Moments, K-ft

A41

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME



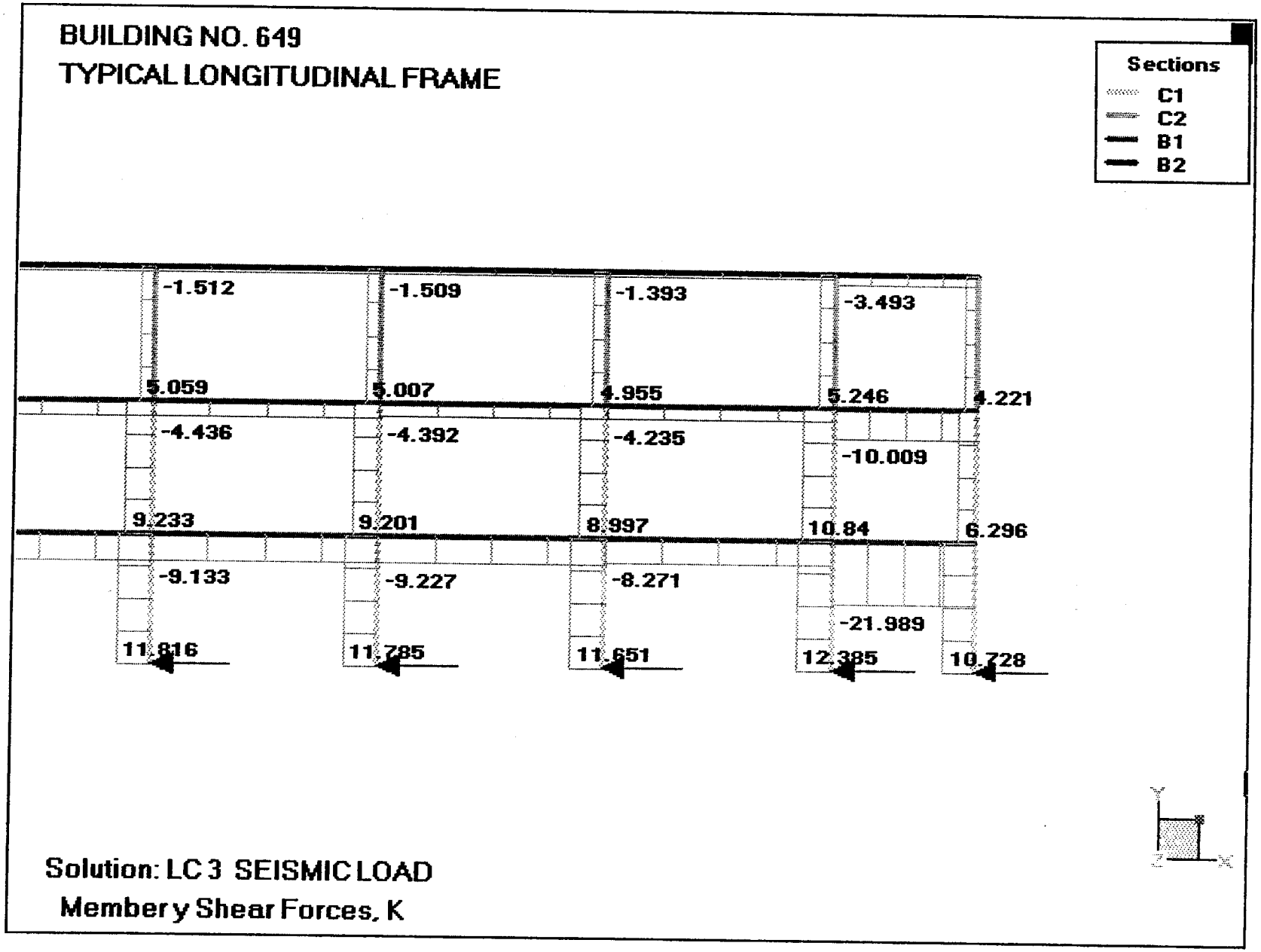
Solution: LC 3 SEISMIC LOAD

Member Axial Forces, K

A42

BUILDING NO. 649

TYPICAL LONGITUDINAL FRAME

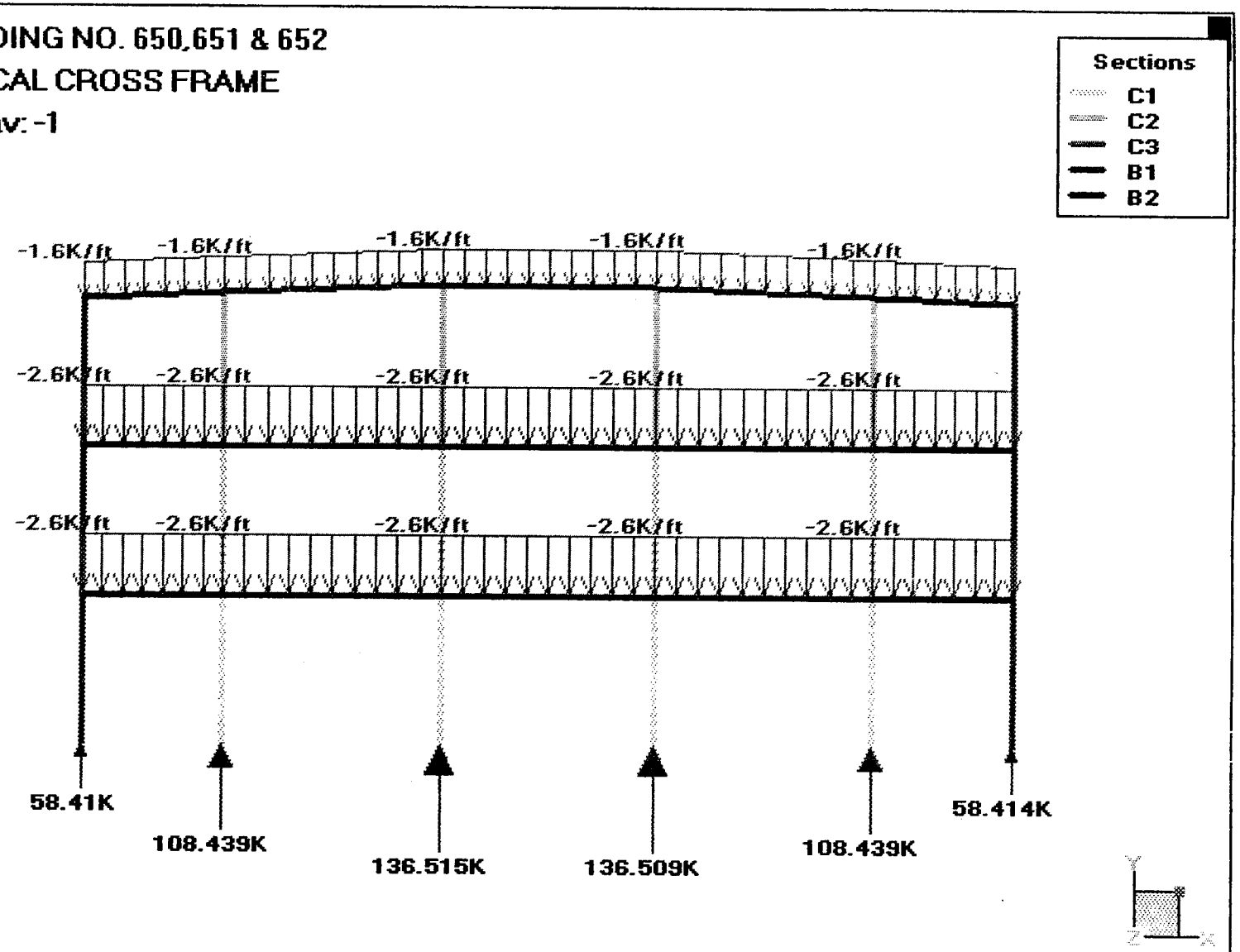


Solution: LC 3 SEISMIC LOAD

Member y Shear Forces, K

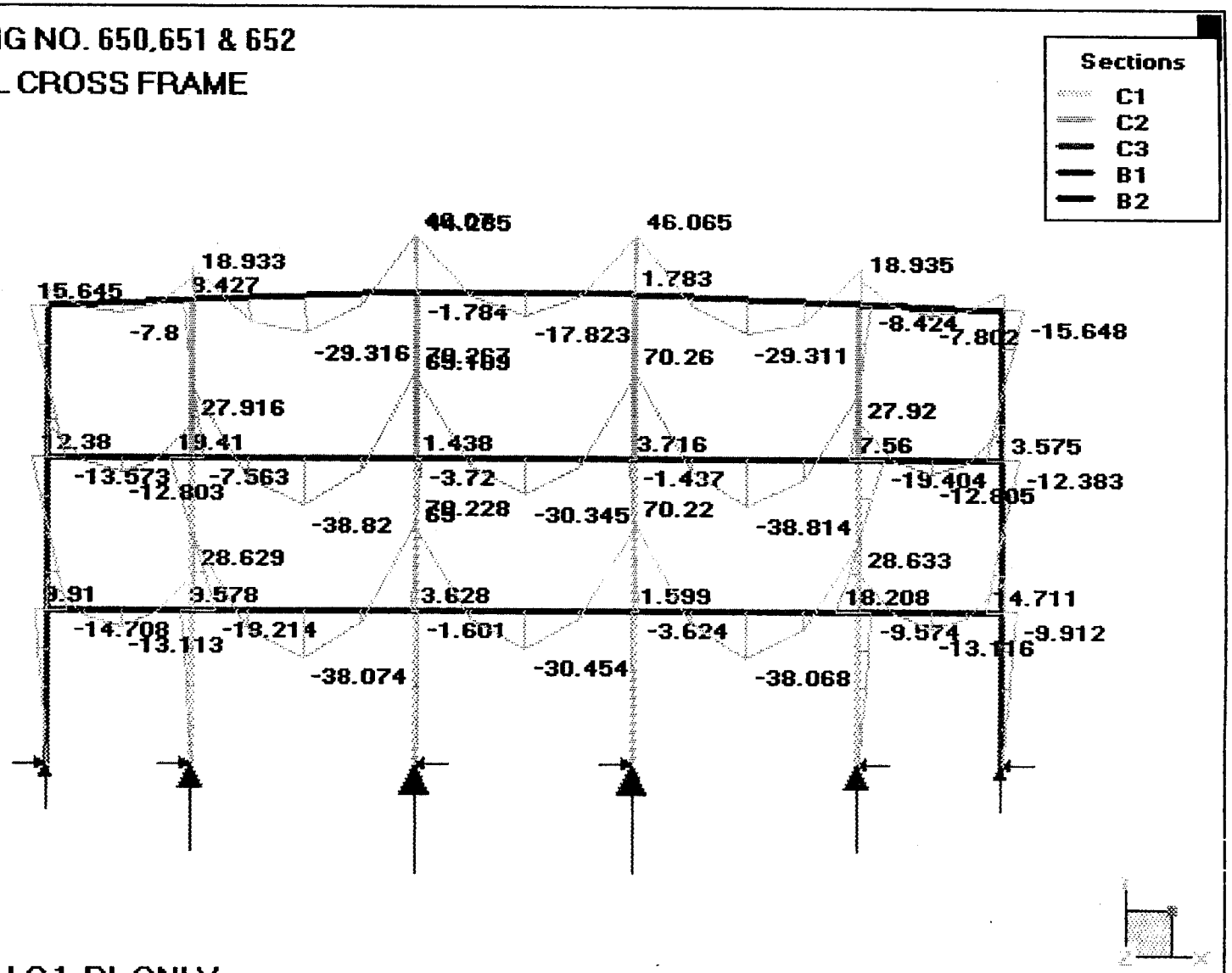
A43

BUILDING NO. 650,651 & 652
TYPICAL CROSS FRAME
Y Grav: -1



Solution: LC 1 DL ONLY

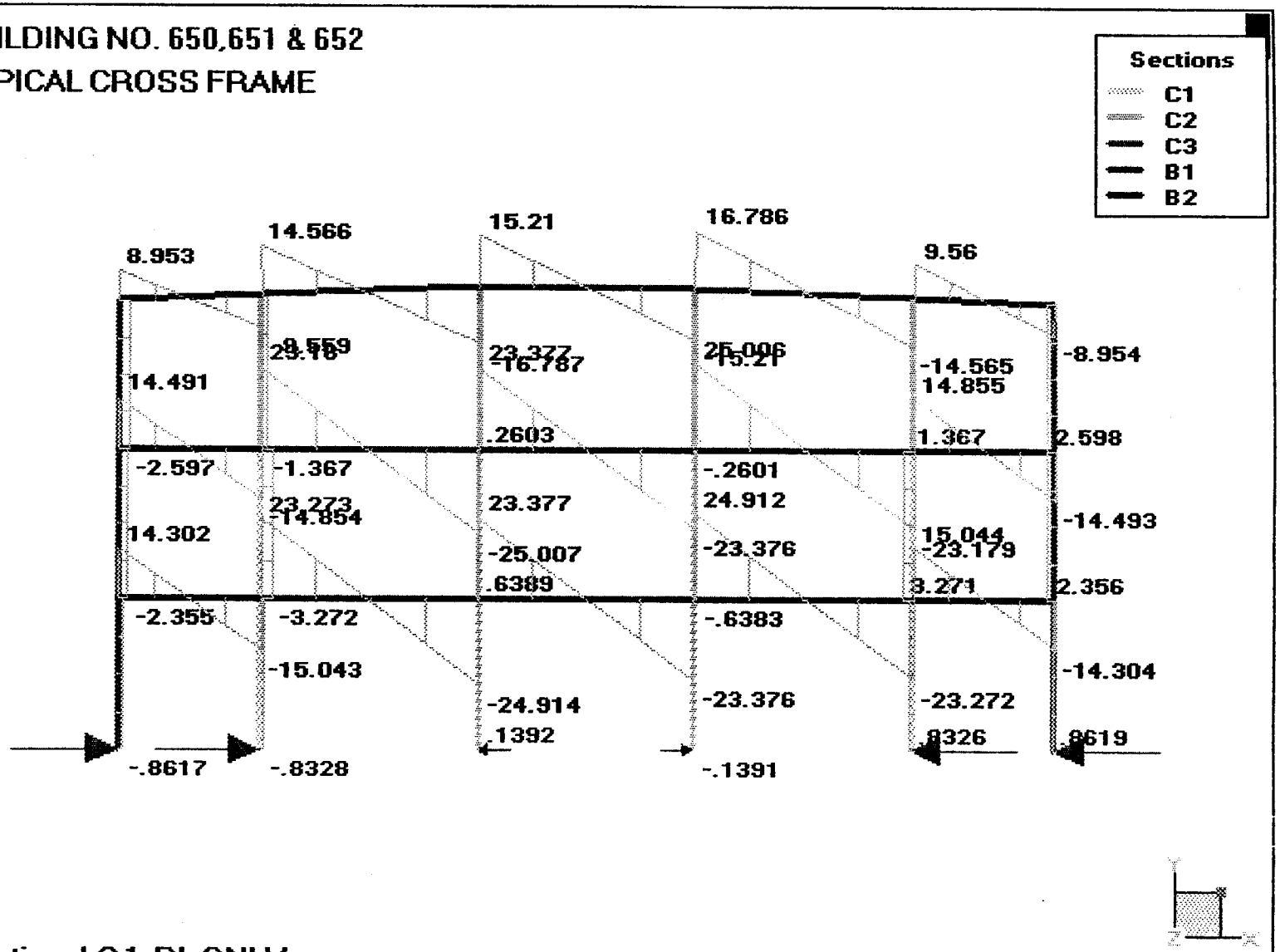
BUILDING NO. 650,651 & 652
TYPICAL CROSS FRAME



Solution: LC 1 DL ONLY
Member z Bending Moments, K-ft

B3

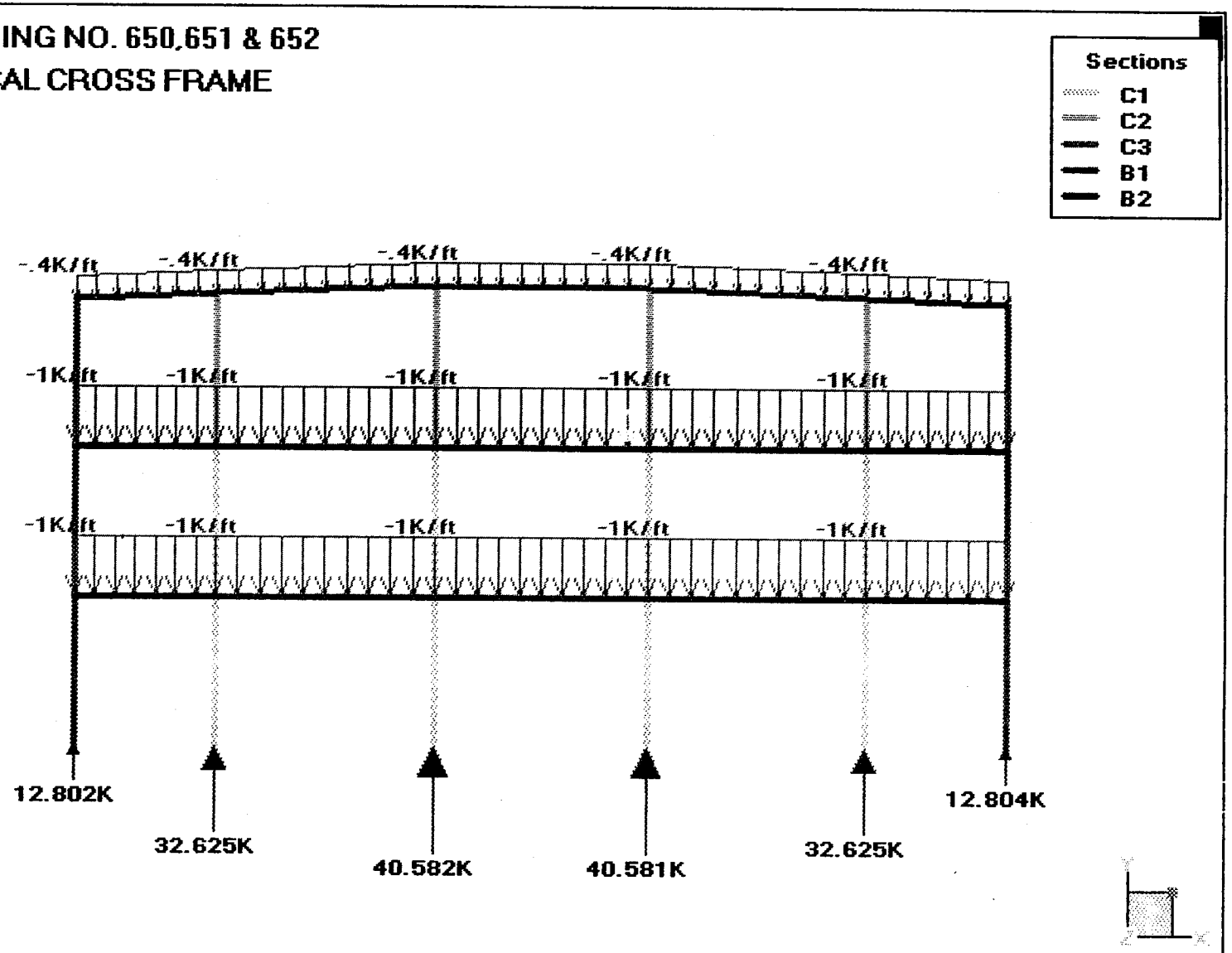
BUILDING NO. 650,651 & 652
TYPICAL CROSS FRAME



Solution: LC 1 DL ONLY
Member y Shear Forces, K

B4

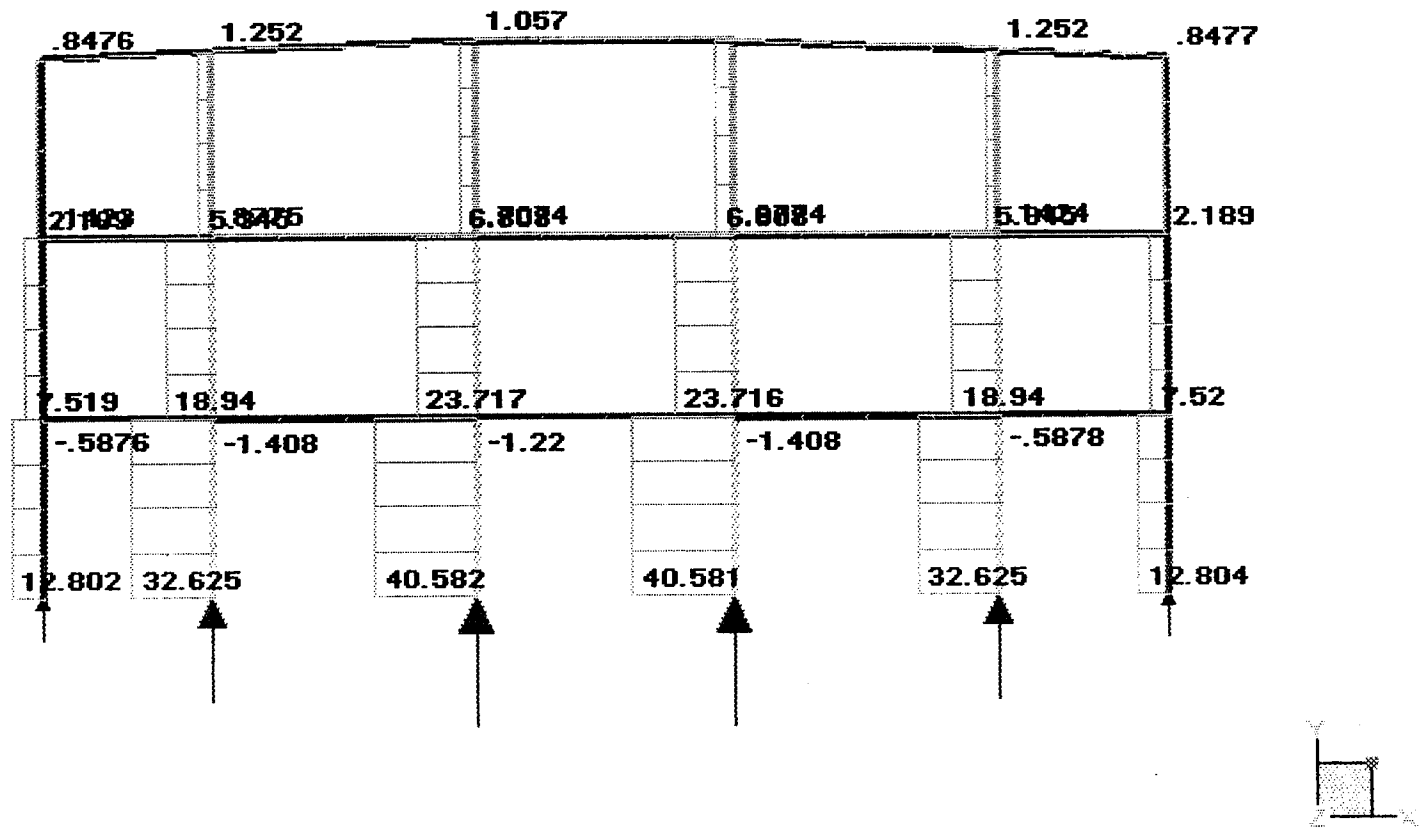
BUILDING NO. 650,651 & 652
TYPICAL CROSS FRAME



Solution: LC 2 LL ONLY

B5

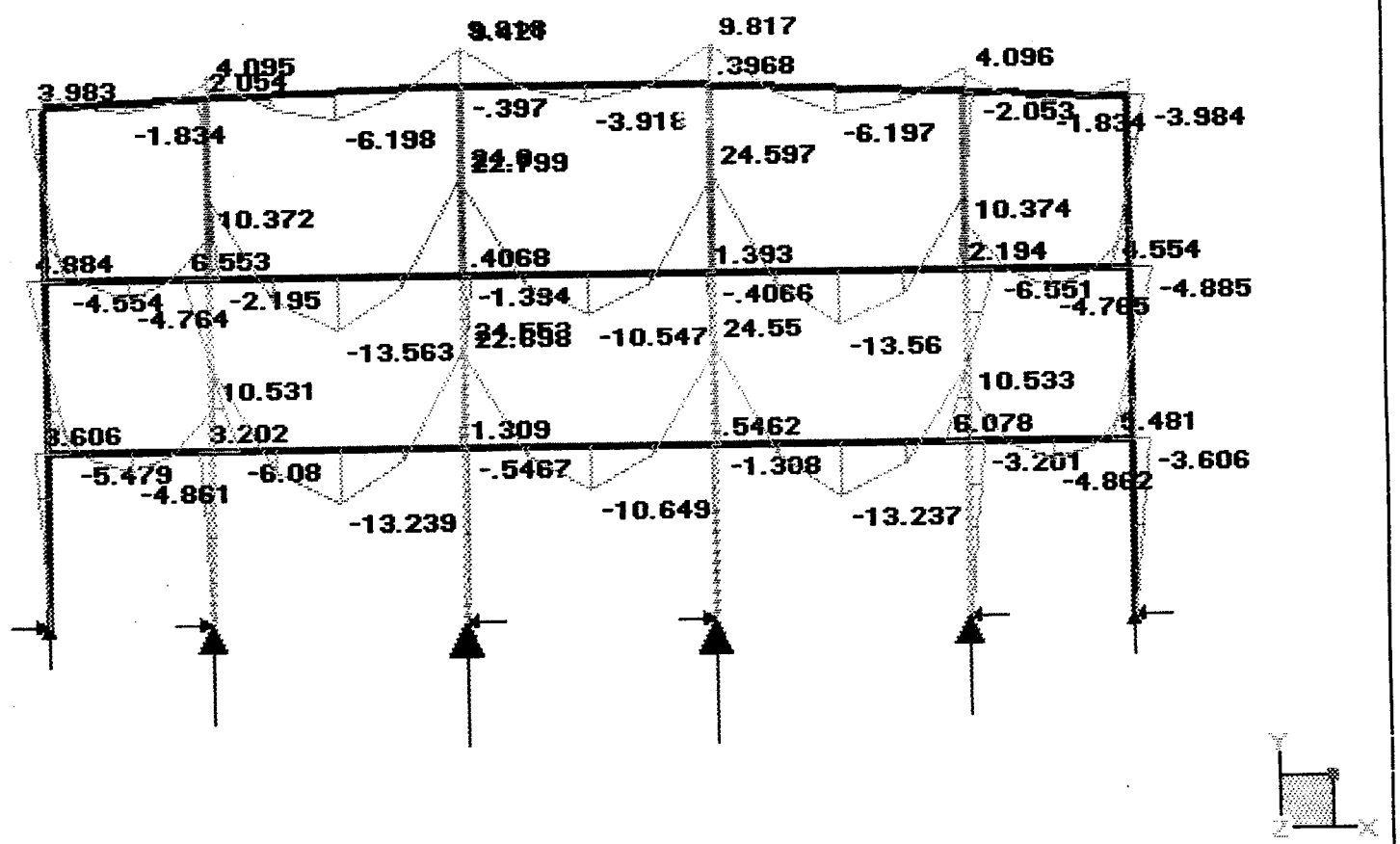
BUILDING NO. 650,651 & 652
TYPICAL CROSS FRAME



Solution: LC 2 LL ONLY
Member Axial Forces, K

BUILDING NO. 650,651 & 652

TYPICAL CROSS FRAME

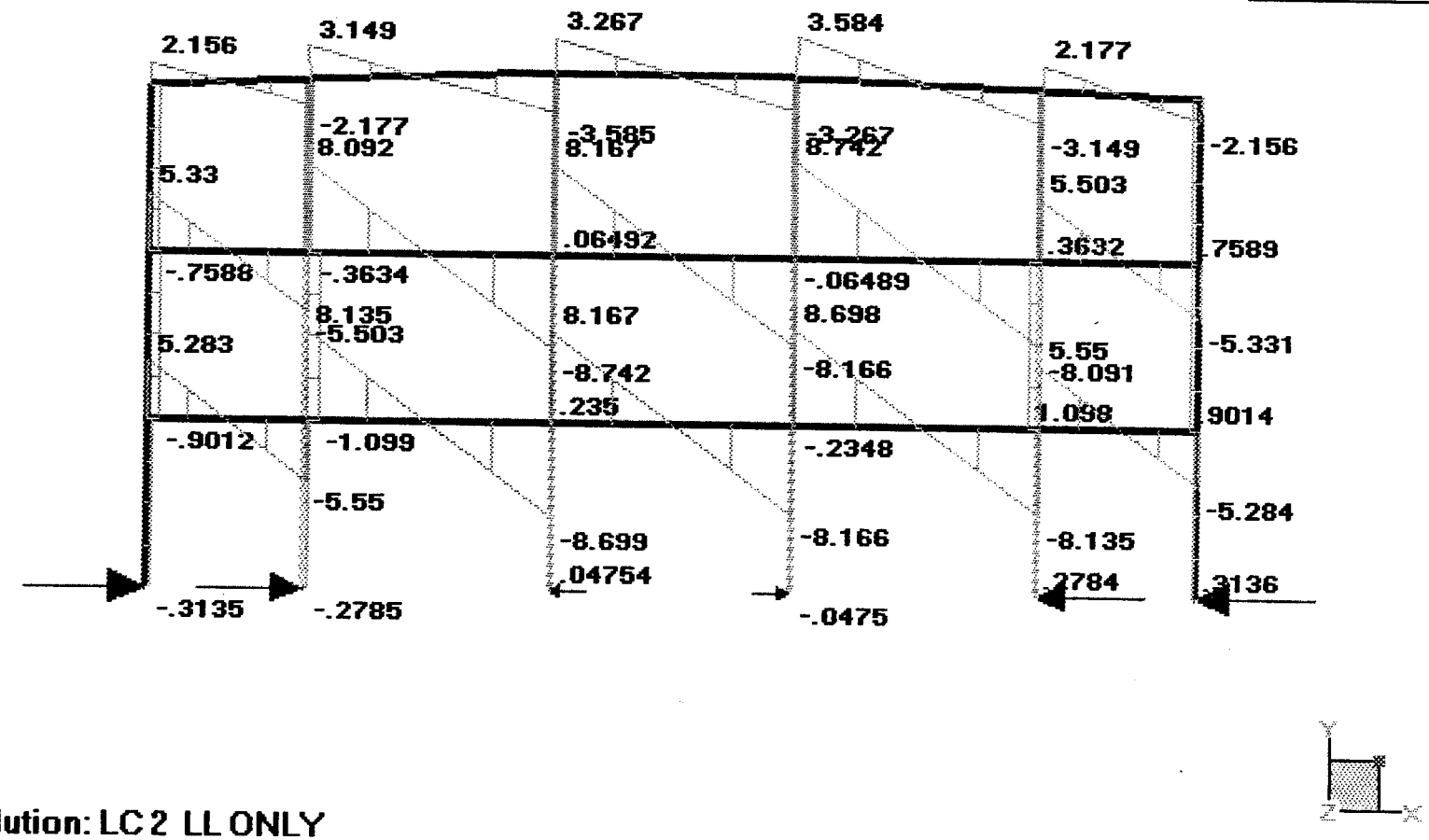


Solution: LC 2 LL ONLY

Member z Bending Moments, K-ft

87

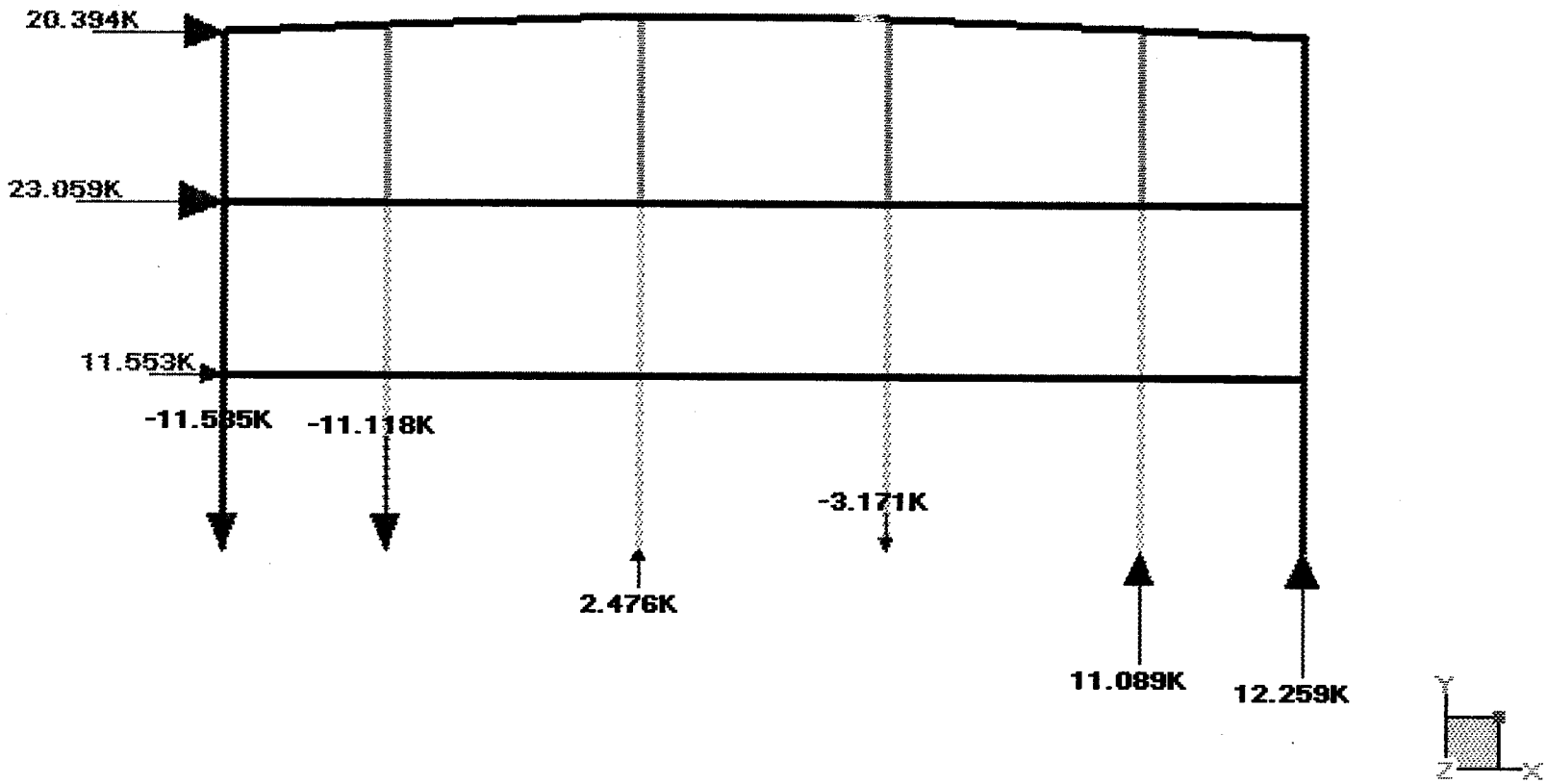
BUILDING NO. 650,651 & 652
TYPICAL CROSS FRAME



Solution: LC 2 LL ONLY
Member y Shear Forces, K

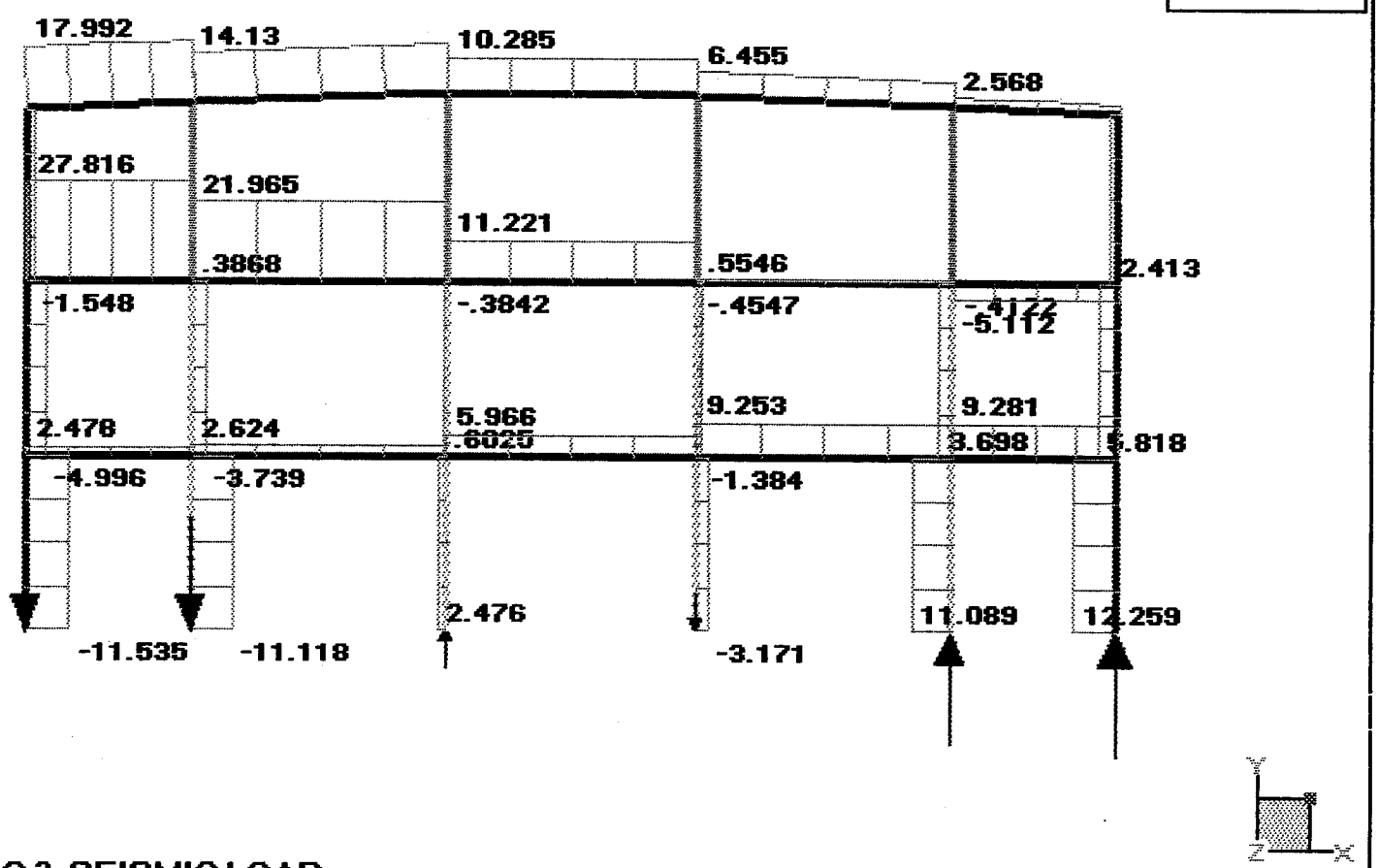
B8

BUILDING NO. 650,651 & 652
TYPICAL CROSS FRAME



Solution: LC 3 SEISMIC LOAD

BUILDING NO. 650,651 & 652
TYPICAL CROSS FRAME

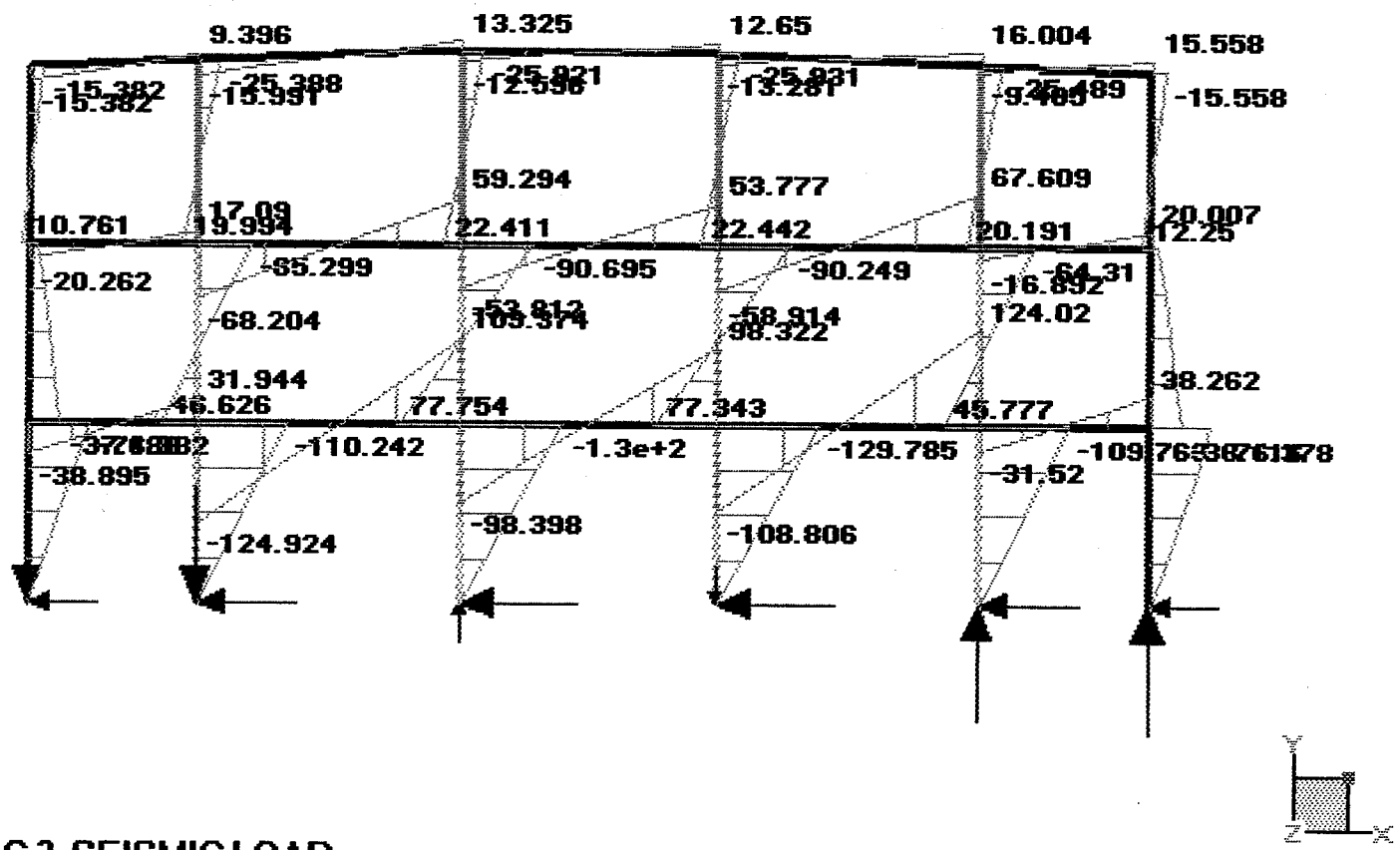


Solution: LC 3 SEISMIC LOAD
Member Axial Forces, K

B10

BUILDING NO. 650,651 & 652

TYPICAL CROSS FRAME



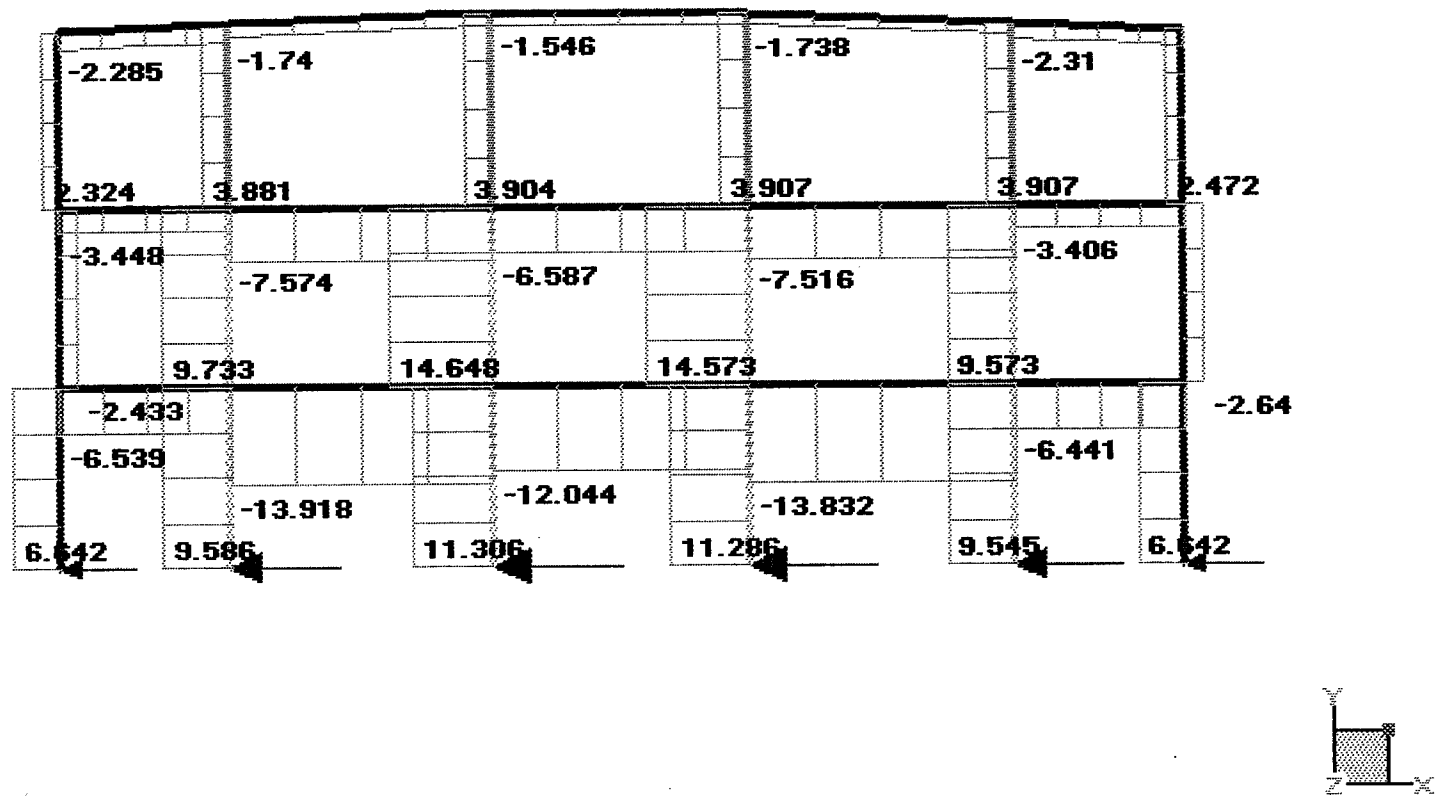
Solution: LC 3 SEISMIC LOAD

Member z Bending Moments, K-ft

B11

BUILDING NO. 650,651 & 652

TYPICAL CROSS FRAME



Solution: LC 3 SEISMIC LOAD

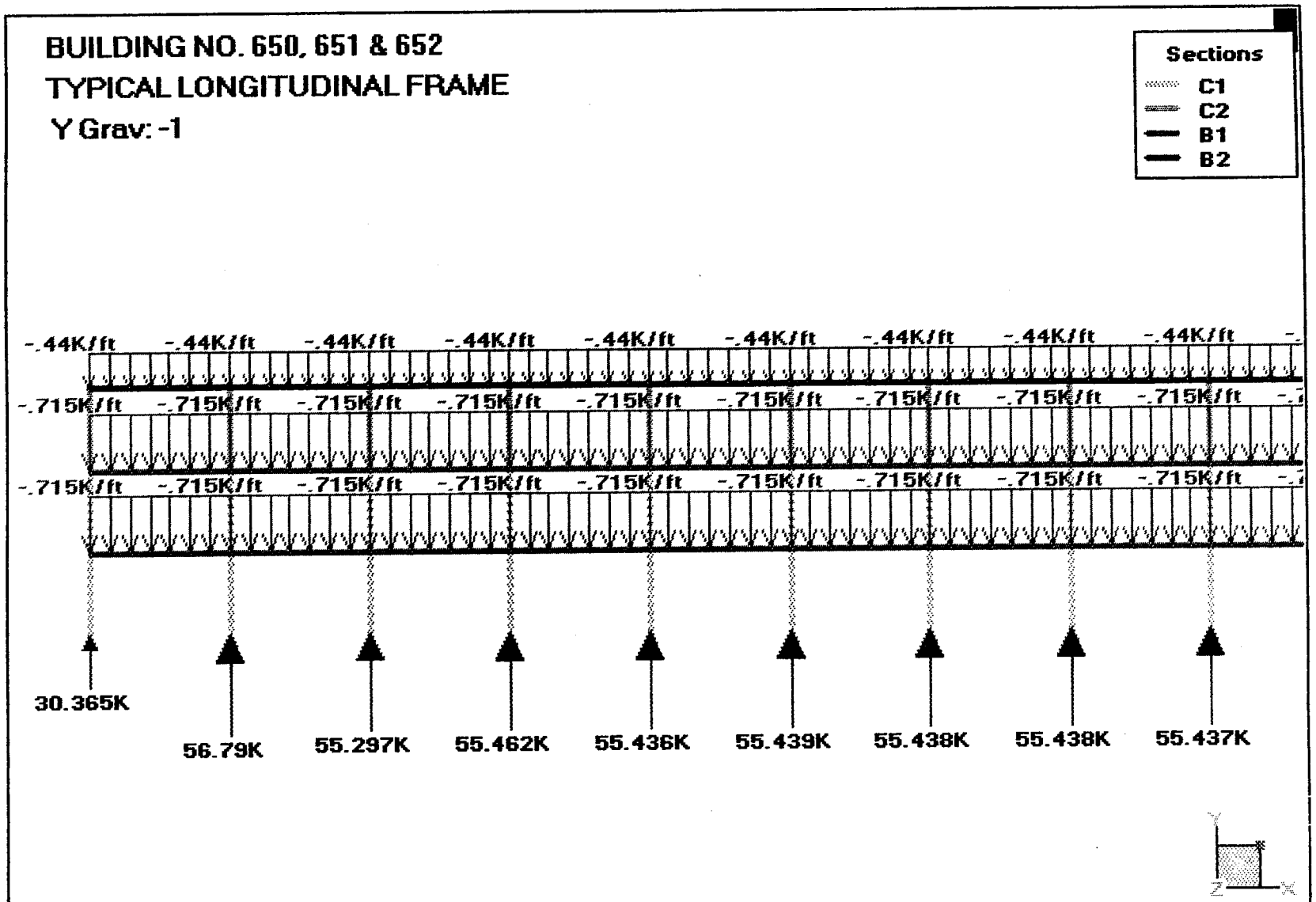
Member y Shear Forces, K

B12

BUILDING NO. 650, 651 & 652

TYPICAL LONGITUDINAL FRAME

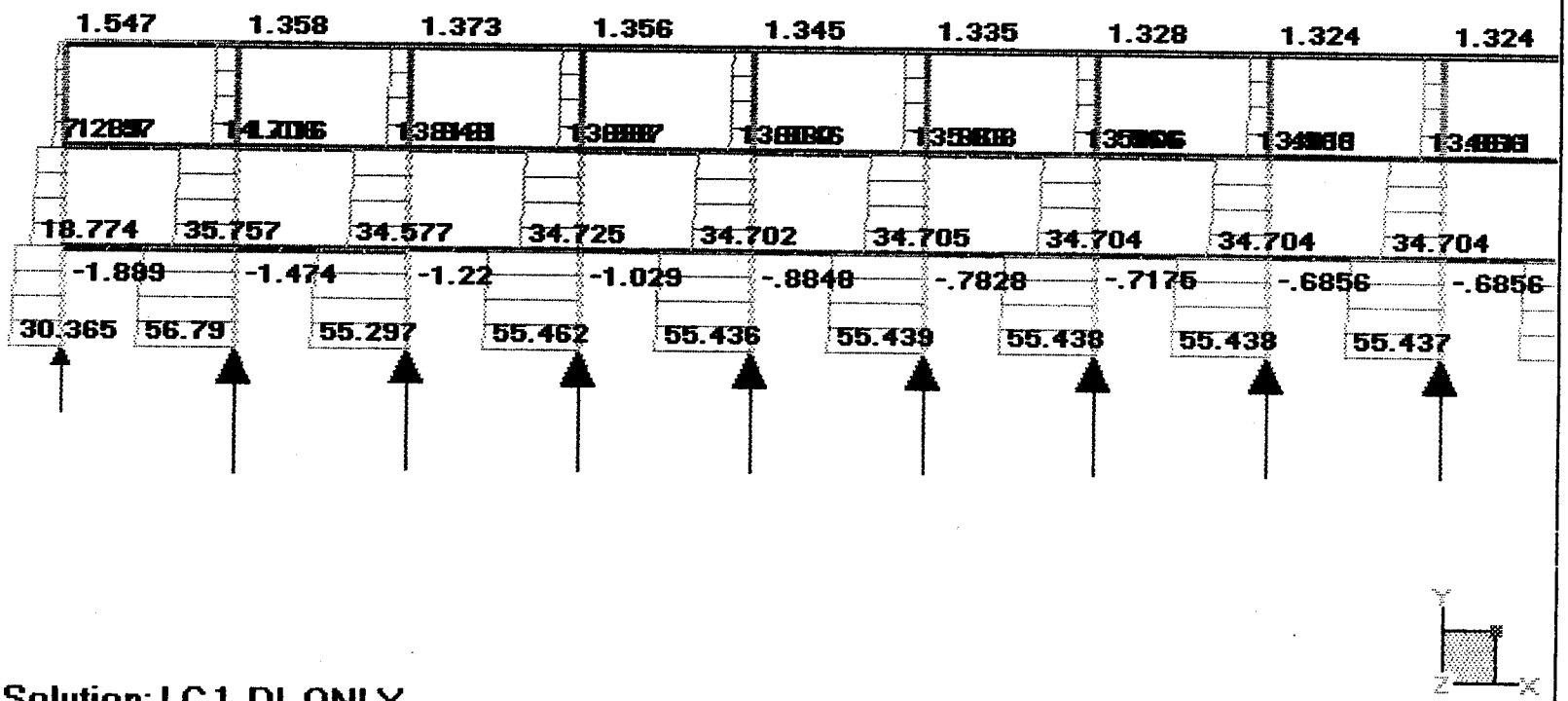
Y Grav: -1



Solution: LC1 DL ONLY

B13

BUILDING NO. 650, 651 & 652
TYPICAL LONGITUDINAL FRAME



Solution: LC 1 DL ONLY
Member Axial Forces, K

B14

BUILDING NO. 650, 651 & 652
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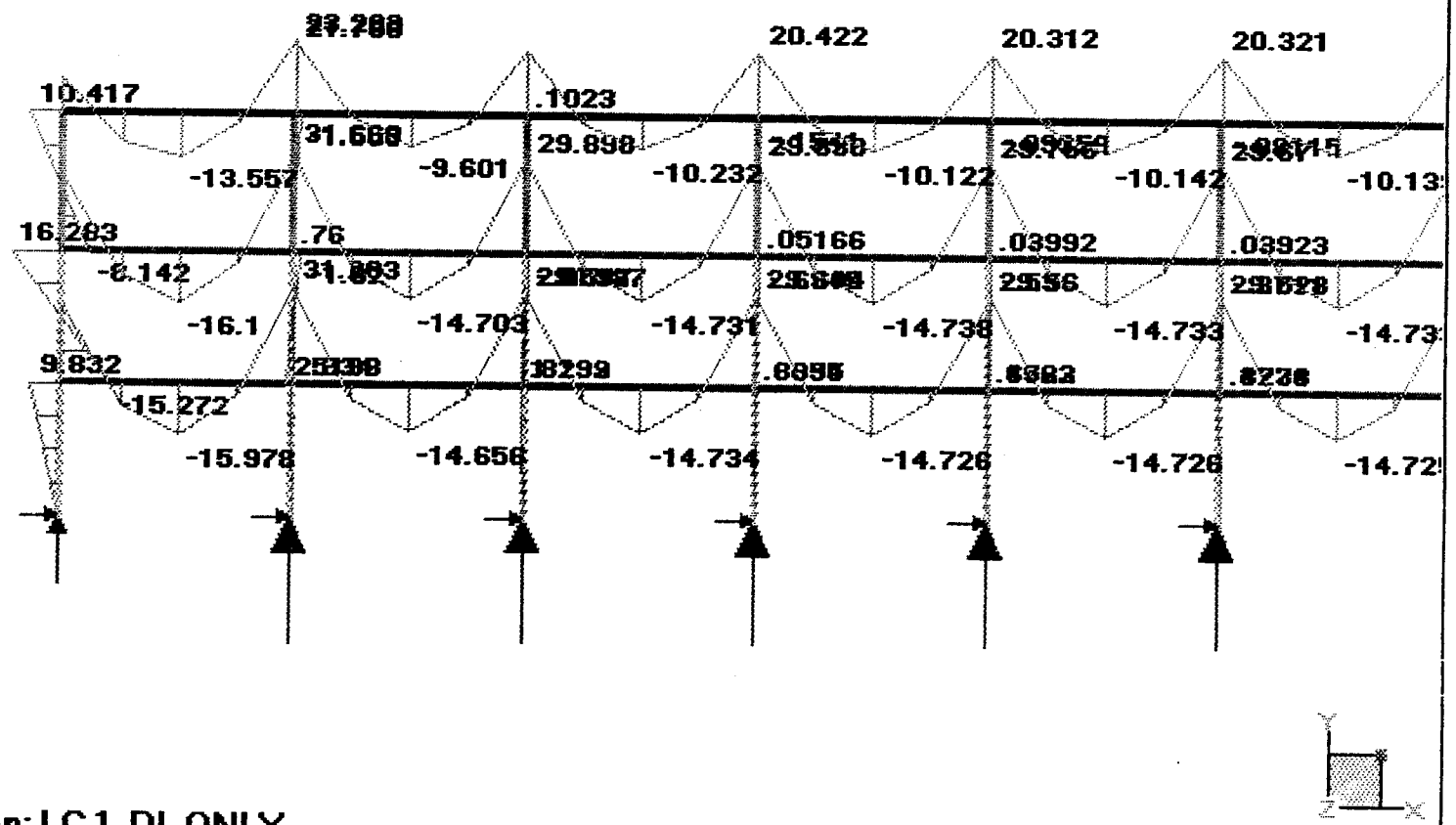
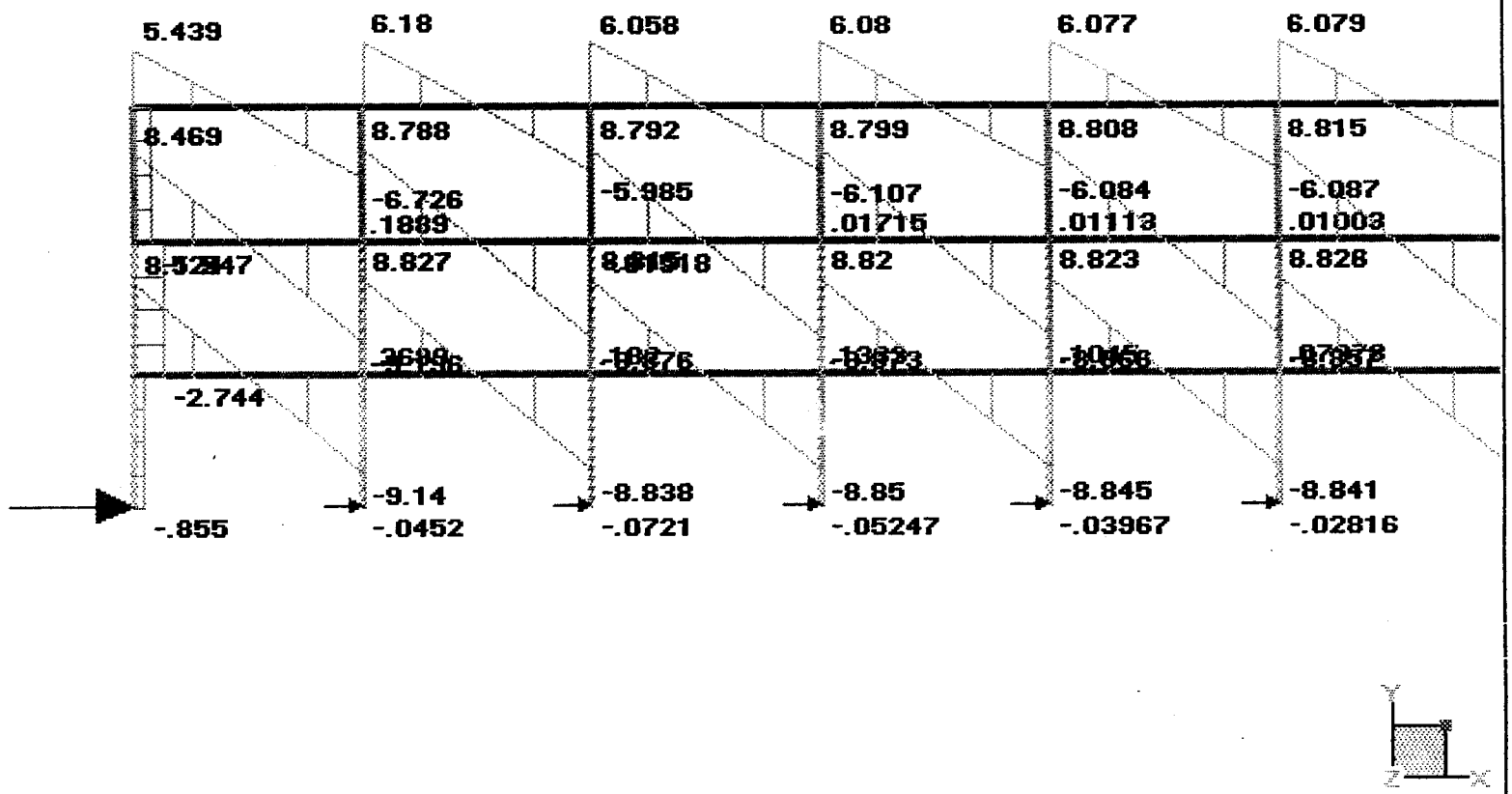


Solution: LC 1 DL ONLY
Member z Bending Moments, K-ft

B15

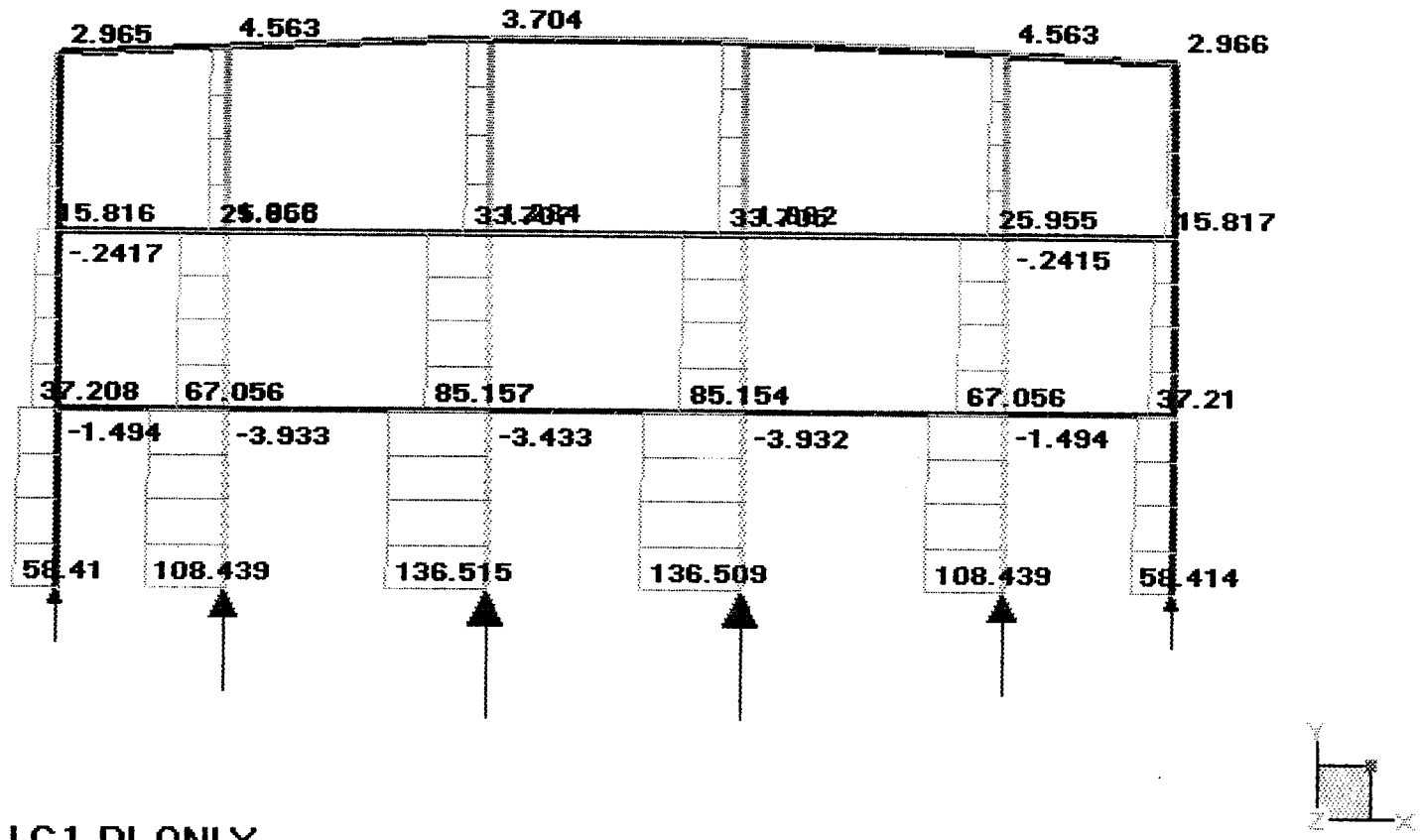
BUILDING NO. 650, 651 & 652
TYPICAL LONGITUDINAL FRAME



Solution: LC 1 DL ONLY
Member y Shear Forces, K

918

BUILDING NO. 650,651 & 652
TYPICAL CROSS FRAME

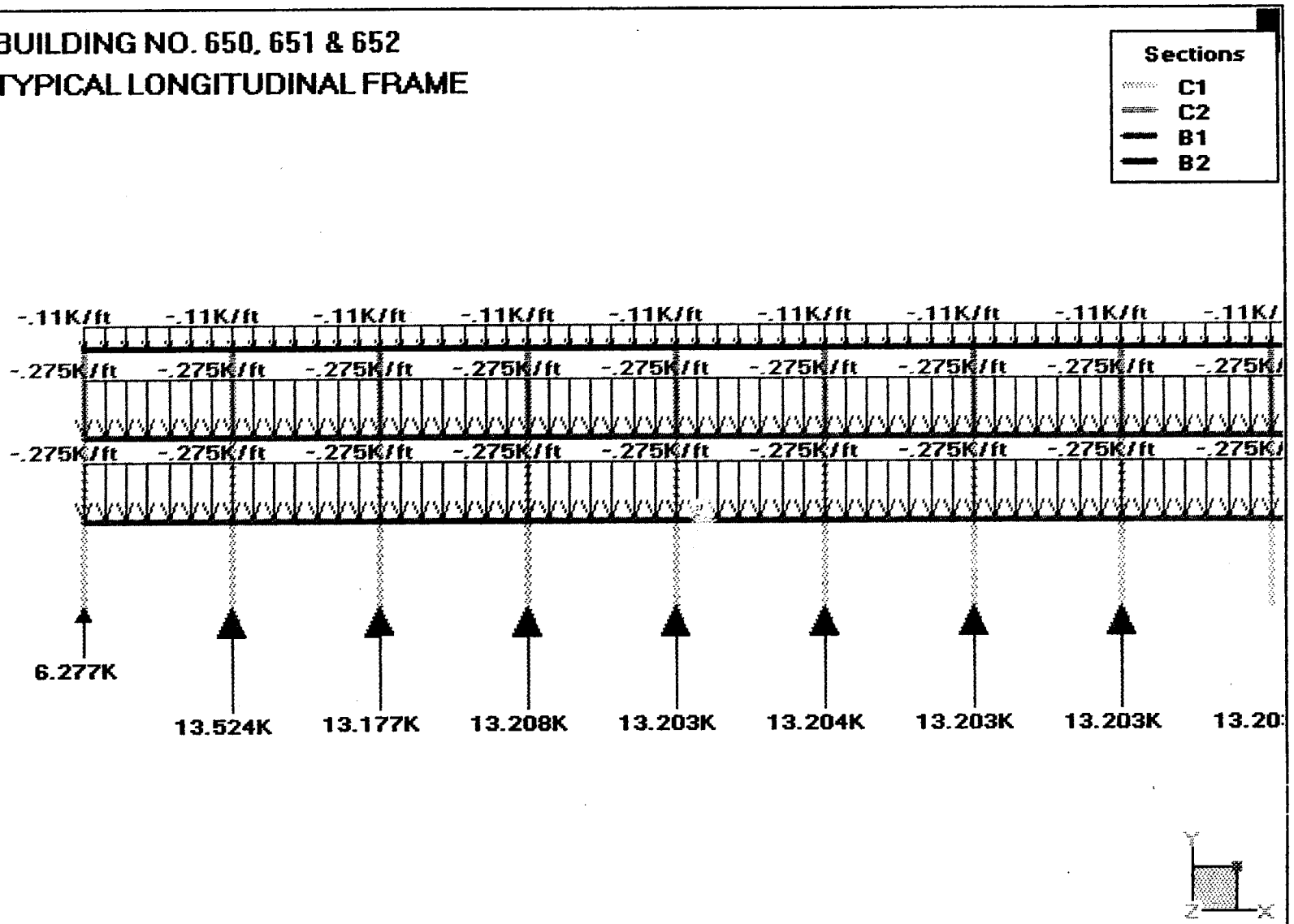


Solution: LC1 DL ONLY
Member Axial Forces, K

B2

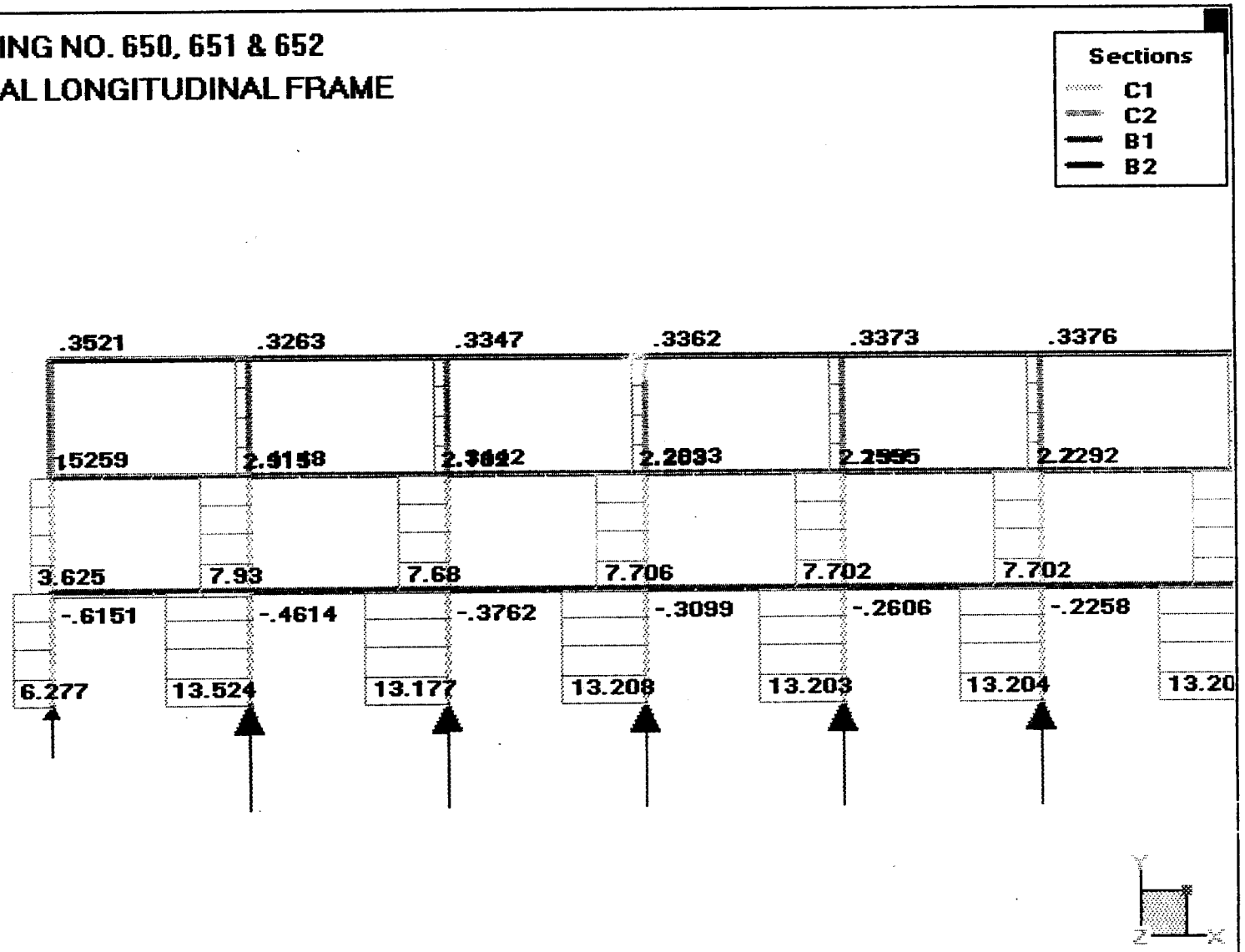
BUILDING NO. 650, 651 & 652

TYPICAL LONGITUDINAL FRAME



Solution: LC 2 LL ONLY

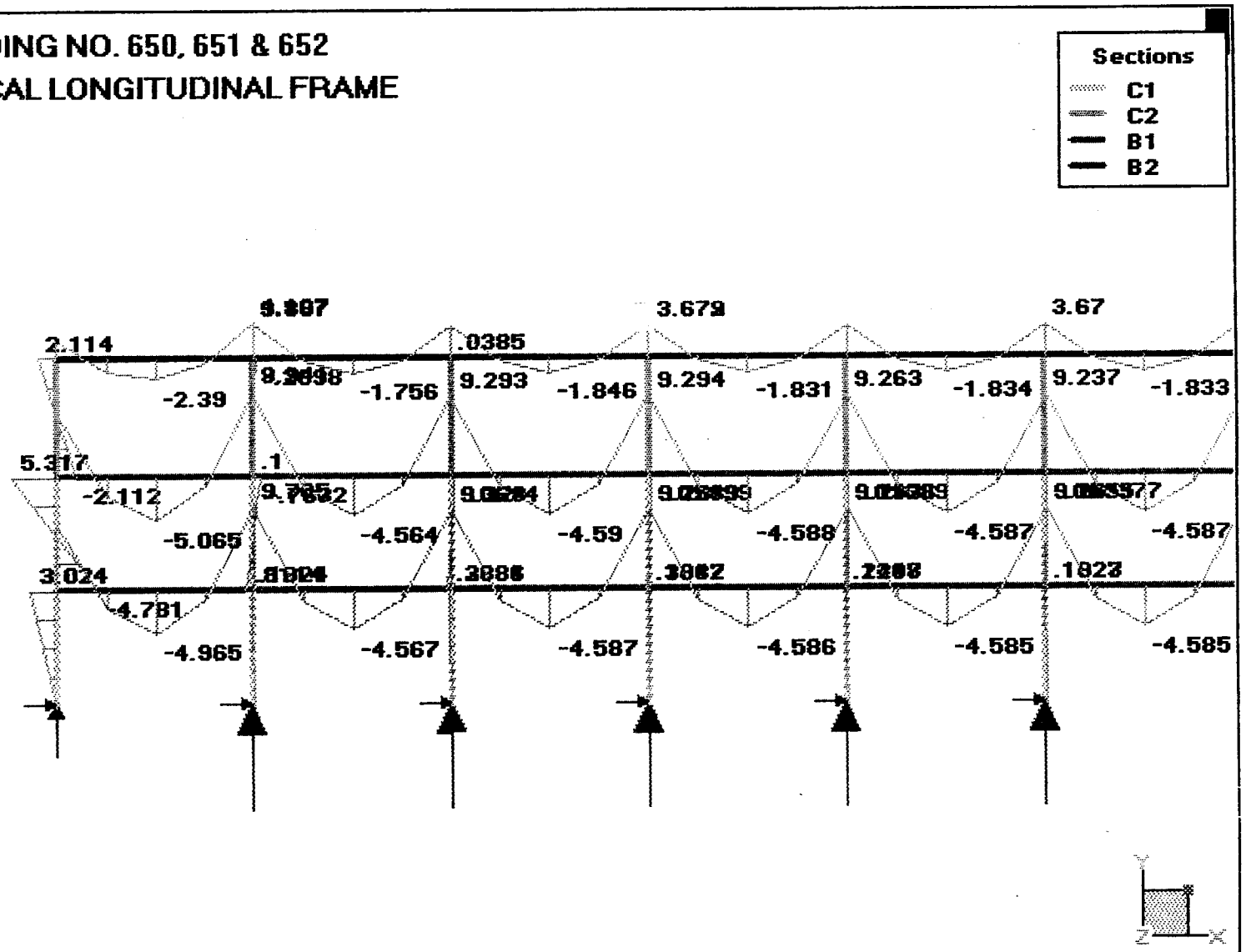
BUILDING NO. 650, 651 & 652
TYPICAL LONGITUDINAL FRAME



Solution: LC 2 LL ONLY
Member Axial Forces, K

B18

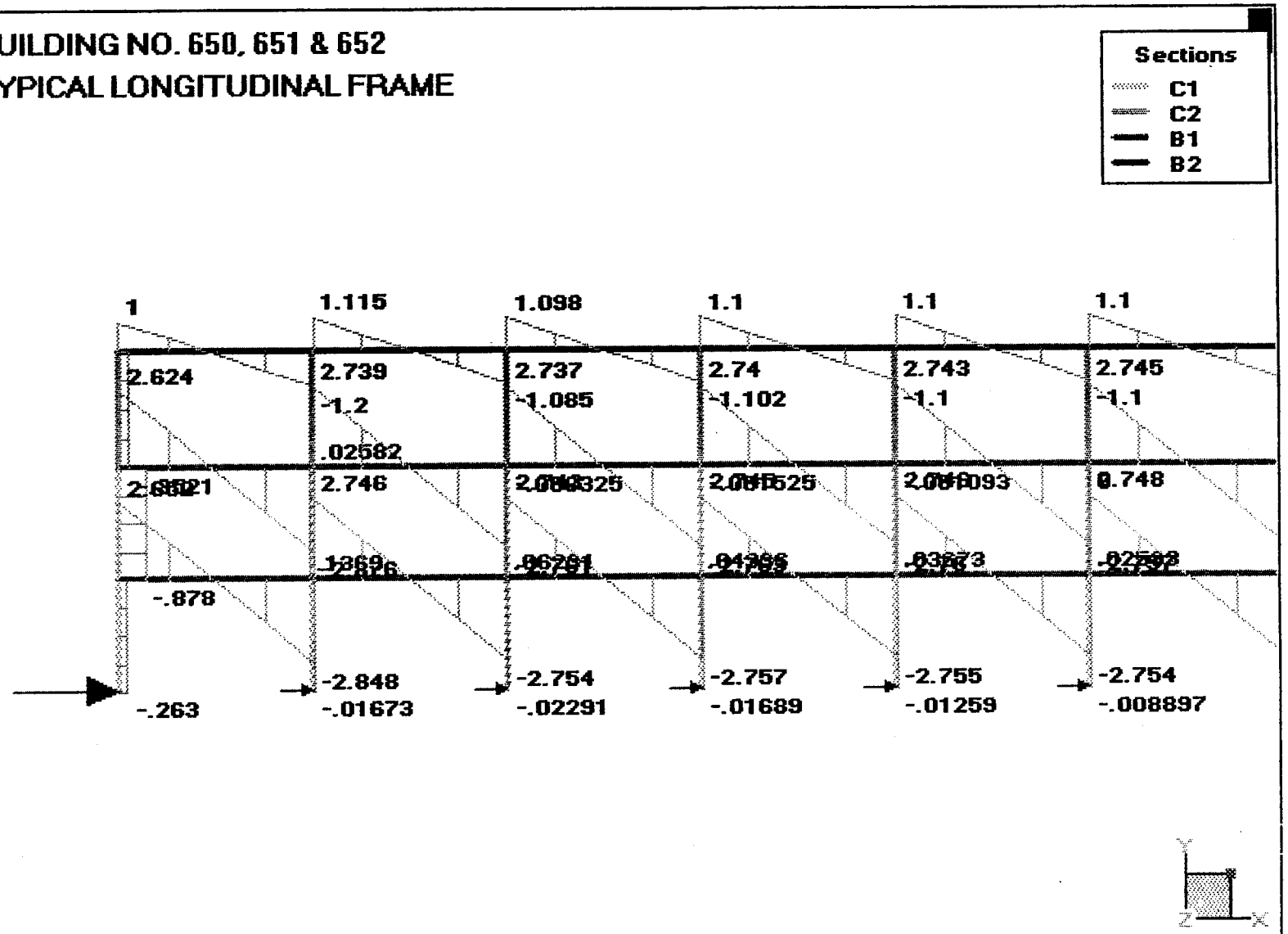
BUILDING NO. 650, 651 & 652
TYPICAL LONGITUDINAL FRAME



Solution: LC 2 LL ONLY
Member z Bending Moments, K-ft

B19

BUILDING NO. 650, 651 & 652
TYPICAL LONGITUDINAL FRAME

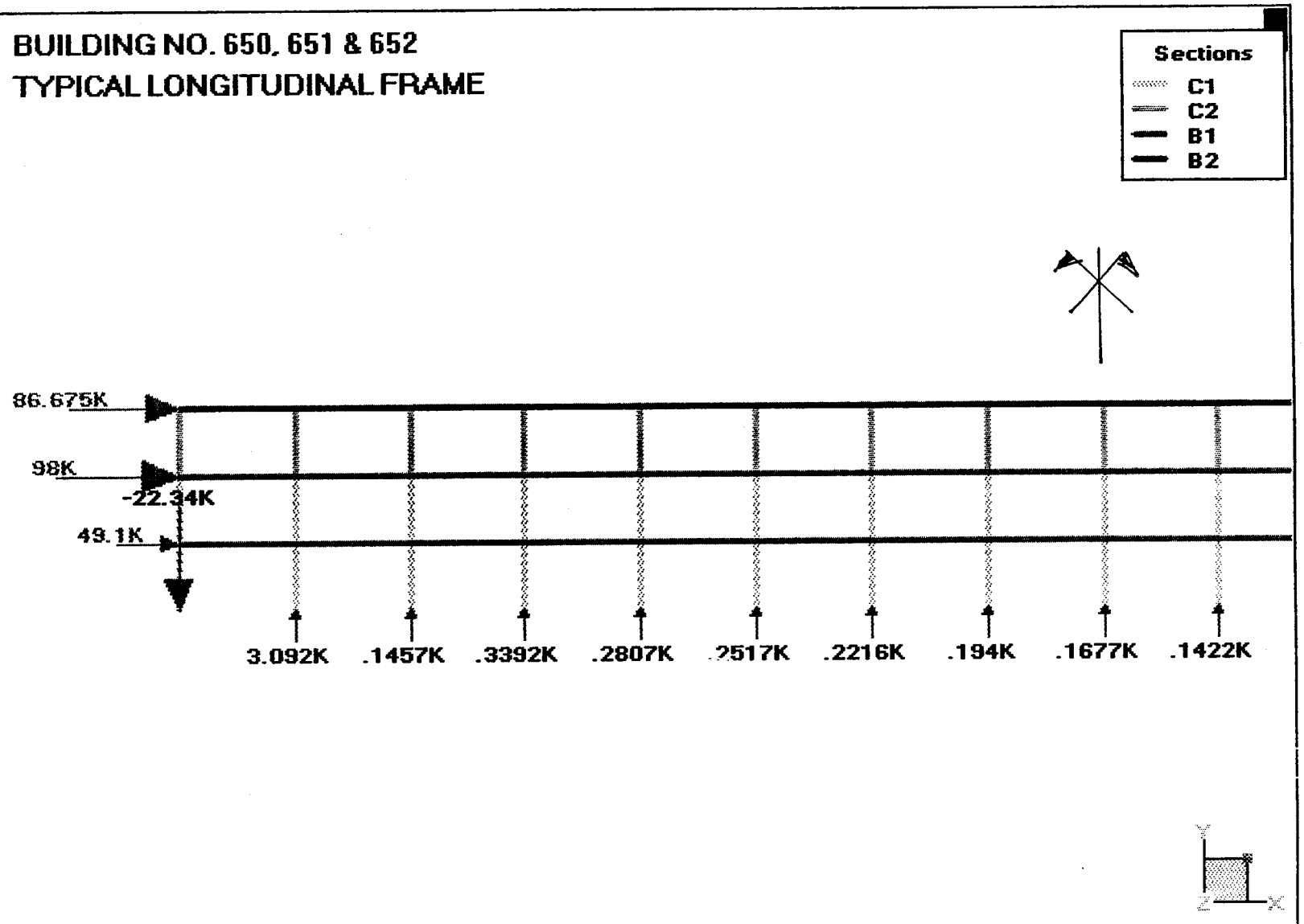


Solution: LC 2 LL ONLY
Member y Shear Forces, K

B20

BUILDING NO. 650, 651 & 652

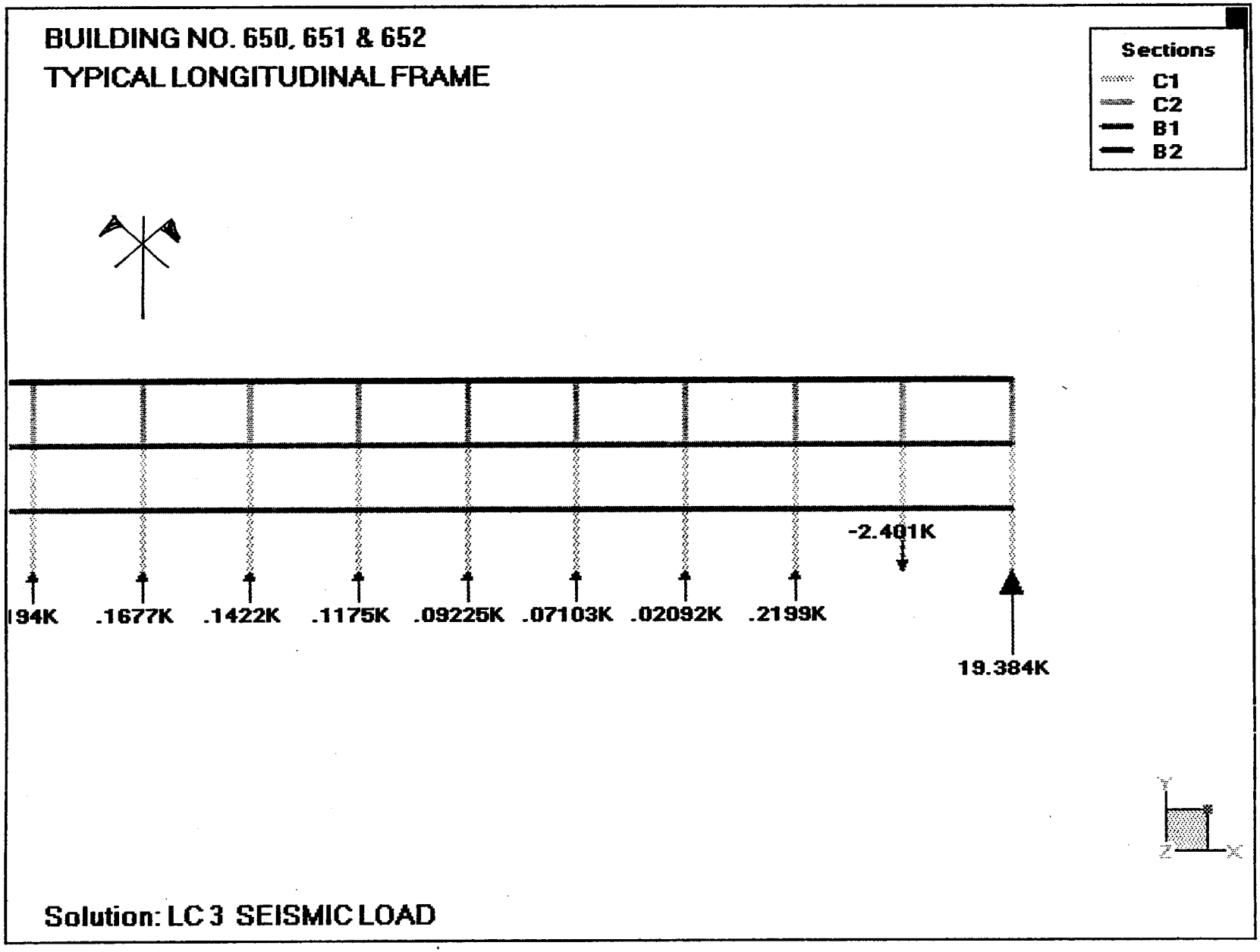
TYPICAL LONGITUDINAL FRAME



Solution: LC 3 SEISMIC LOAD

BUILDING NO. 650, 651 & 652

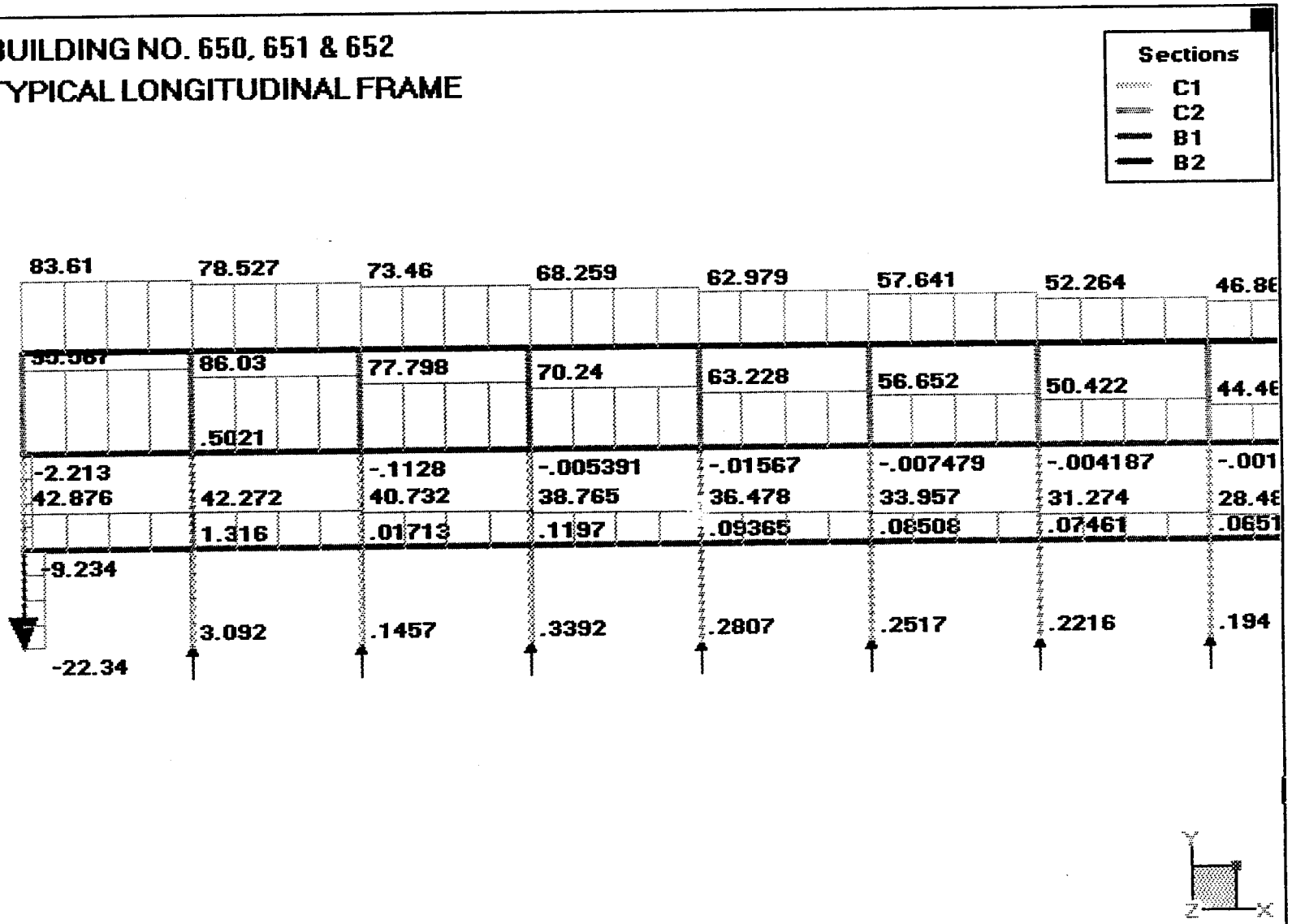
TYPICAL LONGITUDINAL FRAME



Solution: LC 3 SEISMIC LOAD

B22

BUILDING NO. 650, 651 & 652
TYPICAL LONGITUDINAL FRAME

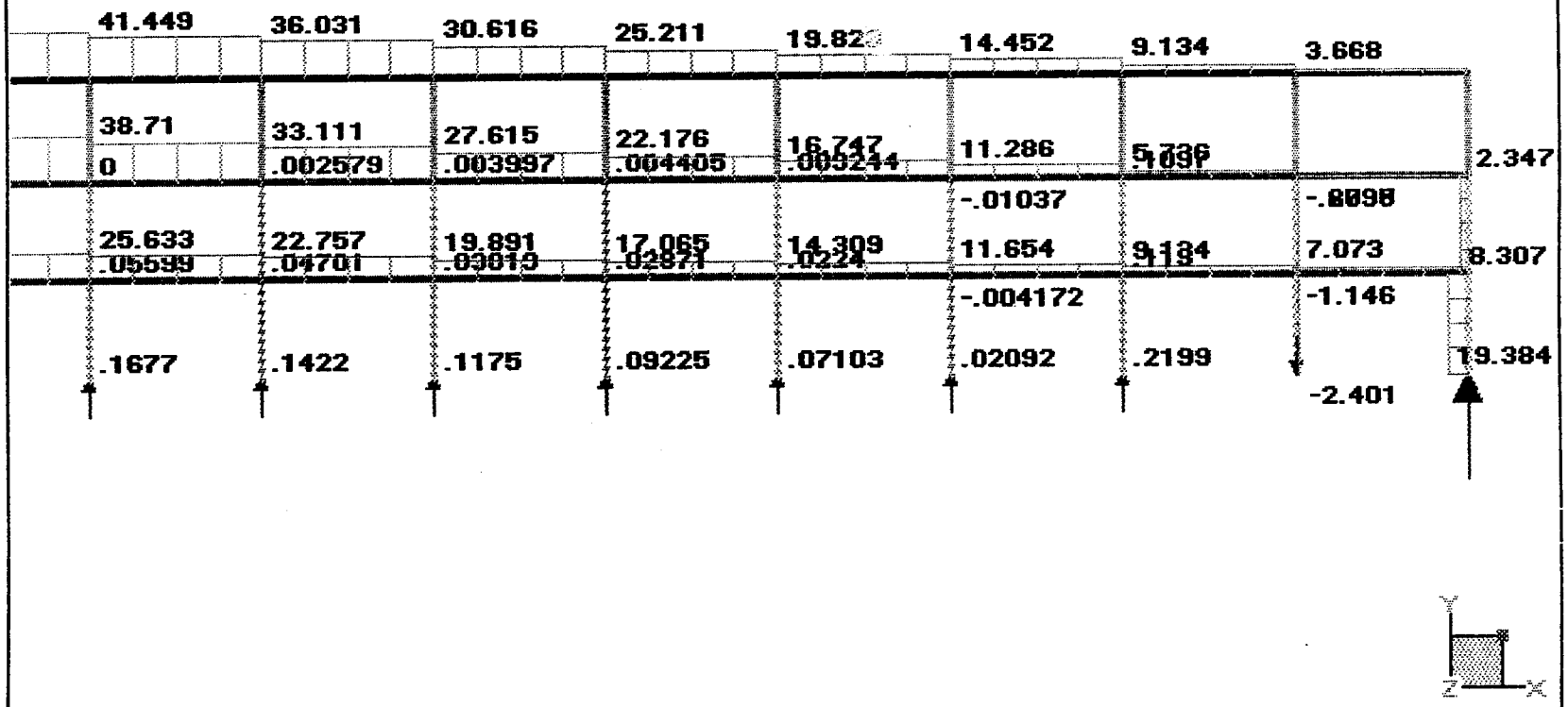


Solution: LC 3 SEISMIC LOAD
Member Axial Forces, K

B23

BUILDING NO. 650, 651 & 652

TYPICAL LONGITUDINAL FRAME



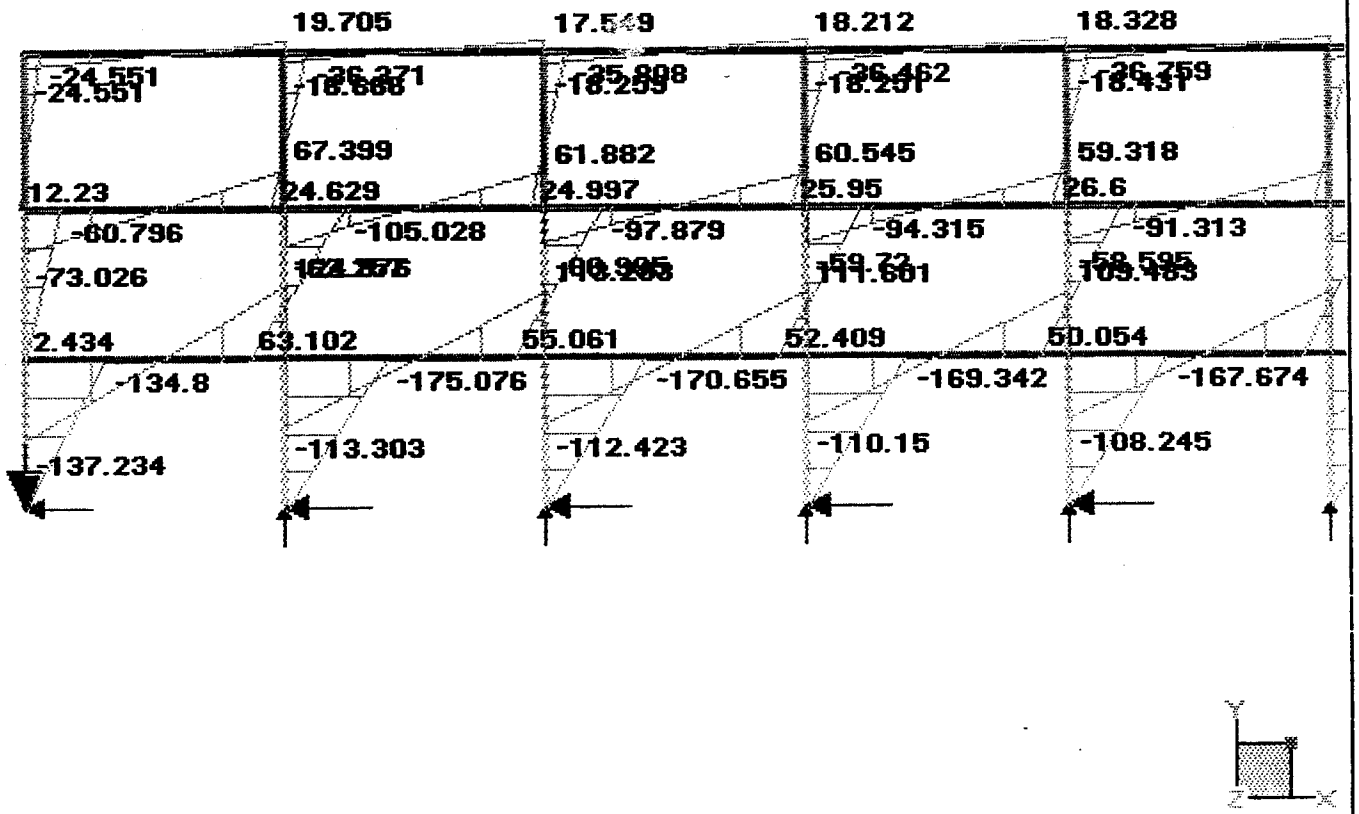
Solution: LC 3 SEISMIC LOAD

Member Axial Forces, K

B24

BUILDING NO. 650, 651 & 652

TYPICAL LONGITUDINAL FRAME



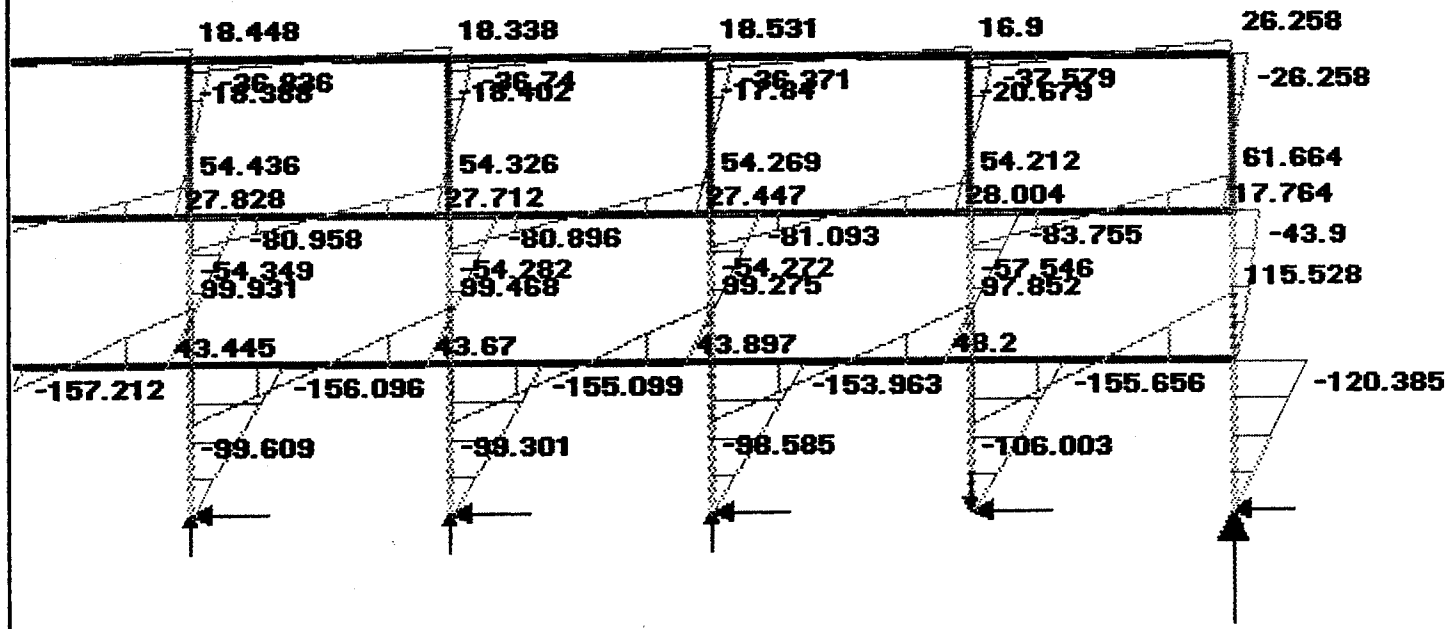
Solution: LC 3 SEISMIC LOAD

Member z Bending Moments, K-ft

B-5

BUILDING NO. 650, 651 & 652

TYPICAL LONGITUDINAL FRAME

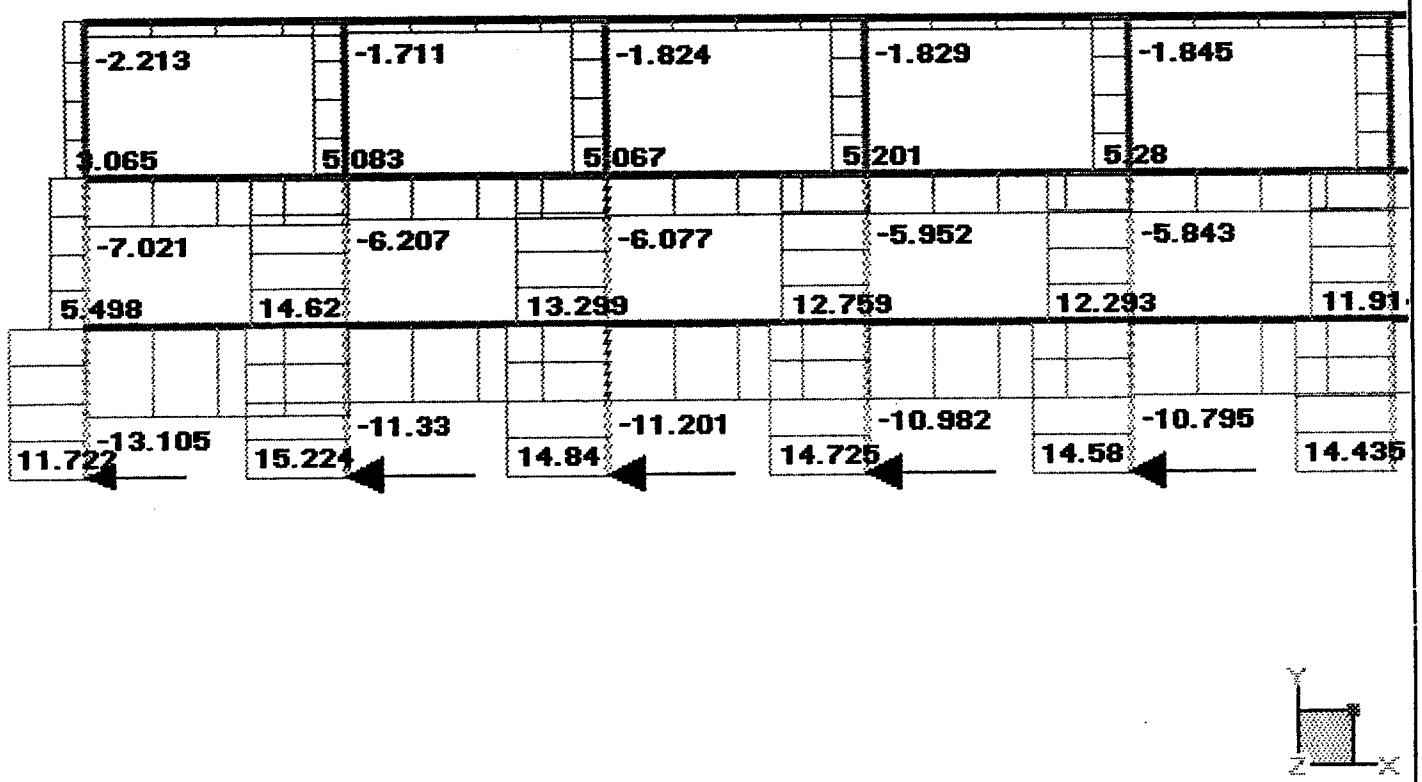


Solution: LC 3 SEISMIC LOAD

Member z Bending Moments, K-ft

B26

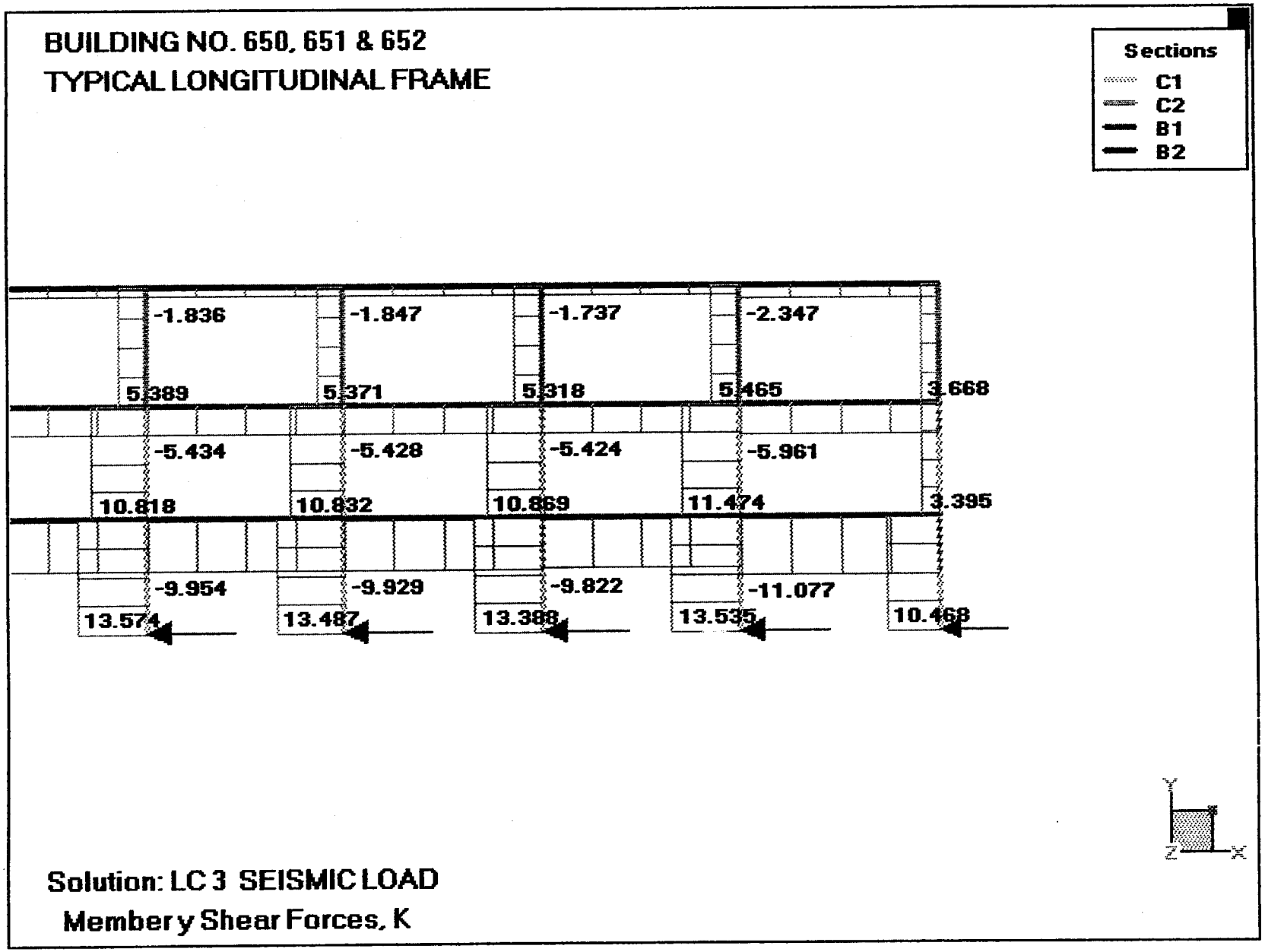
BUILDING NO. 650, 651 & 652
TYPICAL LONGITUDINAL FRAME



Solution: LC 3 SEISMIC LOAD
Member y Shear Forces, K

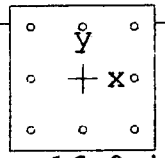
827

BUILDING NO. 650, 651 & 652
TYPICAL LONGITUDINAL FRAME



Solution: LC 3 SEISMIC LOAD
Member y Shear Forces, K

B28



16.0 x 16.0 inch

f'c = 0.6 ksi

fy = 40.0 ksi

Confinement: Tied

clr cover = 1.88 in

spacing = 4.81 in

8-#7 at 1.87%

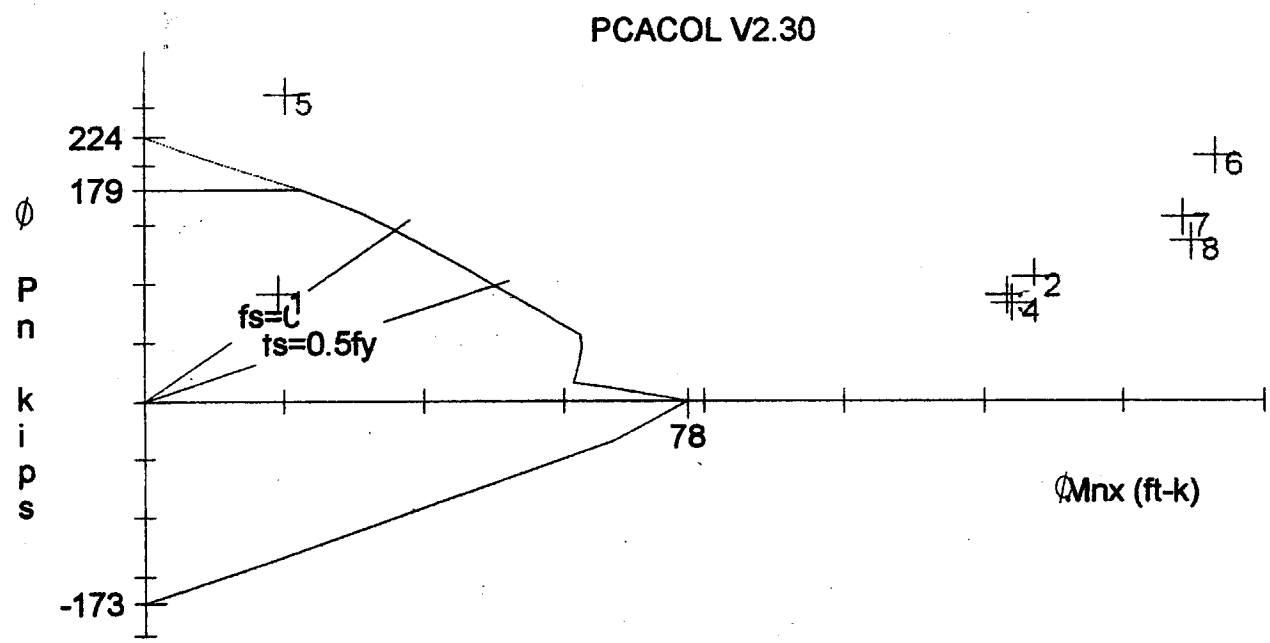
As = 5 in^2

Ix = 5461 in^4

Iy = 5461 in^4

© 1993 PCAin

Yc = 0.00 in



File name: UNTITLED.COL

Project: SCHOFIELD BARRACKS

Column Id: GROUND FLOOR COLUMN

Engineer: HL & L CORP.

Date: 02/13/01 Time: 21:33:34

Code: ACI 318-89

Units: in-lb

X-axis slenderness is not considered.

Material Properties:

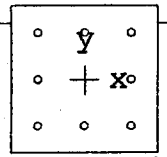
Ec = 1485 ksi eu = 0.003 in/in

fc = 0.51 ksi Es = 29000 ksi

Beta1 = 0.85

Stress Profile: Block

phi(c) = 0.70, phi(b) = 0.90



12.0 x 12.0 inch

f'c = 0.6 ksi

fy = 40.0 ksi

Confinement: Tied

clr cover = 1.88 in

spacing = 3.19 in

8-#5 at 1.72%

As = 2 in^2

Ix = 1728 in^4

Iy = 1728 in^4

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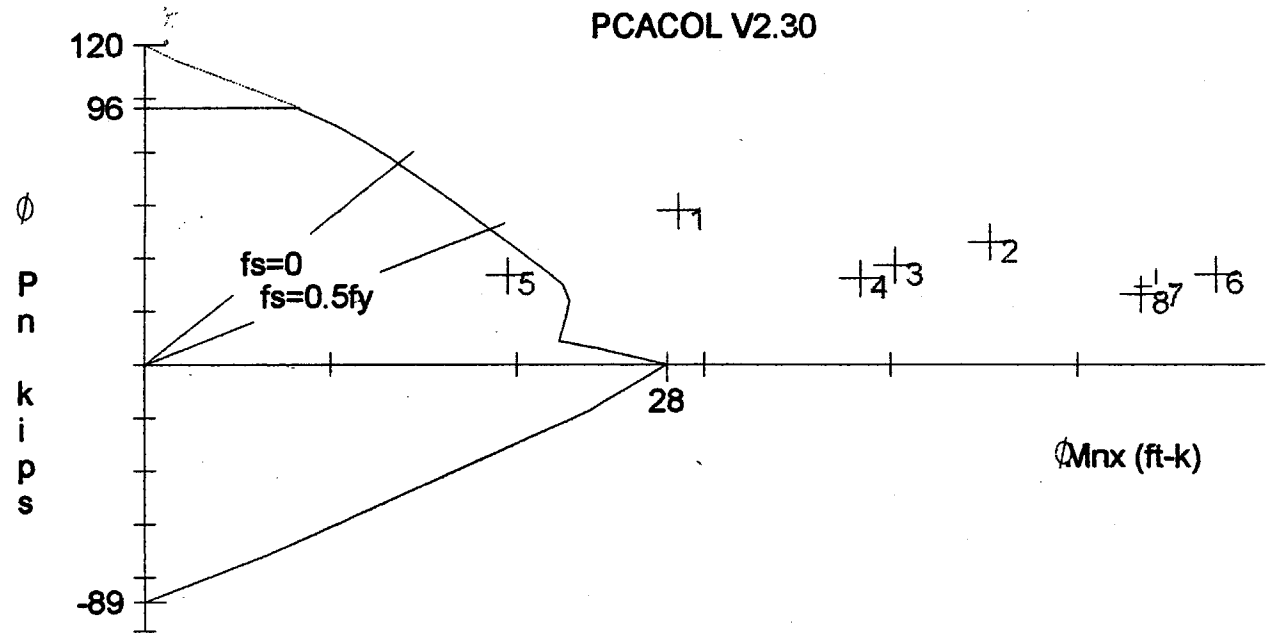
Yo = 0.00 in



File name: UNTITLED.COL

Project: SCHOFIELD BARRACKS

Column Id: ROOF COLUMN

Engineer: HL & L CORP.

Date: 02/13/01 Time: 21:33:34

Code: ACI 318-89

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Beta1 = 0.85

Stress Profile: Block

phi(c) = 0.70 phi(b) = 0.90

22

ATTACHMENT 22

QUAD F AS-BUILT DRAWINGS

(REFER TO THE COMPACT DISK INCLUDED IN THIS SOLICITATION)

Technical Guide
for
Installation Information Infrastructure Architecture (I3A) Implementation

Version 2

19 May 2000

by
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(reedk@isecfdeo-emh1.army.mil)

Prepared for
Department of the Army
Headquarters
U.S. Army Information Systems Engineering Command
Fort Huachuca, Arizona 85613-5300

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1 Introduction

1.1 Purpose.

This document provides guidance for the planning, design, and implementation of the Installation Information Infrastructure Architecture (I3A) for Army installations in the Continental United States (CONUS).

1.2 Background.

In previous engineering designs, the each area of telecommunications was addressed separately. Each area had its own design standards, schedule, and funding. This approach led to much confusion, re-engineering, and duplicate work. In an effort to synchronize the efforts and formulate a more efficient and effective design, the I3A concept was initiated.

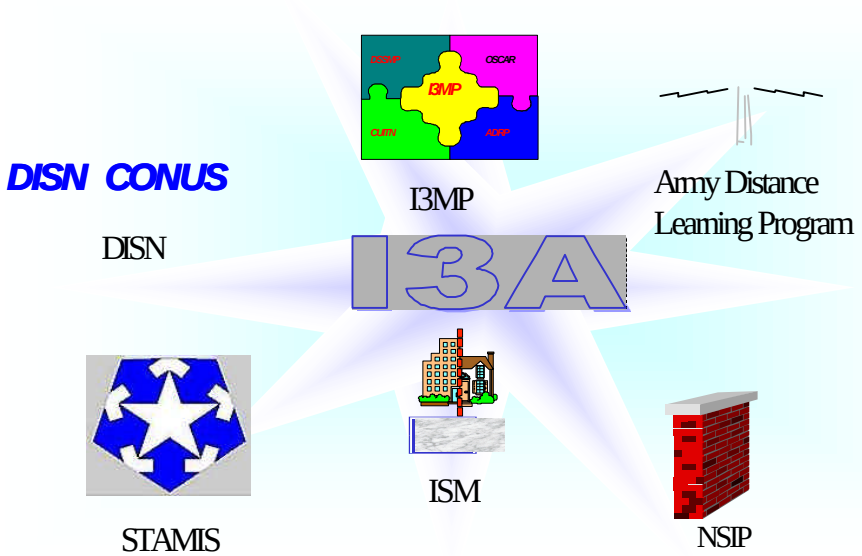
1.3 Goal.

This document will assist the telecommunications designer by supplying common standards and architecture. Through the use of this document, all telecommunications engineering should follow the same standards, thus allowing a concerted installation effort that may be phased if required by funding.

1.4 Scope.

1.4.1 I3A Program Synchronization.

Integration of architectures throughout the United States Army and Department of Defense is essential. The I3A is a synchronization tool for major U.S. Army automation and communications programs



( ). The underlying objective is to meet current information transfer requirements while creating an infrastructure sufficiently flexible to meet the exponentially increasing future data communications requirements and to accommodate new technology advances. A long-term benefit of the I3A is to accommodate the transmission of not only voice and video, but also data.

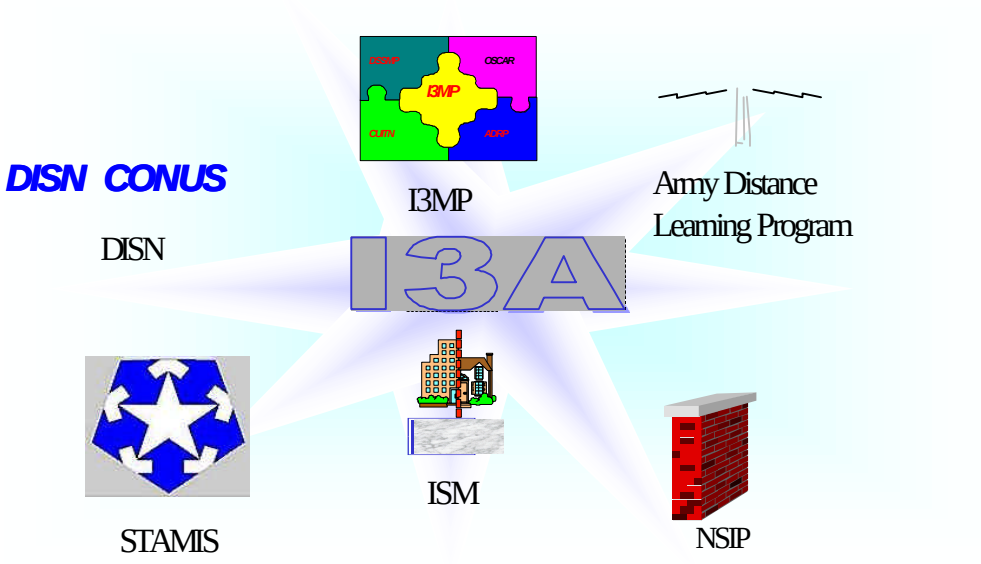


Figure 1-1: I3A Program Synchronization

1.4.2 Technical Guidance.
Designers should always review applicable policies and programs before planning their infrastructure or network. This ensures integration with current systems and will enable the designer to identify programs and standards up front that provide procedural or technical guidance. Planning includes identifying technologies and selecting the templates and topologies that best fit your installation requirements.

1.4.3 Integrated Transfer System.
The Army's goal of a common, fully integrated, digital transfer system is expected in the 2010+ time frame. For providing this service, Layer 3 switching using Gigabit Ethernet (GbE) is expected to support the communications infrastructure. The I3A infrastructure will support multimedia (e.g. voice, data, image, and video) communications. The I3A program will provide an infrastructure capable of supporting the integration of the voice telephone network and computer data networks. shows a sample of an integrated network. I3A is applicable to the design and engineering of new buildings and other projects under the Army military construction programs, as well as in the installation, rehabilitation, and replacement of current installation telecommunications infrastructure. This document is intended to support the necessary site surveys and analysis, which should be done prior to actual engineering of solutions to accommodate unique requirements. This guide assists in the integration of the Outside Cable Rehabilitation-II (OSCAR-II), Common User Installation Transport Network (CUITN), Digital Switched Systems Modernization Program (DSSMP), Military Construction-Army (MCA), locally managed projects, and the Army Defense Information Systems Network (DISN) Router Program (ADRP). The I3A should be capable of connecting the tactical and sustaining base in support of the Army Warfighter as a key component of the Force Projection concept; however, tactical interfaces are beyond the current scope of this document.

1.5 Document Content.
This document will establish an implementation concept that can be used to shape architectural templates and influence the design process for the I3A. It will identify proven infrastructure

construction techniques, define common practices, and serve as an authoritative implementation guide.

1.6 Future Concerns and Planning.

1.6.1 Advanced Applications.

More advanced user requirements and bandwidth sensitive applications (e.g., tele-medicine, desktop video teleconferencing, and educational applications) are requiring faster processors and distributed client/server computing that are driving the enterprise network evolution to upgrade the information infrastructure. All require higher performance/throughput, greater network predictability, higher network availability, and enhanced security than is currently available in the existing communications infrastructure.

1.6.2 Challenges.

Installation networking engineers and designers face challenges such as systems integration, interoperability, identifying the most efficient technologies, and leveraging government contracts for purchasing equipment. This document assists the planner in making informed decisions that are technically correct and financially feasible.

1.6.3 Future Growth.

In the near-term, most users will have an analog telephone to a Narrowband-Integrated Services Digital Network (N-ISDN) switch for voice communications and a local area network (LAN) connection for computer data communications. Using N-ISDN the user can conduct video teleconferencing calls worldwide. However, the supporting infrastructure must be capable of evolving to common user data networks as the user requirements grow and the higher data transfer rates are needed to support the new services (e.g., video and teleconferencing).

1.7 Department of Defense Architectural Standards.

The Department of Defense (DoD) has established a broad body of guidance on information technology standards, architecture, and design. This guidance is incorporated in a hierarchy of standards and architectural guidance documentation that is available on the world wide web (www). Some of the standards include: Joint Technical Architecture (JTA) (http://www-jta.itsi.disa.mil/) and JTA-Army (JTA-A) (http://arch-odisc4.army.mil/).

1.8 DoD Directives (DoDD) and DoD Instructions (DoDI).

In addition to the hierarchy of architectural standards outlined in the preceding paragraphs, DoD has created and implemented detailed guidance regarding interoperability among Command, Control, Communications, and Intelligence (C^3I) systems, and between these and systems tasked to support them. This I3A Implementation Guide is in compliance with all the Interoperability Policy Documents (http://jitc-emh.army.mil/ciidocs.htm).

1.9 Outside CONUS Implementation.

Specific Outside CONUS (OCONUS) implementation is not included in this document, but it may be addressed at a later date.

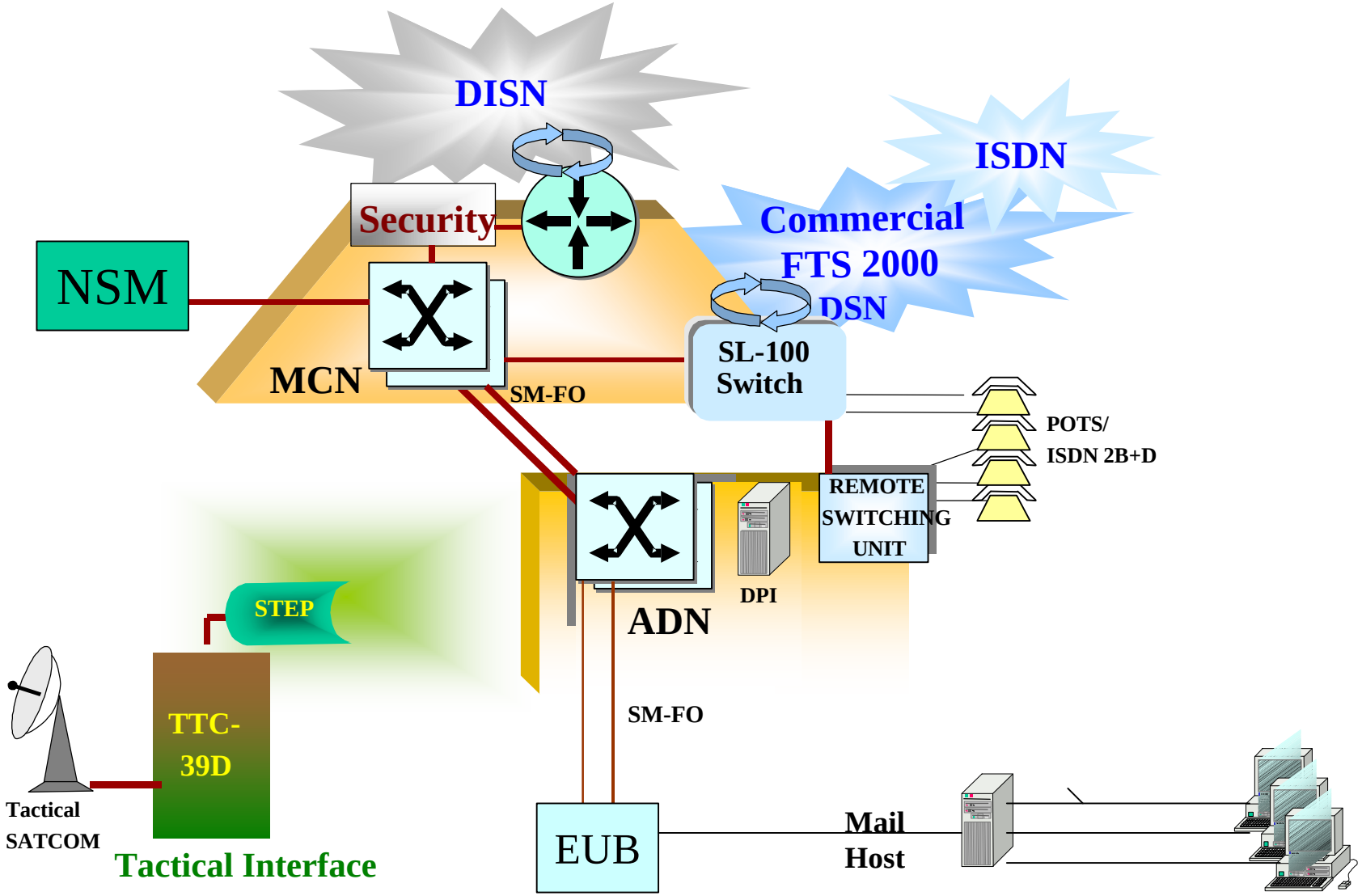


Figure 1-2: I3A Integrated Layout

2 Premises Distribution System (PDS).

2.1 Premises Distribution System Specifications.

The premises distribution system (PDS) is designed to satisfy I3A policy information system (IS) requirements within a facility. The PDS shall be installed in accordance with Telecommunications Industry Association (TIA) Electronics Industry Association (EIA) general guidelines with modifications and clarifications provided below. EIA/TIA specifications can be purchased at http://www.tiaonline.org/standards/search_n_order.html. Please note that the specifications, physical plant, and inside planet components discussed below reflect objective architecture concepts that may or may not need to be adapted.

2.2 Workstation Outlet.

2.2.1 Outlet Box.

For standard administrative and medical facility (hospital) outlets use a 4-11/16" by 4-11/16" double gang electrical box mounted flush with the wall surface. Double gang electrical boxes shall be full-depth to provide dedicated space for current and possible future fiber optic cable installation. For single connector outlets, such as voice, data, cable television (CATV) or closed circuit television (CCTV), use a full-depth, single gang, electrical box mounted flush with the wall surface.

2.2.2 Outlet Faceplate.

For standard administrative outlets use a full (double gang) face plate with connector locations for all copper and (if used) fiber optic cable. Standard administrative outlets may, by specific user request, use single gang outlet faceplates in conjunction with a reducing ring. For single gang outlet boxes, use a single gang outlet faceplate with appropriate connector locations and, if required, mounting lugs for wall phones.

2.2.3 Outlet Connectors.

2.2.3.1 Copper Connectors.

Copper connectors shall be EIA/TIA Category 5e (Cat 5e), 8-pin/8-position insulation displacement terminations wired per T568A (default configuration) or T568B (if required to maintain system configuration uniformity, security or other user-specified reasons). Category 3 (Cat 3) rated connectors shall not be used in new construction or rehabilitation projects. Copper connectors and plugs shall be unkeyed unless the user requires keyed connectors and plugs to maintain system uniformity, security, or other user specified reasons.

2.2.3.2 Fiber Optic Connectors.

Fiber optic connectors shall be EIA/TIA "SC" type (default choice) or "ST" type (if required to maintain system configuration uniformity, security or other user specified reasons). EIA/TIA "SC" type connectors are preferred in new systems as the international standard now accepted by the Federal Government; "ST" type connectors are most commonly found in existing systems but as a design choice has been superseded by the "SC" type. Small form factor connectors (available from several manufacturers), offer a potential for significant installation cost reduction, however the EIA/TIA has declined to select any individual product for inclusion in the standards. Use of small form factor connectors that are recognized by EIA/TIA-568A may be used. The designer and user are cautioned that these connectors, while certified as meeting the

existing performance standards, are not yet standardized and are not interoperable. Small form factor connectors offer significant savings in space and potentially in equipment cost. The trade-off is that the user must be aware that the specific small form factor connector selected for a project may not be available in the future due to market conditions. A prudent action is to purchase sufficient spare small form factor connectors to protect against future non-availability.

2.2.3.3 Coaxial Connectors.
Coaxial connectors shall normally be "F" type connectors; use other type connectors (i.e.: BNC, etc.) only if specifically required by the user. The designer should coordinate with the cable service provider where franchise agreements are in place.

2.2.4 Outlet/Connector Markings.
Each communications outlet shall have a unique identifying number. In the telecommunications closet (TC), this unique identifying number shall be associated with the position on the patch panel or cross connect to which the outlet is connected. Each horizontal cable shall be labeled both at the outlet and patch panel or cross-connect position in the communications closet.

2.2.5 Outlet Types.
The following outlet types are identified as commonly used in military construction projects. Sketches of these outlets are included on Figure 2-5: Telecommunications Outlet Types.

a) Administrative Outlet. Two 8-pin modular (RJ45 type) connectors in a single or double gang outlet faceplate, one connector dedicated to voice use and one dedicated to data use.

b) Administrative w/Fiber Outlet. Two 8-pin modular (RJ45 type) connectors in a single or double gang outlet faceplate, one connector dedicated to voice use and one dedicated to data use, and two fiber optic connectors, dedicated to data use. Use of administrative outlets with fiber optic connectors is at specific user request for each project.

c) Medical Facility (hospital) Outlet. Two 8-pin modular (RJ45 type) connectors in a double gang outlet faceplate, one unkeyed, dedicated to voice use, one keyed or unkeyed, dedicated to data use, and two dedicated blank positions for fiber optic connectors. Use of keyed modular connectors for data and installation of fiber optic connectors is at specific user request for each project.

d) Furniture Outlet. Two 8-pin modular (RJ45 type) connectors in a modular furniture outlet faceplate with outlet box extender, one connector dedicated to voice use, and one connectors dedicated to data use. Connector voice and data dedication may be reassigned as requirements dictate. Use of modular furniture outlets with fiber optic connectors is at specific user request for each project.

e) Wall Outlet. One 8-pin modular (RJ45 type) connector in a single gang outlet faceplate with mounting lugs dedicated to voice use.

f) Special Outlet (FAX, Counter Top, etc.). Configuration generally similar to administrative or wall outlets but dedicated to special use and mounted at special heights usually defined by user (i.e., wall outlet mounted at 18'' (450mm) above finished floor, or administrative outlet mounted just above countertop level.)

g) Pay Phone Outlet. One 8-pin modular (RJ45 type) connector in a single gang outlet faceplate with mounting lugs dedicated to voice use.

h) Barracks Outlet. One 8-pin modular (RJ45 type) connector in a single gang outlet faceplate, dedicated to voice use.

i) Barracks Outlet (TRADOC Schools). Two 8-pin modular (RJ45 type) connectors in a single gang outlet faceplate, one dedicated to voice use and one dedicated to data use.

j) Barracks Outlet (Combination). One 8-pin modular (RJ45 type) connector in a single gang outlet faceplate, dedicated to voice use, and one "F" type connector, dedicated to CATV or CCTV use.

k) Coaxial Cable Outlet. One "F" type connector, dedicated to CATV, CCTV or other video or data use.

l) User Defined Outlet. Number and type of connectors as defined by user.

2.2.6 Outlet Density.

For planning purposes, when actual outlet locations are not known and cannot be determined with available information, reasonably accurate total outlet count estimations can be obtained based on the size and dedicated usage of the space. Calculations are based on gross square footage (overall building footprint without deducting for hallways, equipment rooms, restrooms, etc.), and the average outlet density for that specific category of facility space. See Figure 2-8: Typical Floor Plan for a typical building floor plan. Currently, ten categories of facility space are routinely identified within MILCON, each with its assigned average outlet density (SF per outlet). These factors are derived from consideration of EIA/TIA 569A and other U.S. Army requirements.

	Facility Space Category	Area (SF) per Outlet
a.	Administrative Space (Shown on PDS-0002)	80
b.	High Density	50
c.	Laboratory/Technical Space	100
d.	Clerical	140
e.	Barracks Space	315
f.	Medical/Clinic Space	80
g.	Classroom Space	80
h.	Warehouse Space	5000
i.	Other Space	500
j.	Army Family Housing Units	See Below

For Army Family Housing (AFH) Units, the number of rooms in the AFH unit determines minimum outlet quantities. In general provide one telephone outlet and one CATV outlet (as a minimum) in each of the following rooms: kitchen, living room, dining room, family room/area, each bedroom, and any other logical location deemed appropriate.

2.3 House Wiring

2.3.1 Horizontal Cable

2.3.1.1 Copper Voice and Data.

Two CAT5e 4-pair 24 American Wire Gauge (AWG), 100 ohm, solid, unshielded twisted pair (UTP) cables shall be installed to each standard dual connector outlet and one CAT5e, 4-pair 24 AWG, 100 ohm, solid, UTP cable shall be installed to each single connector outlet. Use only cable that has passed the Underwriters Laboratory (UL) LAN certification program, and is

labeled with UL acceptable markings. Termination shall be performed using an 8-pin (RJ45 type) connector. All terminations shall be wired in accordance with EIA/TIA T568A. In a standard cabling scheme, horizontal cables are arbitrarily designated "voice" and "data" to identify and differentiate their purpose. Each voice outlet shall be assigned a unique telephone number in accordance with the single-line concept.

2.3.1.2 Fiber Optic Data.
Fiber optic cable to each outlet is optional at specific user request. As a minimum, administrative (including hospital) outlet boxes and faceplates shall be sized and configured to allow for the future installation of two strands of fiber optic cable. When the user requires fiber optic cable, multimode 62.5/125-micron cable shall be installed using duplex "SC" type connectors (see paragraph 2.2.3.3 for discussion of fiber optic outlet connectors). Single-mode fiber optic cable and other type connectors may be substituted as required by the user. Plenum cables should be specified when required.

2.3.2 Cable Length.
Copper data cable length shall be limited to 295 feet from patch panel termination in the TC to the data outlet termination in accordance with EIA/TIA 568A. For planning purposes, in most administrative buildings where the TC is centrally located, assume an average of 120 feet of cable from the TC to each outlet. For non-administrative buildings (example: barracks), building renovations, or where the TC is not centrally located, adjust the average cable length for planning purposes as required (i.e., average measured length).

2.3.3 Vertical Riser Cable

2.3.3.1 Copper.
Multi-pair voice riser cable shall meet the requirements of Insulated Cable Engineers Association (ICEA) S-80-576 and EIA/TIA-568-A for Cat 3 100-Ohm unshielded twisted pair cable. Conductors shall be solid un-tinned copper, 24 AWG. The voice riser cable originating in the main telecommunications closet (TC) or main cross connect shall be terminated in each TC on 110 type punch blocks mounted on the telephone backboard. Provide at least two riser cable pairs for every outlet connected to the TC served by the riser cable. Plenum cables should be specified when required. ICEA specifications are listed, and can be purchased at http://global.ihs.com/.

2.3.3.2 Fiber Optic.
A minimum of 12 strands of 62.5/125-micron multimode fiber optic cable shall be installed between the main telecommunications closet or main cross connect and each TC. The data fiber optic cable riser shall be terminated in a patch panel installed in an equipment rack or cabinet. If requested by the user, 12 strands of single mode fiber optic cable may also be used. The designer should note that the network architecture recommends single mode fiber optic cable between TCs. Plenum cables should be specified when required.

2.3.4 Coaxial Cable.
When CATV or CCTV requirements are identified, either a 75-ohm broadband coaxial cable or single-mode fiber optic cable system shall be installed. When a coaxial system is installed, care shall be taken to ensure the correct cable is used. The designer should coordinate with the cable service provider where franchised agreements are in place. The table below lists cable type with corresponding distance limitation. This table is derived from vendor specifications (Anixter) for coaxial cable.

Cable	Distance
RG-59	<=150 feet
RG-6	<=250 feet
RG-11	<=400 feet

2.3.5 Building Infrastructure.
See Figure 2-2: Telecommunications Closet/Premise Distribution and Figure 2-3: Telecom Room/Supporting Structures for details.

2.3.5.1 Cable Tray.
Solid-bottom or slotted-bottom cable tray shall be used to provide a centralized cable management/distribution system. See Figure 2-2: Telecommunications Closet/Premise Distribution for details. Provide a cable tray with one square-inch of cross-sectional area per outlet location to be served. [For 30 outlets – a 9” by 4” = 36 square-inches cable tray would be satisfactory.] During actual design, an optimal fill ratio of 40% shall be planned for; under no circumstances shall the fill ratio exceed 60%. Ladder cable tray shall be avoided.

2.3.5.2 Enclosed Duct (Raceway).
When a building design does not provide for installation of cable tray, enclosed square duct may be installed. Enclosed duct may also be used in place of cable tray when cable plant requires physical security. For initial design guidance, provide 1 square inch of cross-sectional area of the enclosed duct per outlet location. During actual design, an optimal fill ratio of 40% shall be planned for; under no circumstances shall a fill ratio of 60% be exceeded.

2.3.5.3 Conduit.
Electrical metallic tubing (EMT) conduit shall be installed from the cable’s backbone distribution system, whether cable tray or enclosed duct, to each outlet. Conduit for standard outlets shall be a minimum of 1-inch EMT conduit. When cable tray or enclosed duct is not used, individual conduits shall be installed from the TC to each outlet. Where fiber optic cable is not initially installed to the standard dual connector outlets, a pull line shall be installed in each conduit. An optimal conduit fill ratio of 40% shall be planned for; under no circumstances shall a fill ratio of 60% be exceeded. Note: Use of cable tray and/or enclosed duct (raceway) is a significant cost saver.

2.3.5.4 Pull Cord.
All empty conduit routed to outlet boxes shall be provided with a pull cord. All 1-inch conduit containing only copper communications cabling routed to administrative and hospital outlet boxes shall be provided with a pull cord for future installation of fiber optic cable.

2.3.5.5 Pull Boxes.
Pull boxes shall be placed in conduit runs where a continuous conduit length exceeds 100 feet, or where there are more than two 90-degree bends. Pull boxes shall be placed in straight, aligned runs of conduit and not be used in lieu of a bend.

2.3.5.6 Systems Furniture Wiring.
The use of interconnected Systems Furniture has become more prevalent in the current office environment, and presents some unique challenges for the telecommunications designers and implementers. Although systems furniture is designed for quick reconfiguration of office space,

experience has shown that power and telecommunications connections within the system furniture cannot be reconfigured easily.

2.3.5.6.1 Direct Connection.
Figure 2-6: Systems Furniture Wiring shows two possible solutions for direct wiring to the systems furniture. This concept is one of a continuous home run from the TC to the furniture outlet. Continuous runs allow flexibility in cabling. Testing of the installed cable plant is simplified by providing an end-to-end circuit, without an additional connection point.

2.3.5.6.2 Multi-User Telecommunications Outlet Assembly or Consolidation Point.
TIA/EIA TSB 75, Additional Horizontal Cabling Practices for Open Offices, allows for Multi-User Telecommunications Outlet Assembly (MUTOA) or Consolidation Point (CP). These options provide greater flexibility in an office that is frequently reconfigured, but do introduce an additional connection and point of loss. If the MUTOA or CP is used, it shall be sized to support the number of users in the area plus 25%.

2.3.5.6.3 Protection and Separation.
The implementers shall ensure that the cable is protected at all transition points, and that metallic separation is provided between telecommunication and power wiring in the power pole and/or systems furniture track.

2.3.5.7 Optional PDS Items.
See Figure 2-7: Supporting Structure for Renovations for details. In new construction, particularly in large administrative or medical facility buildings, cable distribution systems shall use the cable tray (or duct) and conduit systems as described. In new construction involving small, mixed use (non administrative) facilities, or construction projects involving renovation of existing buildings, use of “J” hooks, flexible cable tray, and alternative support systems specifically certified for CAT5e cable is permissible. Polyvinyl Chloride (PVC) surface mounted duct shall be used in renovation projects where access to the walls for installation of conduit and outlet boxes is not possible, or where historical requirements prohibit the alteration of the building structure.

2.4 Telecommunications Closet.
See Figure 2-2: Telecommunications Closet/Premise Distribution, Figure 2-3: Telecom Room/Supporting Structures, and Figure 2-4: Small Building/Premise Distribution for sample closet layouts.

2.4.1 Multi-Story Buildings.
In multi-story buildings, a minimum of one TC shall be located on each floor (small facilities, i.e., air traffic control towers, firing ranges, etc., may use one TC for the entire facility). TCs on successive floors shall be vertically stacked wherever possible. A minimum of three 4-inch rigid steel conduits shall be installed between stacked closets on successive floors, in accordance with EIA/TIA 569A.

2.4.2 Closet Sizing.
TCs shall be sized in accordance with EIA/TIA 569A for all new construction projects with primarily administrative function (small mixed-use facilities shall not require full compliance with EIA/TIA 569A). Generally, the TC shall be sized to approximately 1.1% of the area it serves. When a higher than normal outlet density is required in the facility, the TC size shall be increased to support the additional termination equipment. For the normal case, a 10,000 square

foot area shall be served by a minimum of one 110-square foot TC. TC sizing allowances shall be made only in cases of construction projects involving building renovation, and under no circumstances shall a closet be smaller than 70 square feet (7’ x 10’).

2.4.3 Closet Interior Finishes.
Floors, walls and ceilings shall be treated to eliminate dust. Finishes shall be light in color to enhance room lighting.

2.4.4 Closet Door.
TC doors shall be a minimum of 36” wide, 80” tall, hinged to open outward (or slide side to side) and be fitted with a lock to control access to the room.

2.4.5 Closet Location.
TCs should be dedicated spaces not shared with other functions (i.e., electrical rooms, mechanical rooms, etc). TCs shall be located centrally in the area they serve. TCs should be located such that maximum copper cable distance from the patch panel through the structured cabling system to the furthest outlet does not exceed 295 feet. In rehabilitation projects, rooms containing transformers, air handling units, etc., shall be avoided if at all possible.

2.4.6 Telephone Backboards.
See Figure 2-2: Telecommunications Closet/Premise Distribution and Figure 2-4: Small Building/Premise Distribution for sample backboard layouts. In new construction and in existing renovation when possible, telephone backboards shall cover a minimum of two walls in the TC. Backboards shall be ¾-inch thick and 96 inches tall, finished with a fire resistant coating (or be rated as fire and smoke resistant) and rigidly attached to the wall to support all attached equipment. When renovating an existing closet that does not have adequate space, the backboard shall be sized as large as possible to accommodate the protected entrance terminal (PET) and 110-type blocks.

2.4.7 Equipment Racks. Equipment Racks.
Equipment racks shall be floor mounted 19 inches wide located at or near the center of the TC to allow for the 24-30 inches overhang of installed equipment while leaving sufficient walking space behind the rack. If mounting requirements for oversize equipment are anticipated, 23 inches may be substituted. In narrow or crowded closets, equipment racks may be floor mounted adjacent to a wall, but shall provide a minimum 36 inches space both in front and in back of the rack.

2.4.8 Equipment Cabinets.
Equipment cabinets shall be used to mount secure or mission critical equipment or in circumstances where controlled access is desired, such as CATV or CCTV distribution in barracks. Cabinets shall provide, at a minimum, sufficient space for current and anticipated future equipment requirements. Equipment cabinets may be floor or wall mounted and shall be logically grouped based on the purpose of the equipment they enclose.

2.4.9 Cable Rack.
Channel type cable rack shall be used in the TC to provide distribution between the telephone backboard, equipment racks, riser conduits, and the distribution cable tray.

2.4.10 Closet Lighting.
Light fixtures shall be mounted a minimum of 102 inches above the finished floor and provide a minimum of 50 foot candles of illumination measured 39 inches above the finished floor.

2.4.11 Closet Climate Control.
Each TC shall be independently climate controlled, capable of providing cooling year round (24 hours/day, 365 days/year) to protect all installed electronic equipment. Rooms shall be provided with positive atmospheric pressure to exclude dust.

2.4.12 Closet Contaminants.
Information system equipment shall not be installed in spaces where moisture, liquid or gaseous spillage, or other contaminants may be present.

2.4.13 Electrical Power.
A minimum of two dedicated 15-ampere, 110-volt alternating current (AC) outlets shall be installed with each equipment rack or cabinet to provide power for the installed equipment. An additional outlet shall be placed on each wall in the telecommunications closet.

2.4.14 Voice Communications.
Each TC shall have one wall mounted telephone installed at or near the entry door.

2.4.15 Grounding.
All TCs shall be connected to a single point building ground in accordance with EIA/TIA 607.

2.5 Cable Terminations. See Figure 2-1: Premise Distribution.

2.5.1 Copper Termination.
All copper distribution cable used for voice or data circuits shall be terminated at the TC on 110-type (or similar) CAT5e compliant termination panels mounted in an equipment rack (very small installations, i.e., one or two phones, can use a EIA/TIA Category qualified block).

a) Voice and data cables shall normally be terminated on the same patch panel or block and individually identified. Note: in the standard cabling scheme, the designations “voice” and “data” are arbitrary and do not imply that one outlet is better than the other – the outlets are identical in capability.

b) Where physical security is required, or by specific user request, data cable may be terminated in an enclosed 19-inch cabinet to provide enhanced protection for terminations, data equipment, and patching.

2.5.2 Copper Voice Patch Cables.
Voice patch cables shall have a standard 8-pin/8-position (RJ45 type) connector on one end and a termination compatible with the incoming voice circuit block or panel on the other end. There is no requirement for voice patch cable to be CAT5e compliant.

2.5.3 Copper Data Patch Cables.
Data patch cables shall be factory assembled 4-pair, stranded UTP, 24 AWG, CAT5e cable.

2.5.4 Fiber Optic Termination.
All fiber optic distribution cable shall be terminated in rack- mounted patch panels. Duplex patch cables shall be used. Where required, and if space allows, all fiber optic cable shall be terminated in an enclosed 19-inch cabinet to provide greater protection for terminations, data equipment, and patching

2.5.5 Fiber Optic Patch Cables.
Fiber optic patch cables shall be factory assembled using the same fiber optic cable type and connectors as the patch panels they are interconnecting.

2.6 Telecommunications System Labeling.

2.6.1 Outlet/Patch Panel Labeling.

The telecommunications systems labeling shall be done in accordance with TIA/EIA 606. All outlets and patch panel positions shall be labeled as to their function and with a unique identifier code. All devices, outlet locations, and designations shall also appear on the system drawings. As a minimum the following shall be reflected in the outlet/patch panel labeling:

a) Security Level (if applicable).
b) Room Number.
c) Alpha or Numeric Designator.
d) Labeling shall be a minimum of ¼-inch high.

2.6.2 Conformance to Existing.

The labeling system used shall conform to any existing labeling, to the Director of Information Management (DOIM) standard or, if neither exists, to the method described above. All designations shall be done in standard commercial labeling. Handwritten labels shall not be used for the final configuration.

2.6.3 Telecommunications Outlet Labeling.

Outlet labeling shall be done in accordance with TIA/EIA-606. Each outlet location shall be labeled with a unique designator and level of classification, in sequence starting with “A” or “1” and proceeding clockwise around the room. The left 8-pin (RJ-45 type), CAT5e compliant connector shall be designated for voice and be labeled "VOICE." The right 8-pin (RJ-45 type), CAT5e compliant connector shall be designated for data and be labeled "DATA.” All LAN components in the system shall also be labeled with similar designations in accordance with TIA/EIA 606. The left or top 568SC fiber optic cable shall be labeled "A" and the right or bottom 568SC fiber optic cable shall be labeled "B."

2.6.4 Telecommunications Patch Panel Labeling.

Patch panel labeling shall be done in accordance with TIA/EIA 606. Each position shall be labeled with a unique designator corresponding to the outlet location. The top or left 8-pin (RJ-45 type), CAT5e compliant port for each outlet location shall be designated for voice and be labeled "VOICE." The bottom or right 8-pin (RJ-45 type), CAT5e compliant port for each outlet location shall be designated for data and be labeled "DATA." Fiber-optic port labeling shall be done in accordance with TIA/EIA 606. The left or top 568SC port shall be labeled "A." The right or bottom 568SC port shall be labeled "B."

2.6.5 Distribution System Labeling.

The distribution system should be labeled as described in EIA/TIA 606 for pathways. In addition all transitions and changes in distribution system size and type shall be labeled. Each cabinet shall be labeled at the top with a unique designation.

2.7 Edge Device for Building.

Power and possibly heating, ventilation, and air-conditioning (HVAC) must be available or obtainable before any equipment is considered.

2.7.1 Selection of Equipment.

Selection of an edge device for an end user building (EUB) shall be based on the approved list of network devices, proposed or existing network architecture for that location and the user

requirements. Additional considerations for selecting edge devices are whether the device supports LAN Emulation (LANE) and Multi-Protocol Over ATM (MPOA), and which versions of each are supported.

2.7.2 LAN Connectivity and Characteristics.
Defense Data Network (DDN) hosts, mini or mainframe computers, e-mail hosts, and departmental LANs located within EUBs shall be directly connected to the network backbone via the appropriate adapter cards in the ATM edge devices and an interface located in the TC. Area Distribution Nodes (ADNs) shall also house one-armed routers and LANE service devices when required for support of legacy LANs.

2.7.3 Connection to ADN/Main Communications Node (MCN).
The edge device located in the EUB TCs shall connect to the ATM switch at the ADN or MCN via OC-3c or higher links. The designer shall ensure that the edge device is fully compatible with the data switches in the ADN/MCN (LANE and MPOA).

2.8 Building Entrance Facility.

2.8.1 Definition.
The building entrance facility (equipment room) is the demarcation point between the outside plant cabling and the inside plant distribution cabling.

2.8.2 Protected Entrance Terminals (PETs).

2.8.2.1 Protector Modules.
The PET shall be equipped with gas modules to protect the inside plant wiring and equipment from power surges.

2.8.2.2 Copper Termination.
Twisted pair outside plant cable is terminated on the PET. See Figure 2-2: Telecommunications Closet/Premise Distribution for details. Cross-connects can then be placed from the PET to the first set of 110-type terminal blocks as needed. The first set of terminal blocks provides connection for all risers and for outlets served by the main TC. For example, in a three-floor building, one tie cable shall be terminated on 110-type blocks on the same backboard as the PET; one tie cable shall be terminated on 110-type blocks in the 2nd-floor TC; and one tie cable shall be terminated on 110-type blocks in the 3rd-floor TC. A tie cable connects a second set of 110-type blocks in each TC to a rack mounted, 8-pin (RJ45 type) connector voice patch panel. This panel can be patched to the distribution patch panel, which in turn terminates the CAT5e outlet wiring. Cross-connects can be done by the DOIM/Telephone personnel, and jumpers can be installed by the user/Information Mission Area (IMA) department, providing the desired connectivity between the outside plant and the inside plant wiring. This design allows maximum flexibility for future moves, adds, and changes.

2.8.2.3 Sheath Limitations.
If the outside plant (OSP) sheath distance from the building entrance point to the PET location is greater than 50 cable feet; the use of EMT is required.

2.8.2.4 Stencils.
All PETs shall be stenciled with the terminal number and cable count.

2.8.3 Fiber Termination Device.
Outside plant (OSP) fiber optic cables are terminated on optical patch panels. The inside plant fiber optic riser cables are terminated on optical patch panels in the same or adjacent equipment racks. Patch cables are connected between the patch panels to provide the desired connectivity. All patch panels shall be stenciled with the panel number and the cable count.

2.8.4 Placement of Electronics.
Electronic equipment shall not be placed in boiler rooms or other environmentally unsound locations. Common-user telecommunications equipment may be installed in the building entrance facility; however, many building entrance facilities do not have the environment control to support the operation of electronic communications equipment. If the building entrance facility does not have environmental control, the electronics shall be installed in the primary TC.

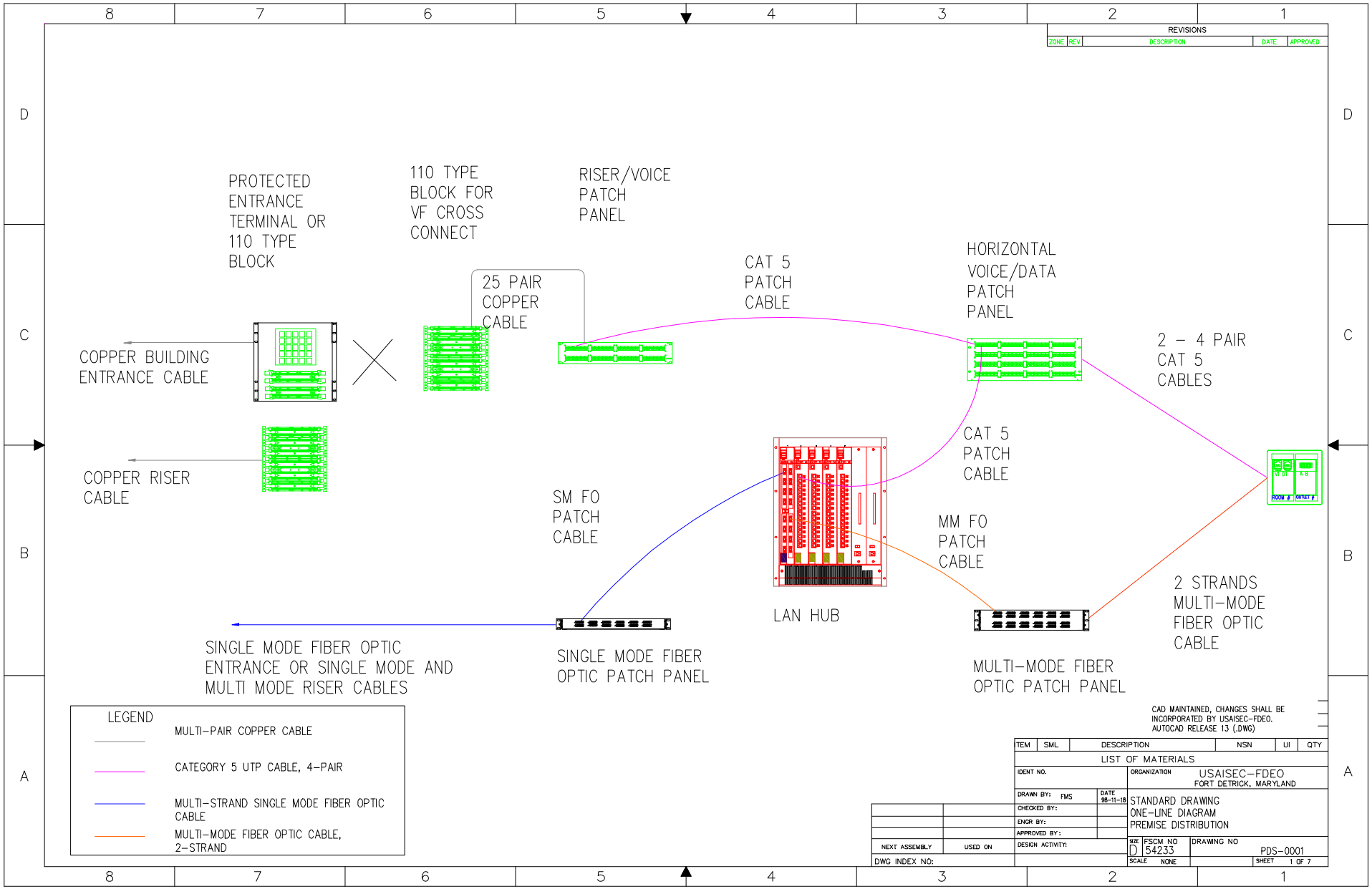


Figure 2-1: Premise Distribution

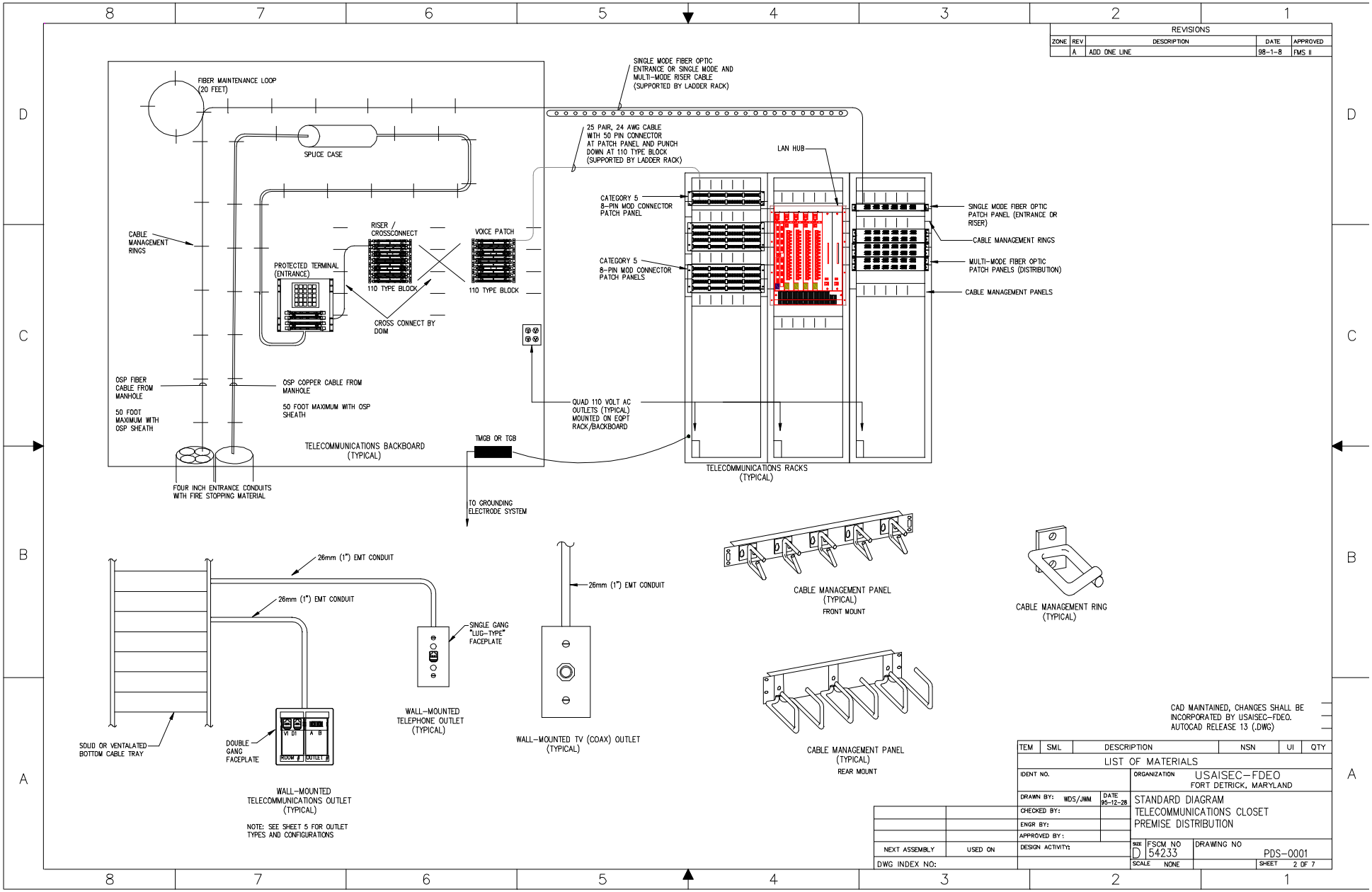


Figure 2-2: Telecommunications Closet/Premise Distribution

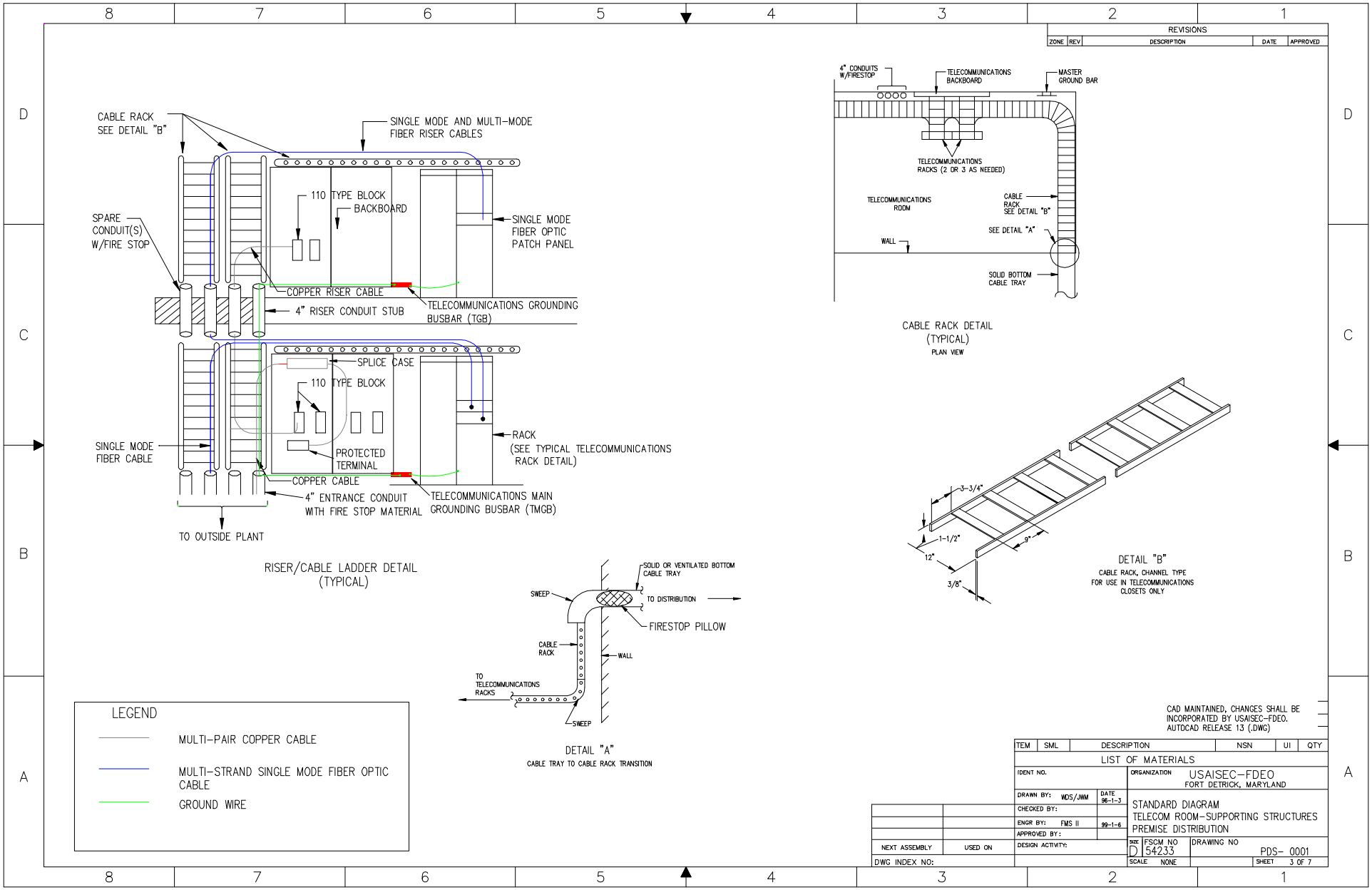


Figure 2-3: Telecom Room/Supporting Structures

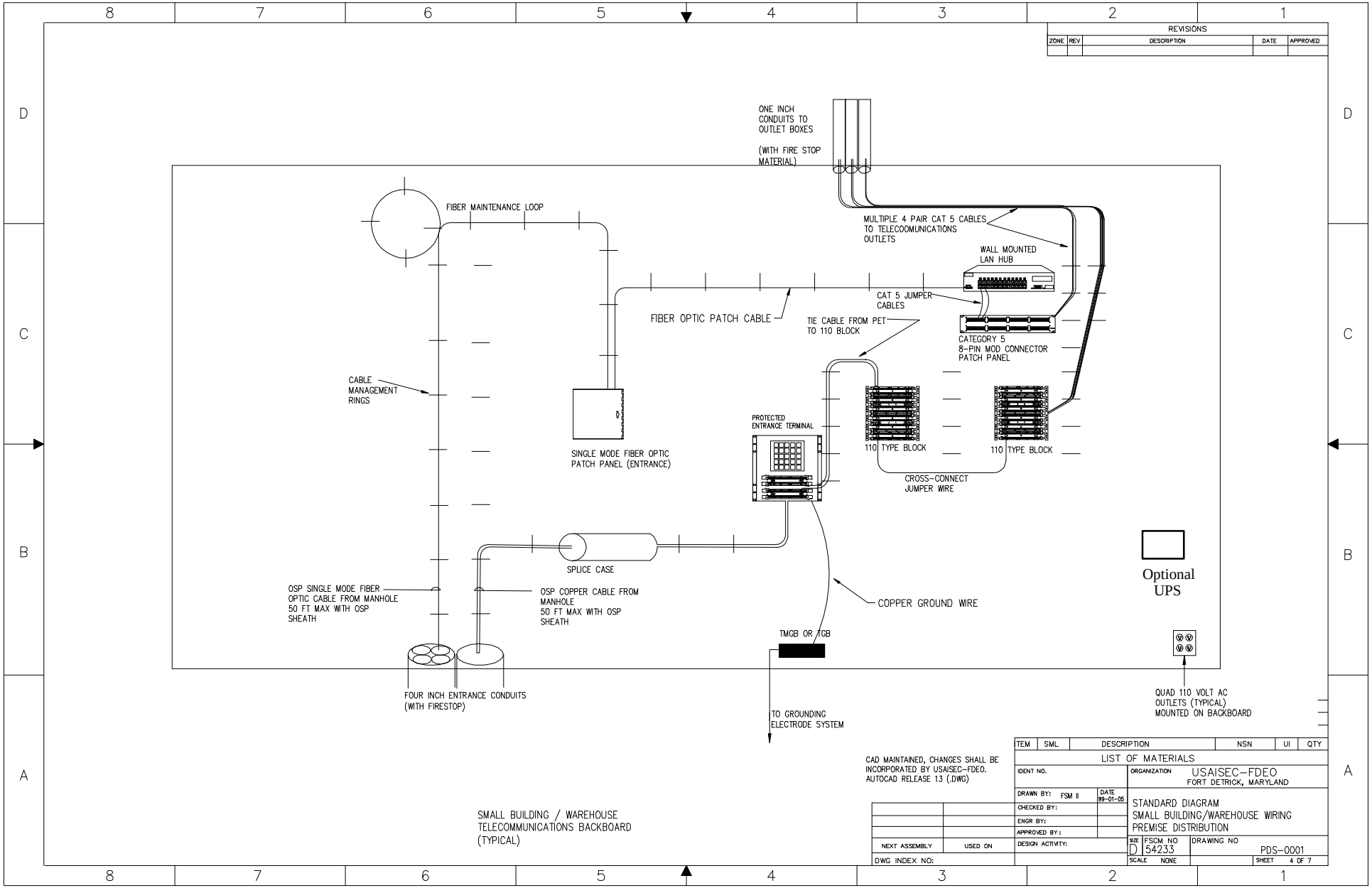


Figure 2-4: Small Building/Premise Distribution

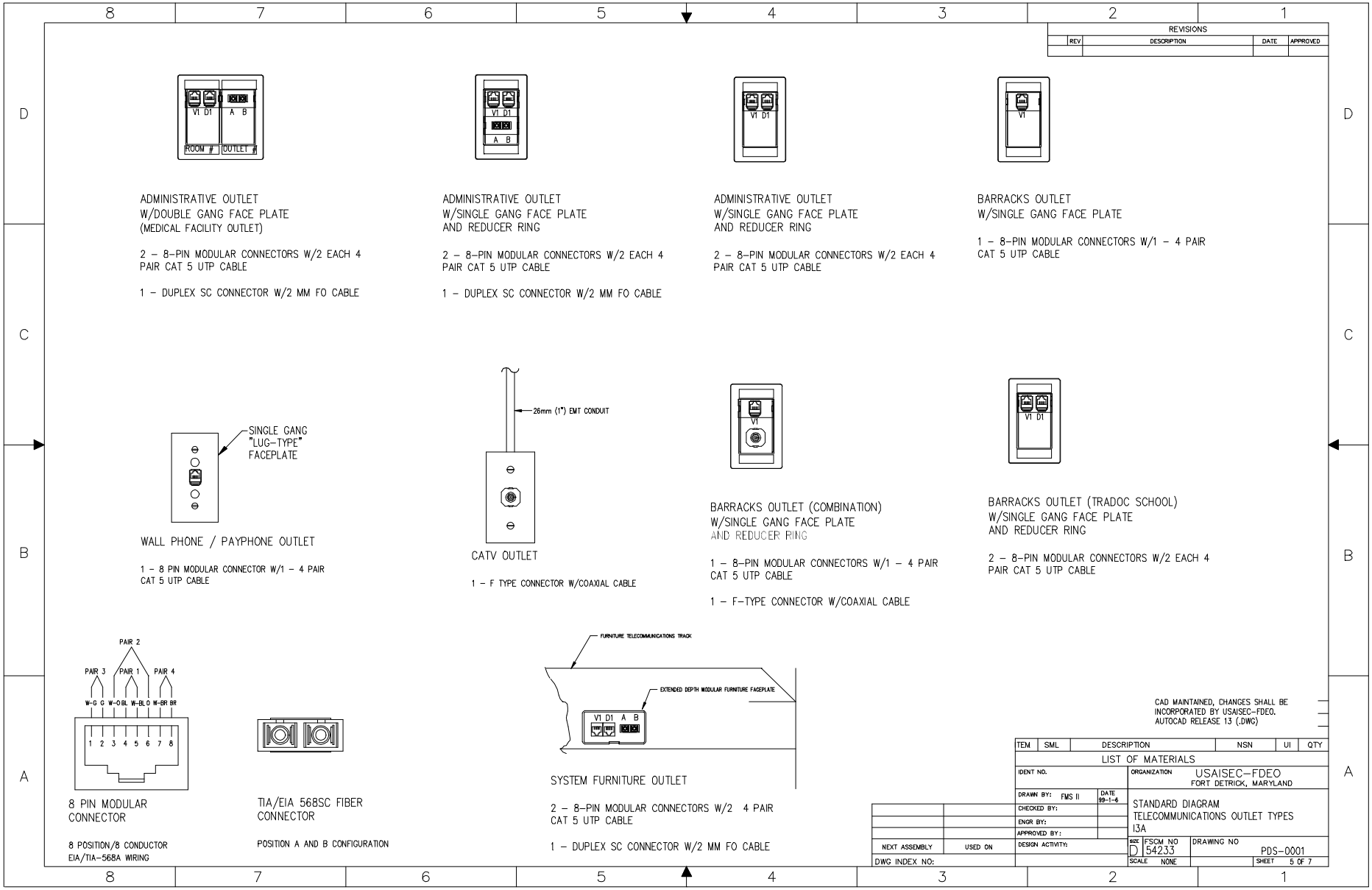


Figure 2-5: Telecommunications Outlet Types

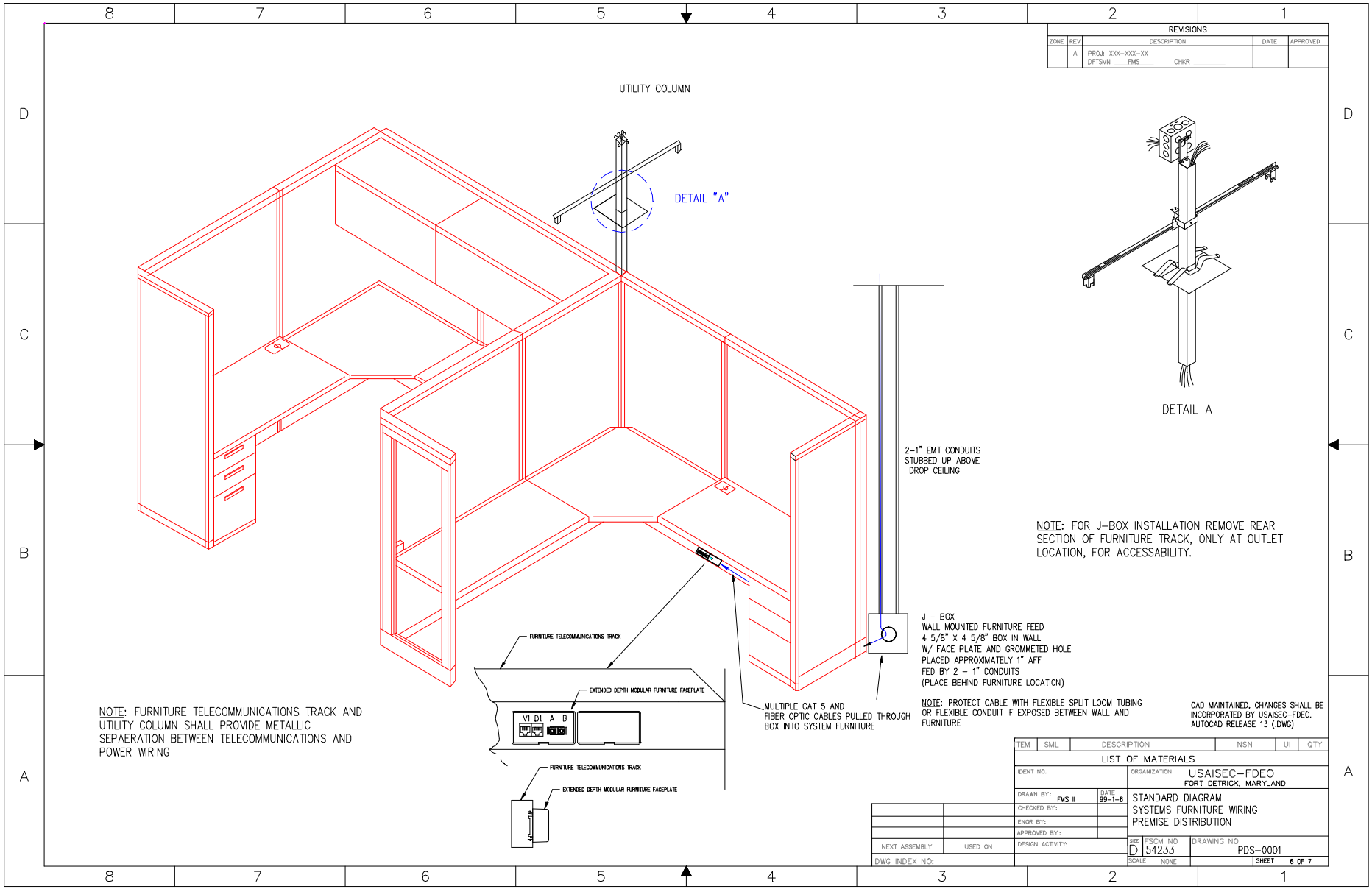


Figure 2-6: Systems Furniture Wiring

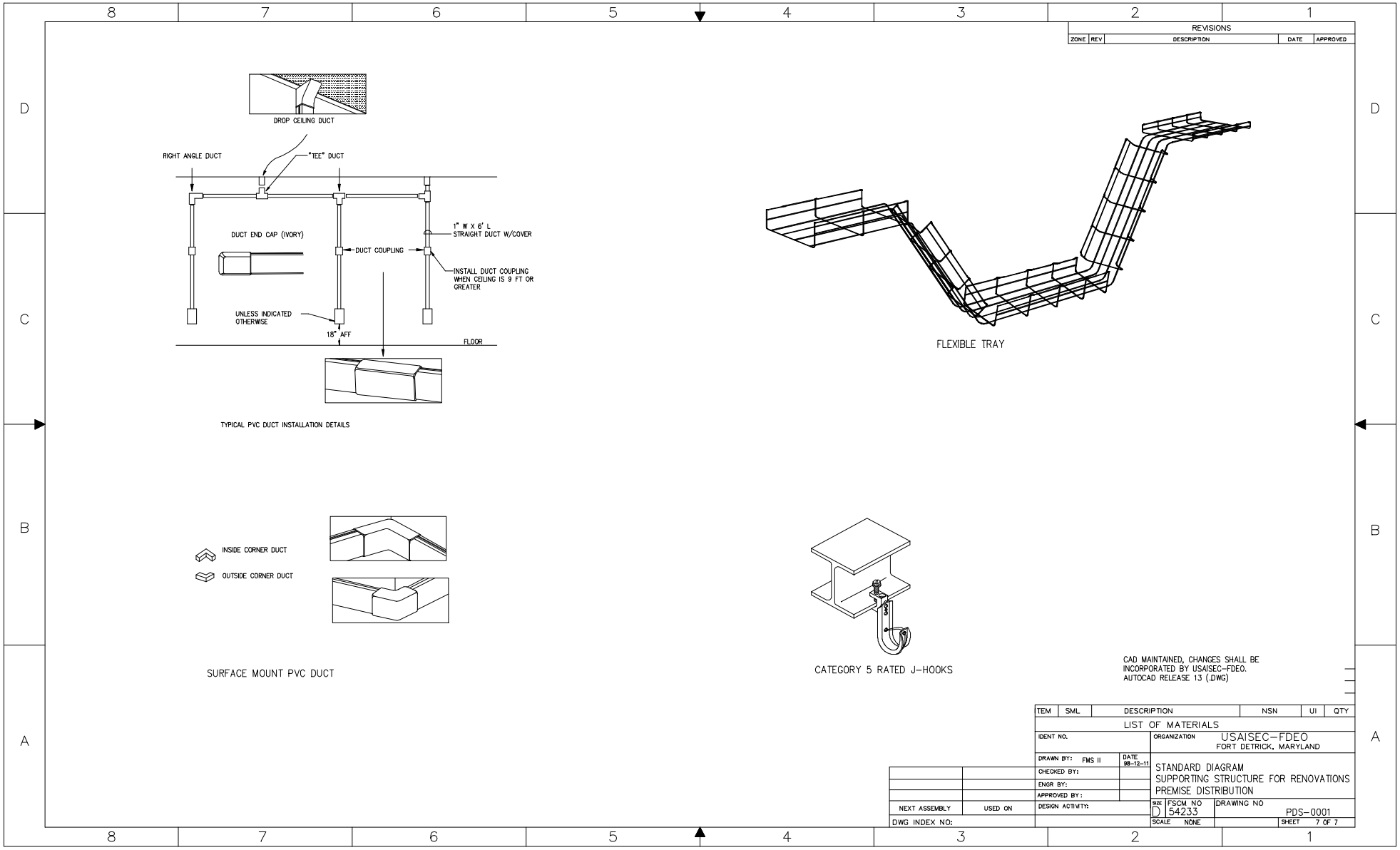


Figure 2-7: Supporting Structure for Renovations

▼ TELECOMMUNICATIONS OUTLET, DUAL 8–PIN MODULAR CONNECTOR WITH DUPLEX SC FO CONNECTOR, MOUNTED 18" AFF

F▼ SYSTEMS FURNITURE TELECOMMUNICATIONS OUTLET, DUAL 8–PIN MODULAR CONNECTOR WITH DUPLEX SC FO CONNECTOR, MOUNTED ON FURNITURE CUMMUNICATIONS TRACK

W▼ WALL/PAY PHONE OUTLET, SINGLE 8–PIN MODULAR CONNECTOR WITH LUG TYPE FACEPLATE, MOUNTED 48" AFF

J – OPEN BOXES WITH COVERS (2 EA. 4 5/8" x 4 5/8" x 4" DEEP) ONE FOR POWER ONE FOR COMMUNICATIONS. MOUNTING HEIGHT 3" AFF.

J1 – 2 EA. 4 5/8" x 4 5/8" x 4" DEEP (ONE FOR POWER ONE FOR COMMUNICATIONS) BOXES WITH SHORT FLEX CABLE TO CONNECT TO SYSTEMS FURNITURE. MOUNTING HEIGHT 3" AFF.

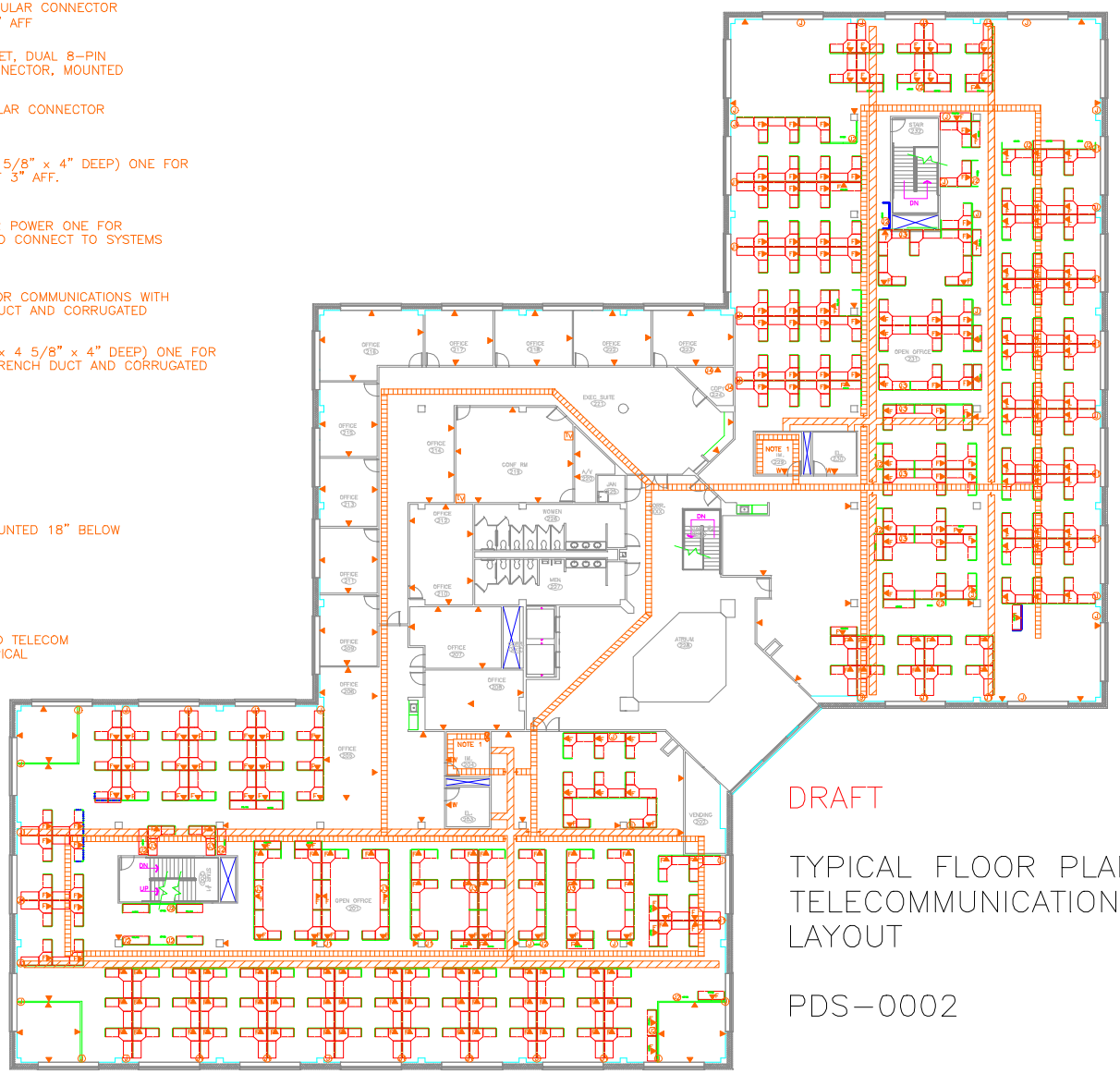
J2 – FLOOR BOX (4 5/8" x 4 5/8" x 4" DEEP) FOR COMMUNICATIONS WITH 4 EA. RJ45 TELEPHONE TERMINATIONS VIA TRENCH DUCT AND CORRUGATED METAL DUCT.

J3 – FLOOR PULL THROUGH J–BOX (2 EA. 4 5/8" x 4 5/8" x 4" DEEP) ONE FOR POWER ONE FOR COMMUNICATIONS CONNECTED VIA TRENCH DUCT AND CORRUGATED METAL DECK.

TELECOMMUNICATIONS CABLE TRAY

TV CATV OUTLET, SINGLE "F" TYPE CONNECTOR, MOUNTED 18" BELOW DROP CEILING

NOTE: REFERENCE TELECOMMUINCATIONS CLOSET AND TELECOM ROOM – SUPPORTING STRUCTURE DRAWINGS FOR TYPICAL TELECOMMUNICATIONS ROOM LAYOUT



DRAFT

TYPICAL FLOOR PLAN
TELECOMMUNICATIONS
LAYOUT

PDS–0002

Figure 2-8: Typical Floor Plan

3 Outside Plant.

An overall schematic for OSP sizing of duct and cable is provided in Figure 3-3: OSP Infrastructure Standards. Much of the OSP work references Rural Electrification Administration (REA) or Rural Utilities Service (RUS) standards. The REA has been reorganized to form the RUS. Most documents with the RUS prefix are available in electronic format; however, those documents with the REA prefix may not be available in electronic format. As the documents are digitized, a new RUS number is assigned (http://www.usda.gov/rus/telephone/regs/regs.shtml).

3.1 Environmental and Historical Considerations.

3.1.1 Special Considerations.

Most military installations have areas that may be affected by environmental, historical, or archeological matters. Environmental hazards may include toxic waste, fuel spillage/leakage, asbestos, unexploded ordinances, etc. Wildlife preservation may be another area of concern at some sites. Compliance with historical restrictions will require special engineering considerations (type of exterior facing, mounting of terminals, placement of pedestals, etc.).

3.1.2 Price of Conformance.

Although these issues may not appear to have a high impact on the engineering solution, the price of conformance to site restrictions may add considerable cost to the project. Special conditions should be discussed with the DOIM and agreements documented.

3.2 Construction/Installation Alternatives.

3.2.1 General Installation.

3.2.1.1 Road Crossings.

The cable route should be planned to cross the road only as necessary to serve subscribers without the use of aerial inserts. Such crossings could be constructed by cutting or sawing perpendicularly across the road, by trenching perpendicularly across the road, by directional boring under the road, or by pipe pushing under the road. Since road crossings are often undesirable and expensive, construction route planning personnel should select the side of the paved road for the most general routing of the cable, which will result in the fewest crossings.

3.2.1.2 Right-of-Ways.

Permission should be obtained from Department of Transportation authorities at locations where public right-of-ways are used. Possible highway improvements, such as road widening, should be considered in planning the construction route. Future roadwork can result in costly telecommunications plant rearrangements or relocations. Additional lead-time is required to obtain permission for public right-of-ways. Detailed drawings showing proposed route, depths, and other pertinent information are required and should be furnished to the approving authorities for review far in advance of anticipated installation. Alternate designs should be explored in case the right-of-way is denied.

3.2.1.3 OSP Cable Placement Options.

Underground (concrete encased manhole and duct) system should be used for placement of outside cable plant in new construction and rehabilitation, within the site cantonment areas, unless otherwise specified. Manhole and duct should be utilized in accordance with the RUS bulletins within congested areas, under all vehicle crossings, around sweeps, bends and utilities,

etc. Direct buried and aerial cable plant systems should not be used except for range cables or other long runs through undeveloped areas, in cases where underground systems cannot be installed or in conformance to local mandates.

3.2.2 Underground (Manhole/Duct).
Supporting documentation for design and construction of manhole and duct is found in RUS Bulletin 1751F-643/RUS Form 515C (http://www.usda.gov/rus/telephone/regs/1751f643.htm), RUS Bulletin 1751F-644 (http://www.usda.gov/rus/telephone/regs/1751f644.htm), REA Bulletin 345-151, and TIA/EIA-758, Customer Owned outside Plant Telecommunications Cabling Standard.

3.2.2.1 Manholes.
See Figure 3-6: Manhole Typical for additional details.

3.2.2.1.1 Types.
Typical manhole size should be 12 feet (L) x 6 feet (W) x 7 feet (H). Precast, multidirectional manholes should be used. Splayed manholes would be beneficial (near MCN/ADN where large cables are engineered) and future duct expansion is expected. See Figure 3-6: Manhole Typical for a butterfly schematic of a typical manhole.

3.2.2.1.2 Oversized Manholes for Route Diversity Splicing.
To avoid catastrophic loss of service in case of building destruction, fibers providing physical route diversity should not be routed through the MCN or ADNs. These cables should be spliced in the manhole and routed to their ultimate destination without entering the MCN/ADN. The manhole placed outside an MCN/ADN should be oversized to allow for this additional splicing.

3.2.2.1.3 Basic Layout.
Measurements between manholes are from lid to lid (center-to-center (CC)). Measurements from manholes to buildings, to pedestals, riser poles, etc. are from the manhole lid to the outside wall, bottom of pole, etc. (center-to-point (CP)). New manholes should be placed to support the locations of junction points, offsets, load points, and curvature in the duct line. New manholes should be placed 600 feet apart. However, consideration should be given to varying this distance to make maximum use of the duct system. For example, if increasing or shortening the distance by 100 feet will allow installation of the ducts to avoid a building or other obstruction in the intended path, then the adjustment should be made if it does not violate the cable reel lengths or pulling tension for the cables to be installed.

3.2.2.1.4 Accessories.
Each new manhole should be equipped with a sump, pull irons, ground rod, bonding ribbon, cable racks and hooks.

3.2.2.1.4.1 Sump.
A sump should be cast into the floor of the manhole. The floor should slope toward the sump to provide drainage from all areas into the sump. The sump should be approximately 13 inches square and 4 inches deep, equipped with a plugged drain, and covered with a removable perforated or punched-steel plate to permit drainage. The cover should be fastened to the housing by a chain or a hinge.

3.2.2.1.4.2 Pull Irons.
Cable pull irons should be installed on the wall opposite each main conduit entrance location 3-1/2 inches to 9 inches from the floor of the manhole in line with the conduit entrance. The pull irons should be placed and embedded during the construction of the manhole wall.

3.2.2.1.4.3 Ground Rod.
A 5/8-inch by 8-foot galvanized steel ground rod should be installed in the floor of each manhole placed under each effort. Four inches of the rod, plus or minus 1/2 inch, should extend above the finished floor level. The rod should not enter the manhole more than 3 inches nor less than 2 inches out from the vertical surface of the adjacent wall. All manhole splices should be bonded to the manhole ground. In existing manholes new ground rods and/or bonding ribbon should be designed at each splice location if none presently exist. Note: Pull throughs require no grounding.

3.2.2.1.4.4 Bonding Ribbon.
Bonding ribbon should be installed in all new manholes. The bonding ribbon should be attached to all rack anchors and be precast into the manholes. The bonding ribbon should be attached to the manhole ground rod.

3.2.2.1.4.5 Hardware.
A minimum of five cable racks, each containing 47 hook spaces mounted vertically, should be provided on each long wall. End wall manhole racks should be provided at the T-end of multi-directional manholes. Corner racks should be provided at the in-line end of the manhole. Racks should set out from the wall a minimum of 3 inches. Each cable rack should be equipped with hooks to support all existing/new cable or if there are no existing/new cables, each rack should be equipped with two cable hooks (minimum length 7 and 1/2 inches). All racks and hooks should be of galvanized metal or non-corrosive materials.

3.2.2.1.5 Stencil.
All new manholes should be stenciled with a number designated by the DOIM.

3.2.2.2 Handholes.
The installation of handholes is not suggested. The cost savings are minimal and do not overcome the limited work space and future problems experienced with handhole installation. The preferred solution is the installation of a full-size manhole. Handholes may be installed if the space is limited or under other extenuating circumstances.

3.2.2.3 Duct.

3.2.2.3.1 Type of Duct.
The type of duct for new installation should be PVC, Schedule B, EB, C, or DB. Schedule B or EB should be used in installations where the duct is concrete encased. Since Schedule B or EB is less robust, care should be taken to ensure that the thin-wall duct is properly supported by spacers, a minimum of one spacer every 10 feet or in accordance with manufacture's specifications and is not damaged (cracked or crushed) prior to or during installation. Schedule C or DB duct should be used for applications where the duct is buried rather than encased in concrete.

3.2.2.3.2 Minimum Duct Sizing.
The minimum sizing for new duct is shown in Figure 3-3: OSP Infrastructure Standard. All duct sizes should be designed to allow for current cable, new cable under this effort, and 50 percent growth. Minimum sizing is listed below.

a) Duct between the cable vault and the first manhole should be based upon the size of the switch and the number of outside cable pairs served from the switch location.

b) Main duct runs should be a minimum of 6-way, 4-inch (two of which are subduct).

c) Lateral duct runs should be a minimum of 4-way, 4-inch (one of which is subduct).

d) Building entrance ducts should be a minimum of 2-way, 4-inch (one of which is subduct).

3.2.2.3.3 Depth of Cover.
At least 24" of cover is required above the top of the duct or duct encasement. Less cover is required under roads or sidewalks (if duct is concrete encased). See Figure 3-5: Conduit Placement and Cut & Resurface for details.

3.2.2.3.4 Trench Width.
To install ducts, the trench width depends on the number of ducts, size of ducts, arrangement of ducts, and space around ducts (at least 2"). Additional width may be required to work in deep trenches or with large count duct banks. See Figure 3-5: Conduit Placement and Cut & Resurface for details.

3.2.2.3.5 New Duct Placement.
In a new duct run, the duct should be swept down into the lower duct window. This practice will allow for easier expansion of the duct run in the future.

3.2.2.3.6 Rerouting of Existing Duct.
Existing duct should be joined to new manholes (precast or cast-in-place) by rerouting the designated ducts from the demolished or abandoned manhole to the new. Rerouting should begin far enough back from the old manhole to allow for standard bending radius and pulling tension. Continuity of operations on the affected cables should be maintained during the duct rerouting actions.

3.2.2.3.7 Reinforced Duct Placement.
New duct, installed to reinforce an existing duct bank, should be placed above the existing duct bank, if the minimum top cover of 24 inches can be maintained. If there is not sufficient top cover available, the new duct should be placed beside the existing duct bank.

3.2.2.3.8 Concrete Encasement.
Concrete encased duct or galvanized steel pipe should be placed under all paved road surfaces and certain heavy-traffic non-surfaced roads. The encasement/pip should be extended a minimum of 6 feet beyond the roadbed for all road crossings on ranges. In accordance with the referenced standards, PVC duct should also be encased in concrete at all sweeps or bends; at stream or drainage ditch crossings or other areas subject to wash outs; and in runs parallel to streets, highways or road surfaces where the top cover is less than 30 inches. For consistency, the contractor should use only one brand of cement that conforms to RUS Bulletin 1751F-644 (http://www.usda.gov/rus/telephone/regs/1751f644.htm).

3.2.2.3.9 Rock.
Rock should consist of boulders measuring ½ cubic yard or more or other material, such as rock in ledges, bedded deposits, unstratified masses and conglomerate deposits, or below ground concrete masonry structures, that cannot be moved without systematic drilling and blasting or the use of a rock saw. Pavements should not be considered as rock. Excavate rock to a minimum of 4 inches below the trench depths required to place duct bank or cable. Backfill the rock excavation and all excess trench excavation with a 4-inch cushion of sand prior to placing the duct or cable.

3.2.2.3.10 Unstable Soil.
When wet or otherwise unstable soil incapable of properly supporting this conduit is encountered in the trench bottom, remove such soil to the depth required and backfill the trench to trench bottom grade, with coarse sand or fine gravel.

3.2.2.3.11 Bends and Sweeps.
Accomplish changes in direction of runs exceeding a total of 10 degrees, either vertically or horizontally, by long sweeping bends having a minimum radius of 25 feet. In no instance should the total of all bends and sweeps in a duct run exceed 180 degrees. Manufactured bends may be used on subsidiary/lateral conduit at the riser pole or building entrance. Long sweeps may be made up of one or more curved or straight sections and/or combinations thereof. Manufactured bends should have a minimum radius of 24 inches for all conduits 3 inches in diameter or larger. Conduits should terminate in bell ends at point of entrance into the manholes and buildings. All bends and sweeps should be concrete encased to protect the duct from the pressures developed while pulling cables.

3.2.2.3.12 Pull String/Rope.
Pull string should be installed in each new conduit or innerduct/subduct. A minimum of 5 feet of pull string should be provided at each end of the conduit. The pull string should be coiled and secured to the wall.

3.2.2.3.13 Plugs.
All ducts subduct and/or innerduct, whether main or subsidiary runs, not scheduled for immediate use should be plugged using acceptable duct plugs or plugging compound. Concrete is not acceptable for plugging ducts.

3.2.2.3.14 Galvanized Steel Pipe (GSP).

3.2.2.3.14.1 For road crossing using the cut and restore method, GSP should generally only be used if the local Department of Public Works (DPW) or DOIM request that trenches not be left open across roadways for an extended duration (to allow for concrete to harden). Otherwise, concrete encased duct should be used.

3.2.2.3.14.2 GSP should be used to push under railroad crossings. The GSP should be 12 inches or greater for pushing under commercial railroad crossings and for multi-duct conduit runs under non-commercial railroad beds. One four-inch GSP can be installed under non-commercial railroad beds in single conduit applications. See Figure 3-5: Conduit Placement and Cut & Resurface for details on railroad crossing.

3.2.2.3.15 Split Duct.
Split Duct is designed for use on a long cable run (normally fiber optic) where the cable is placed in the open duct while the duct and trench are still open. Split Duct should be used for all road

crossings only after 1/5 of the cable reel length for cables greater than 1 inch in diameter, and 1/3 of the cable reel length for cables less than 1inch in diameter, is utilized in each unspliced span (up to 5,000 feet). Normal conduit should be utilized at all other areas.

3.2.2.3.16 Rod/Mandrel/Slug/Clean Ducts or Conduits.

3.2.2.3.16.1 Rodding a duct entails inserting or pushing a rod into the duct to (1) determine the length of the duct, (2) locate the other end of the duct, (3) determine if the duct is usable or blocked, or (4) insert a pull string in the duct.

3.2.2.3.16.2 Mandrelling a duct consists of pulling a mandrel or slug through the duct to clean any mud, sand, or dirt out of the duct. Mandrelling also insures that the duct diameter is in tact and available for installation of cable. The mandrel's diameter (1/4" less than the duct inside diameter) depends on the type and size of the ducts. **Do not mandrel the ducts if existing cables are in the duct.**

3.2.2.3.16.3 Existing vacant ducts, without pull strings, that are to be used in new cable installation should be rodded and mandrelled to detect any obstructions, collapsed ducts, or duct inconsistencies and to place a pull string. Vacant duct, with pull strings, which are to be used in new cable construction should be cleaned with a slug/mandrel prior to the installation of cable.

3.2.2.4 Subduct/Innerduct.

3.2.2.4.1 Subduct should be used when installing new conduit systems. Each subduct should provide four 1-1/2 inch conduits in the space that is normally occupied by a 4-inch conduit. Each pathway should be provided with pull string. One out of every 4 new ducts should be subduct.

3.2.2.4.2 Innerduct is used in existing conduit systems, in GSP or split GSP, or in open trenches for direct buried fiber optic cables. The Government's preference is to use the rigid type innerduct with pull string instead of the flexible innerduct. The type and size of existing conduit should determine the number of innerducts. Typically, four 1-inch innerducts are placed in a 4-inch conduit. Although more innerducts will physically fit in a 4-inch duct, the twisting and intertwining of the innerducts make installation infeasible.

3.2.3 Direct Buried.
Supporting documentation for buried cable installation is available in RUS Bulletins 1751F-640 (http://www.usda.gov/rus/telephone/regs/1751f640.htm), 641 (http://www.usda.gov/rus/telephone/regs/1751f641.htm), and 642 (http://www.usda.gov/rus/telephone/regs/1751f642.htm) and TIA/EIA-758, Customer Owned Outside Plant Telecommunications Cabling Standard.

3.2.3.1 Type of Cable.
Rodent protected cable should be used for buried applications, at locations where there is a problem with rodents damaging underground cables. Typically, all non-rodent proof direct buried cables should be placed in buried innerduct when the outer diameter of the cable is smaller than a gopher's bite dimensions.

3.2.3.2 Warning Tape.
Buried cable warning tape should be used for all direct buried applications (open trenching and plowing). The tape should be installed 12 inches above the cable.

3.2.3.3 Warning Signs.
Buried cable warning signs or route markers are required no less than every 250 feet or at each change in route direction, both sides of street crossings, pipelines, and buried power cables.

3.2.3.4 Plow.

3.2.3.4.1 A cable laying plow cuts a slot as it is pulled forward. The cable is fed in and pushed to the bottom of the slot and the slot closes on it as the machine proceeds forward.

3.2.3.4.2 Plowing should be used in range environments or other areas where there are no significant obstacles and cable runs typically exceed 1000 feet between splices.

3.2.3.5 Trench.

3.2.3.5.1 Trenching involves the excavation of a ditch to place the cable.

3.2.3.5.2 To direct bury a cable, a 6-inch trench width is normally adequate. A maximum trench width of 12 inches should be utilized in direct buried applications.

3.2.3.5.3 Hand dig at all existing manhole locations, building entrance points, utility crossings, through tree roots, under curbs, etc.

3.2.3.6 Cut/Resurface vs. Push/Bore.
See Figure 3-5: Conduit Placement and Cut & Resurface for placement details.

3.2.3.6.1 Cut and resurface should be utilized as the preferred method when crossing any paved area. Push/bore should be utilized as specified by the site DOIM for special circumstances. For road crossings on ranges, concrete encasement should be extended a minimum of 6 feet beyond the edges of the roadbed.

3.2.3.6.2 Directional boring in buried plant construction may be considered as an alternative method of installing cables or wires under highways, streets, driveways, across lawns, etc., to avoid repairing and restoring these items to their pre-construction appearances. Directional boring should be avoided for long distances in populated areas or proposed construction sites.

3.2.3.6.3 When measuring for road crossings where a push and bore may be the installation method used, ensure that there is space for the installer to place his pushing equipment and receive trench. Prior coordination should be made with the DPW to determine which roads or other surfaces cannot be cut.

3.2.3.6.4 Push and bore method should be used for railroad crossings. For railroad crossings, a minimum of a 14-inch steel casing should be used and the pipe should extend no less than 6 feet beyond each outside rail or rail bed, whichever is greater, and should be located no less than 60 inches below the base of the rails.

3.2.3.6.5 Pushes and bores should not be engineered for sites with rocky soil conditions. Cut and resurface methods should be utilized.

3.2.3.7 Depth of Placement.

3.2.3.7.1 According to RUS Bulletin 345-150/RUS Form 515A, the minimum depth of placement for a direct buried cable should provide cover of 24 inches in soil, 36 inches at ditch crossings and 6 inches in solid rock.

3.2.3.7.2 To direct bury a fiber optic cable the minimum depth should provide cover of 42 inches. In solid rock, the minimum depth is reduced to 6 inches.

3.2.3.7.3 The DOIM may have special depth requirements for certain areas (i.e., tank tracks, firing ranges, etc.).

3.2.3.8 Buried Splicing.

3.2.3.8.1 Buried splices should only be engineered if any of the following conditions apply: Electrical or Explosion Hazard (i.e., ammunition storage areas), Vehicular Hazard (i.e., motor pool areas), or Security Hazard (i.e., within a high security compound).

3.2.3.8.2 All other splices in a direct buried run should be placed in pedestals or handholes and should be encapsulated. See Figure 3-7: Pedestals and Building Entrance Details for pedestal details.

3.2.4 Aerial.
Supporting documentation for aerial placement is available in RUS Bulletin 1751F-630 (http://www.usda.gov/rus/telephone/regs/1751f630.htm) and REA TE&CM 635.

3.2.4.1 Aerial Installation Guidance.
Aerial installations should only be used in extenuating circumstances or long runs outside of the cantonment area. Small segments of aerial cable (known as “aerial inserts) may be necessary for sections of a buried cable run. The aerial inserts may span ravines, creeks or rivers, or rocky areas.

3.2.4.2 Messenger Strand.

3.2.4.2.1 A “2.2 M” strand should only be used as a replacement or extension of existing “2.2M” strand. A “6.6M” strand should be the smallest size strand utilized for new cable(s).

3.2.4.2.2 Fiber optic cable should be installed on its own messenger. Copper and fiber cables should not be lashed on the same messenger.

3.2.4.2.3 Figure-8 cable may be installed; however, no additional cable should be lashed to it.

3.2.4.3 Guys and Anchors.
Place new guys and/or anchors for each new messenger strand at each applicable location (cable turns, wind loading, cable ends, etc.). The down guy should be sized to the next larger strand.

3.2.4.4 Aerial Splices and Terminals.

3.2.4.4.1 Aerial fiber splices should not be used. Splice the fiber optic cable in a pedestal at the bottom of the pole.

3.2.4.4.2 Pole-mounted terminals are preferred over strand-mounted terminals.

3.2.4.4.3 Fixed-count terminals are preferred over ready-access (random-count) terminals.

3.2.4.4.4 Terminals should be placed so that no single drop exceeds 500 feet in length.

3.2.4.4.5 Support all terminals and splices either by attachment to the messenger cable or direct attachment to a fixed object (pole, building, pedestals, etc.). Devices should not be supported by the cable.

3.2.4.5 Horizontal Clearances for Poles/Aerial Cable.
These and additional horizontal clearances can be found in the AT&T Outside Plant Engineering Handbook (Handbook may be ordered at http://www.lucent8.com/cgi-bin/CIC_store.cgi, Document Number AT&T 900-200-318).

a) Fire hydrants, signal pedestals – 4 feet
b) Curbs – 6 inches
c) Railroad tracks – 15 feet
d) Power cables under 750 V – 5 feet or more

3.2.4.6 Vertical Clearances for Aerial Cable.
These and additional vertical clearances can be found in the AT&T Outside Plant Engineering Handbook (Handbook may be ordered at http://www.lucent8.com/cgi-bin/CIC_store.cgi, Document Number AT&T 900-200-318).

a) Streets or roads – 18 feet
b) Driveways to residences and garages – 10 feet
c) Alleyways – 17 feet
d) Pedestrian walkways – 8 feet
e) Railroad tracks; measured from top of rail – 27 feet

3.2.4.7 Water Protection.
Weatherproof all outdoor connections by using weather boots or other approved methods. Form a rain-drip loop at all cable entrances into buildings at points of ingress. Waterproof all building entrance points.

3.3 General Cable Specifications.

3.3.1 Cable Distances.

3.3.1.1 Underground.
Measurements between manholes are from lid to lid (taken CC). Measurements from manholes to buildings, to pedestals, riser poles, etc. are from the manhole lid to the outside wall, bottom of pole, etc. (taken CP).

3.3.1.2 Buried.
Measurements for direct buried should be point-to-point (PP).

3.3.1.3 Aerial.
Measurements for aerial cable should be taken so that the cable could be direct buried. Measure from pole to pole and from pole to building attachments or entrance terminal etc. Do not forget to account for sag in the aerial measurements.

3.3.2 Bending Radius.
The minimum bending radius for copper cables and wires should not be less than 10 times the outside diameter of the copper cable or wire. The minimum bending radius for fiber optic cables should not be less than 20 times the outside diameter of the fiber optic cable. If cables or wires are bent too sharply, damage could occur to the copper conductors, optical fibers, shields, armors, and/or jackets of the cables or wires.

3.3.3 Cable Identification.

3.3.3.1 Cable Tags.
Cable tags should be installed at all termination points (terminals) and splices, including house cables. In manholes, cables should be tagged between the splice and the end wall and on both

sides of a splice loop or maintenance loop. Only one tag is required for a copper cable pull-through and two tags for a fiber optic cable pull through.

3.3.3.2 To identify a copper cable you need both: SIZE + TYPE and CABLE ID + COUNT.

3.3.3.3 Cable sizes should be identified with an abbreviation. For example, a 1200-pair cable will be identified as P12-24PF. All cables with less that 25 pairs will include an "X."

6 pair = P6X-24PF
12 pair = P12X-24PF
18 pair = P18X-24PF

To identify a 900 pair, 24 AWG copper cable:

P9-24PF = Size and Type
03, 1-900 = Cable # and Count
(Only existing cable is identified with a 'CA' prefix.)

To identify two different cables under the same sheath:

P21-24PF
07, 1-1500+T1, 1-400+200 DD

Fiber Optic Cables should be identified with CABLE ID + COUNT and then SIZE + TYPE.

FOC 12, 1-72 = Cable # and Strand Count
72G10F = Type of Cable

3.3.4 Copper.

3.3.4.1 Copper Cable (Cut) Length.
To calculate the cut length of copper cable consider the following:

a) Determine the PP distance by adding together the CC distances between splice points.

b) Add 10 feet for every manhole pulled through for racking. Consider it as 5 feet extra on the cable as it comes in and 5 feet extra on the cable as it goes out.

c) For manholes with splices in them, add 20 feet to each end of the copper cable for splice length (total 40').

d) For pedestal splices add 20 feet to each cable end.

e) For cables terminating in buildings, allow for the elevation change from the trench to the PET, cable route in the building and 20 feet for the termination. If the PET is more than 50 feet inside the building, the OSP cable should be placed in EMT.

3.3.4.2 Copper Reel Lengths.
A list of standard copper reel lengths is included in Figure 3-2: Standard Cable Reel Lengths and Diameters. Be aware that each manufacturer may differ slightly from these numbers.

3.3.4.3 Splices.

3.3.4.3.1 Copper and fiber optic cable spliding shall be performed in accordance with RUS Bulletin 1735F-401, Standards for Splicing Copper and Fiber Optic Cable.

3.3.4.3.2 Self-piercing electrical-filled connectors should be used when splicing plastic insulated conductors. When using 25-pair splicing modules, 3M-type MS23 or equal should be used. The connectors should be consistent with previously installed connectors to preclude a requirement for a variety of installation tools by the DOIM. B-wire connectors should not be used.

3.3.4.3.3 Binder group integrity should be maintained. Split binders (of 25-pair groups) should not be spliced through any splice or taper point.

3.3.4.3.4 All dead pairs in a copper cable should be spliced through if the size of the continuing cable will allow a clear and cap at the other end. This method will provide a continuous path for the total distance of the dead pairs in case the path is needed in the future.

3.3.4.3.5 Upon completion of the splice, all underground and buried splice cases should be flash tested. After successful flash testing, the splice case should be filled with encapsulant. The splice case should be a stainless steel case or PSI Type 2. Bond cable sheaths at all cable splices with bonding harnesses to assure sheath continuity.

3.3.4.4 Cable Count Assignment.

3.3.4.4.1 When assigning cable counts, the center of the cable should be the last pairs assigned on a cable route. The upper or higher cable pair counts should be used first. Therefore, the highest pair count in a cable should be located closest to the switch location and the lowest pair count should be farthest away.

3.3.4.4.2 Per the requirements of 6- and/or 12-pair terminals, pair 13 (of a binder group) rather than pair 1 is to be spared.

3.3.4.5 Cable Gauge, Resistance Design.

3.3.4.5.1 The preferred cable gauge is 24 AWG; however, 26 AWG may be used in high-density areas and 19 AWG may be required on longer runs (such as ranges).

3.3.4.5.2 To increase the signaling limit distance, start with the small gauge (large AWG number) at the dial central office and work out and up to a larger gauge (smaller AWG number), i.e., AWG 26 to AWG 24 to AWG 22 (not AWG 22 to AWG 26). Mixing gauges should be engineered in accordance with resistance charts and tables in RUS TE&CM 424 and 426.

3.3.4.6 Loading.

3.3.4.6.1 Analog sets/circuits should be loaded, in accordance with REA Bulletin 345-22, REA Specifications for Voice Frequency Loading, when subscriber loops extend beyond 18,000 feet.

3.3.4.6.2 When loading is required, H88 loading should be utilized: 3,000 feet from the DCO for the first load (must include calculations for tip cables, jumper wire, etc.), then every 6,000 sheath feet thereafter. End sections must be greater than 3,000 feet and less than 12,000 feet. End sections include all drops and station wire.

3.3.4.6.3 If required, build-out capacitors should be designed on trunk circuits between switches and subscriber loops for placement between load points. The build-out capacitors insert additional capacitance to compensate for distances shorter than 6000 feet between loads or between loads and end sections.

3.3.4.6.4 Pairs for any data circuit should NOT be loaded.

3.3.4.6.5 If digital or data sets (no analog) are to be used for the telephone system, NO pairs should be loaded. The user may have to provide loop extenders for long loops or the design should include pair gain devices.

3.3.5 Fiber.

3.3.5.1 Type.
All specifications for fiber optic cables should pertain to finished cable, and not raw (uncabled) fiber. The fober optic cable should conform to the specifications contained in RUS Bulletin 1753F-601, EIA/TIA-472, and EIA 472D. All OSP fiber cable should be single-mode. Multimode fiber may be installed only in situations involving the extension of existing systems that cannot be adapted to single-mode cable.

3.3.5.2 Fiber Cable Cut Length.
To calculate the cut length of fiber optic cable consider the following:

a) The sum of the PP and/or the CC distances between splices.

b) All fiber optic cable pulled through manhole should include a 20-foot maintenance loop in addition to the 10-foot racking length.

c) In accordance with FM 11-487-5, paragraph 3-3.d, for a fiber splice in a manhole: "Assure that enough slack is pulled from both ends to have enough cable for racking and to pull 30 feet or whatever length it takes to get past the top of the manhole to the splicing trailer from each direction."

d) Add 10 feet to each cable end for aerial splicing ends.

e) Add 65 feet to each cable end for direct buried splicing (55' for the splice pit loop + 10' splice end).

f) Add 20 feet for the splice end at an equipment rack location (the approximate height {2x} and width of the equipment rack).

3.3.5.3 Fiber Reel Lengths.
Fiber optic cables are available on up to 40,000-foot reels regardless of the number of strands. Small strand sizes may increase reel lengths. Actual reel lengths should be obtained from the manufacturer.

3.3.5.4 Fiber Cable Count Assignment.
Fiber optic cable strand counts should be assigned in a similar manner as copper counts. The high number counts should be dropped off first and strand one count should be the farthest from the DCO.

3.3.5.5 Use of Innerduct/Subduct.
For underground installation, each fiber optic cable should be installed in innerduct or subduct. If no innerducts are available, the installation of innerduct in the 4" conduit should be included. Fiber optic cable should not be installed directly in a 4" duct.

3.3.5.6 Splices and Power Budget.

3.3.5.6.1 In accordance with RUS Bulletin 1751F-642 (http://www.usda.gov/rus/telephone/regs/1751f642.htm), for buried fiber optic cable plant, direct buried filled splice cases installed in manholes and handholes are preferred over burying the splice.

3.3.5.6.2 Every effort should be made to utilize "loop through" splicing in lieu of homeruns/dedicated cables to the serving location. In "loop through" splicing, only the fiber strands breaking off from the main cable are cut and spliced. The other fibers are not cut. The

sheath is cut from the cable, the exiting fibers cut and spliced, and the remaining fibers are simply folded back within the case (not cut) and then routed on.

3.3.5.6.3 Transmission Limitations.
The power budget should be calculated for the fiber optic cable run. If the loss is too great for a standard laser, a long-range laser should be considered.

3.4 Sizing Requirements.

3.4.1 Copper.

3.4.1.1 The number of OSP copper pairs is calculated by multiplying the number of users or jumpers in the building times 1.5 pairs. This factor will add in some additional pairs for faxes, modems, and special circuits. The cable is then sized to the nearest logical standard cable size.

3.4.1.2 For example, a building with 85 users would require a 200-pair cable (85 x 1.5 = 128 ==> 200 pair).

3.4.2 Fiber.

3.4.2.1 MCN to Alternate Main Communications Node (A-MCN).
For planning purposes, use a minimum of 48 strands between the MCN and the A-MCN to provide load balancing and network reliability. Only the strands destined for that MCN/A-MCN should be routed into the building.

3.4.2.2 MCN to ADN.
A minimum of 24 strands of single-mode fiber optic cable should be installed between the ADN/MCNs. Some of these 24 strands should be used to provide logical connectivity to two adjacent ADNs. In accordance with Paragraph 3.2.2.1.2 , splices for physical route diversity and connection to adjacent ADNs should be done in the manhole outside the MCN/ADN. Only strands destined for that MCN/ADN should be routed into the building. For ADN locations containing more than 2 ADN chassis, additional fibers should be installed. An additional 24 strands should be installed for each 2 chassis (for example, 3 or 4 chassis, install 48 strands).

3.4.2.3 ADN to EUB.
A minimum of 12 strands of fiber should be installed to connect the ADNs to the EUBs. If multiple edge devices are required in an EUB, a minimum of 24 strands of fiber should be installed. The number of edge devices used in a building is based on distance to user (Ethernet distance limit 295 ft), numbers of users in the building, and the bandwidth requirements. See Figure 3-1: Typical EUB Configurations.

3.4.3 Physical Route Diversity and Concrete-Encasement.
If it is not economically feasible to create physically diverse links between the MCNs/ADNs, concrete-encased duct should be used to minimize the impact of damage due to digging or natural catastrophe. All dual-homed buildings (MCNs, ADNs, and critical EUBs) that have only one entry point should have concrete-encased duct to the nearest manhole.

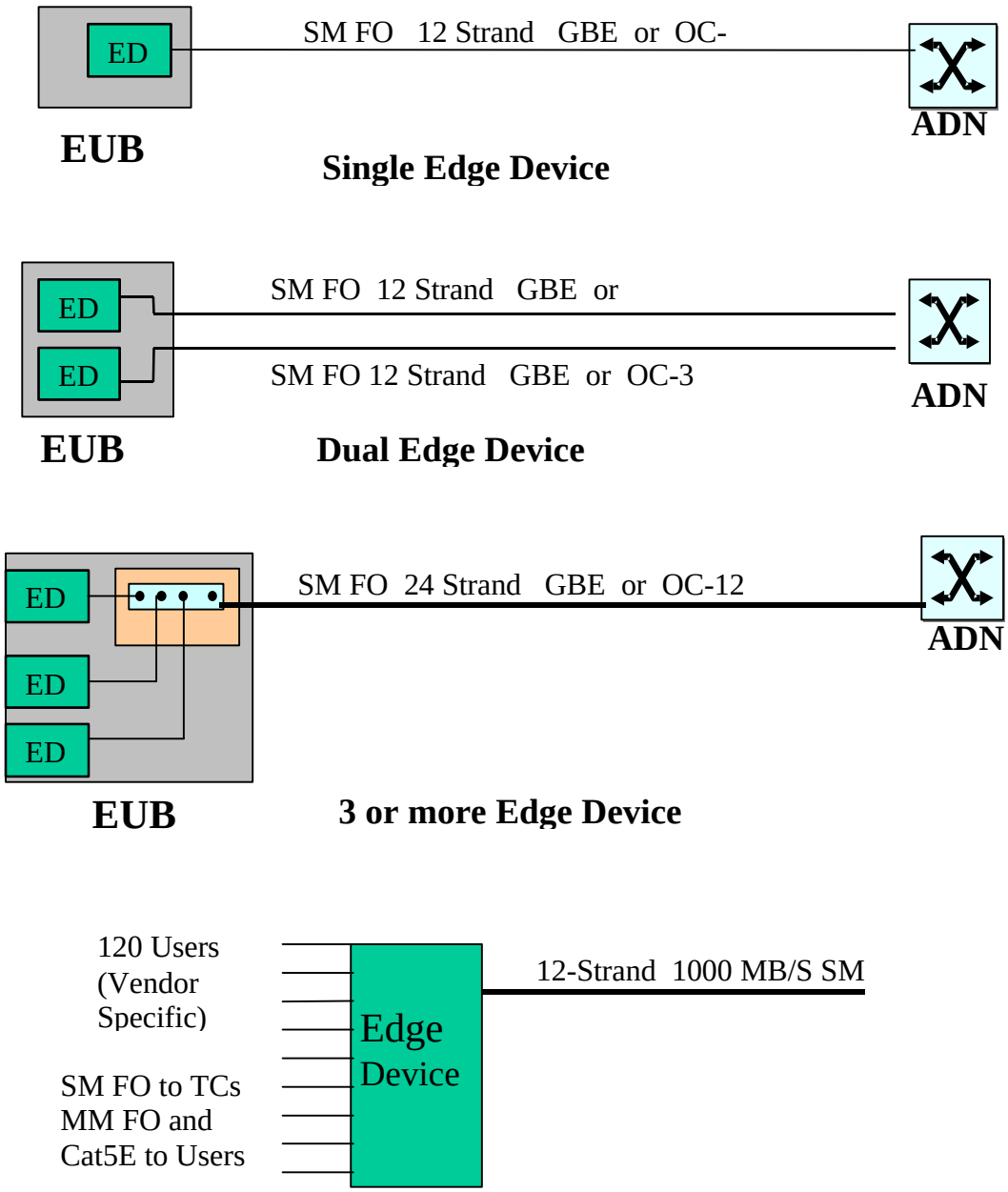


Figure 3-1: Typical EUB Configurations

	Number of Pairs	AWG	Standard Length (ft)	Nominal Diameter (in)
	6X	19	5000	0.53
PE-22	12X	19	5000	0.6
Air Core	25	19	5000	0.81
Alpeth	50	19	2500	1.08
Sheath	6X	22	5000	0.43
	12X	22	5000	0.53
	25	22	5000	0.7
	50	22	5000	0.85
	100	22	5000	1.07
	200	22	5000	1.48
	300	22	2000	1.75
	400	22	2000	1.96
	600	22	1000	2.44
	900	22	1000	2.88
	1200	22	750	3.29
	6X	24	10000	0.41
	12X	24	10000	0.46
	25	24	10000	0.55
	50	24	5000	0.66
	100	24	5000	0.87
	200	24	5000	1.18
	300	24	2500	1.38
	400	24	2500	1.53
	600	24	2500	1.85
	900	24	1500	2.31
	1200	24	1000	2.69
	1500	24	1000	2.92
	1800	24	750	3.01
	2100	24	500	3.39

	Number of Pairs	AWG	Standard Length (ft)	Nominal Diameter (in)
	25	26	10000	0.49
	50	26	10000	0.57
	100	26	10000	0.71
	200	26	5000	0.97
	300	26	5000	1.14
	400	26	5000	1.30
	600	26	2500	1.54
	900	26	2500	1.88
	1200	26	1500	2.10
	1500	26	1500	2.32
	1800	26	1000	2.48
	2100	26	1000	2.68
	2400	26	1000	2.90
	2700	26	1000	3.03
	3000	26	750	3.20

	Number of Pairs	AWG	Standard Length (ft)	Nominal Diameter (in)
	6X	22	9930	0.96
Figure-8	12X	22	9930	1
Filled	25	22	9810	1.16
Self-Supported	50	22	6540	1.34
Alpeth	6X	24	11340	0.88
Sheath	12X	24	11340	0.96
	25	24	11340	1.02
	50	24	11340	1.18
	50	26	13320	1.08
	100	26	8820	1.26

Figure 3-2: Standard Cable Reel Lengths and Diameters

	Number of Pairs	AWG	Standard Length (ft)	Nominal Diameter (in)
	6X	19	5000	0.52
PE-89	12X	19	5000	0.62
Filled	25	19	5000	0.86
Alpeth	50	19	5000	1.12
Sheath	100	19	2500	1.51
	200	19	1500	2.04
	6X	22	5000	0.48
	12X	22	5000	0.52
	25	22	5000	0.66
	50	22	5000	0.86
	75	22	5000	0.96
	100	22	5000	1.1
	150	22	5000	1.32
	200	22	2500	1.49
	300	22	2000	1.72
	400	22	2000	1.96
	600	22	1000	2.4
	900	22	1000	2.9
	1200	22	750	3.28
	6X	24	10000	0.44
	12X	24	10000	0.48
	25	24	10000	0.58
	50	24	10000	0.7
	75	24	5000	0.86
	100	24	5000	0.94
	150	24	5000	1.06
	200	24	5000	1.2
	300	24	2500	1.45

	Number of Pairs	AWG	Standard Length (ft)	Nominal Diameter (in)
	400	24	2000	1.59
	600	24	2000	1.92
	900	24	1000	2.32
	1200	24	1000	2.68
	1500	24	1000	2.92
	1800	24	750	3.2
	2100	24	600	3.44
	25	26	10000	0.52
	50	26	10000	0.58
	100	26	10000	0.78
	200	26	5000	1.02
	300	26	5000	1.18
	400	26	5000	1.33
	600	26	2500	1.59
	900	26	2000	1.92
	1200	26	1500	2.1
	1500	26	1000	2.34
	1800	26	1000	2.6
	2100	26	1000	2.78
	2400	26	1000	2.92
	2700	26	750	3.14
	3000	26	750	3.24

Figure 3-2 (cont.): Standard Cable Reel Lengths and Diameters

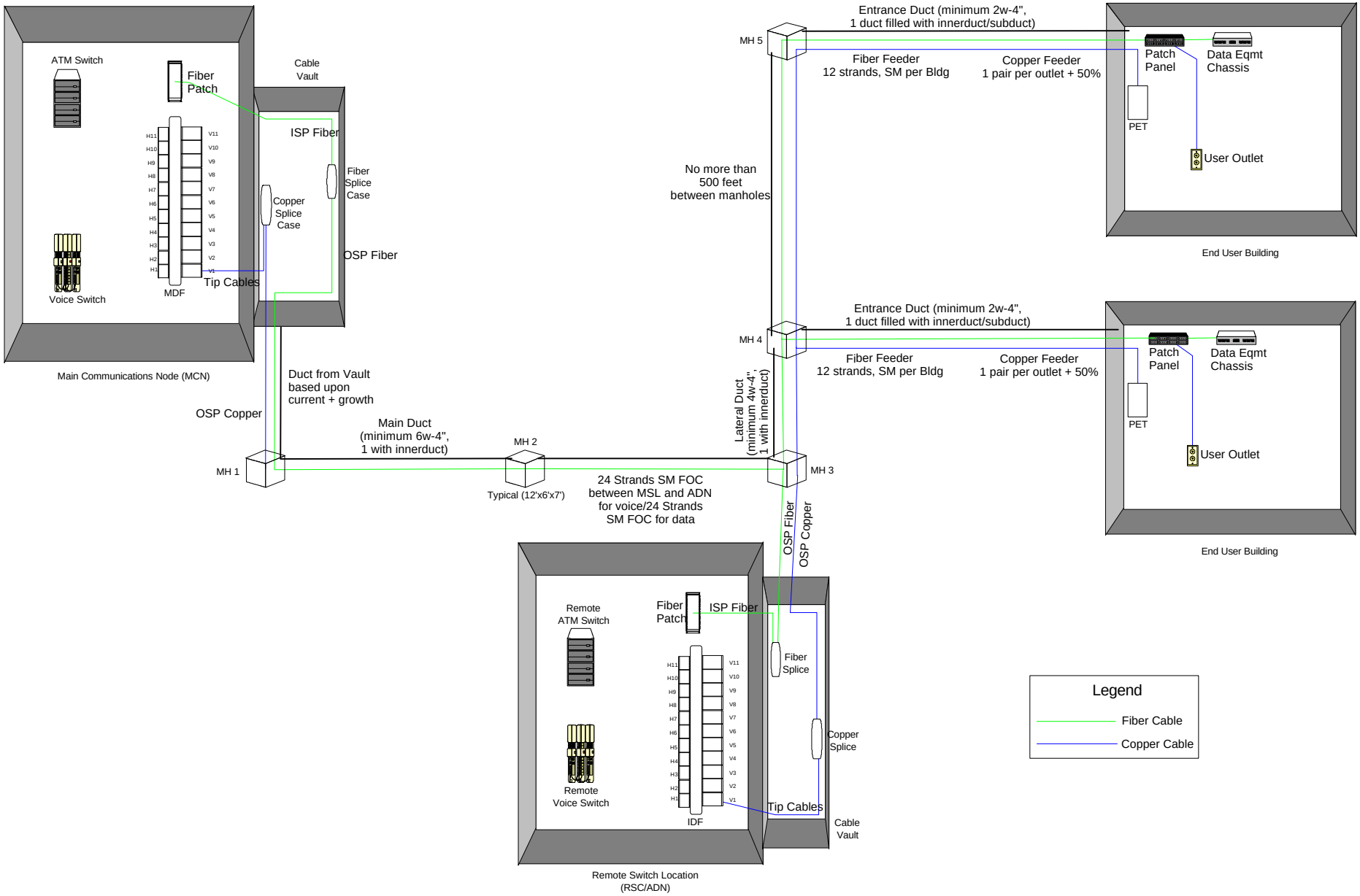


Figure 3-3: OSP Infrastructure Standard

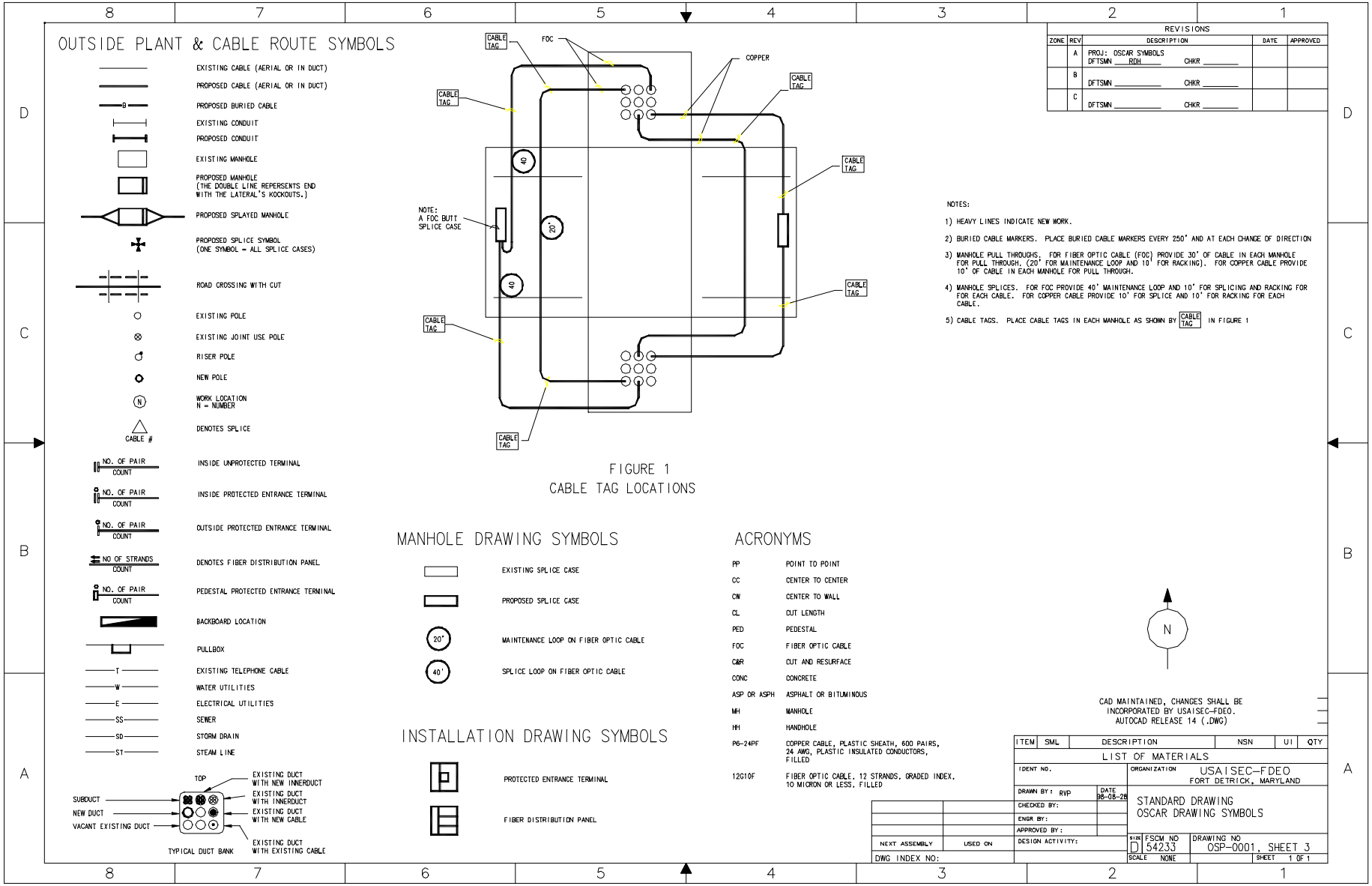


Figure 3-4: Drawing Symbols

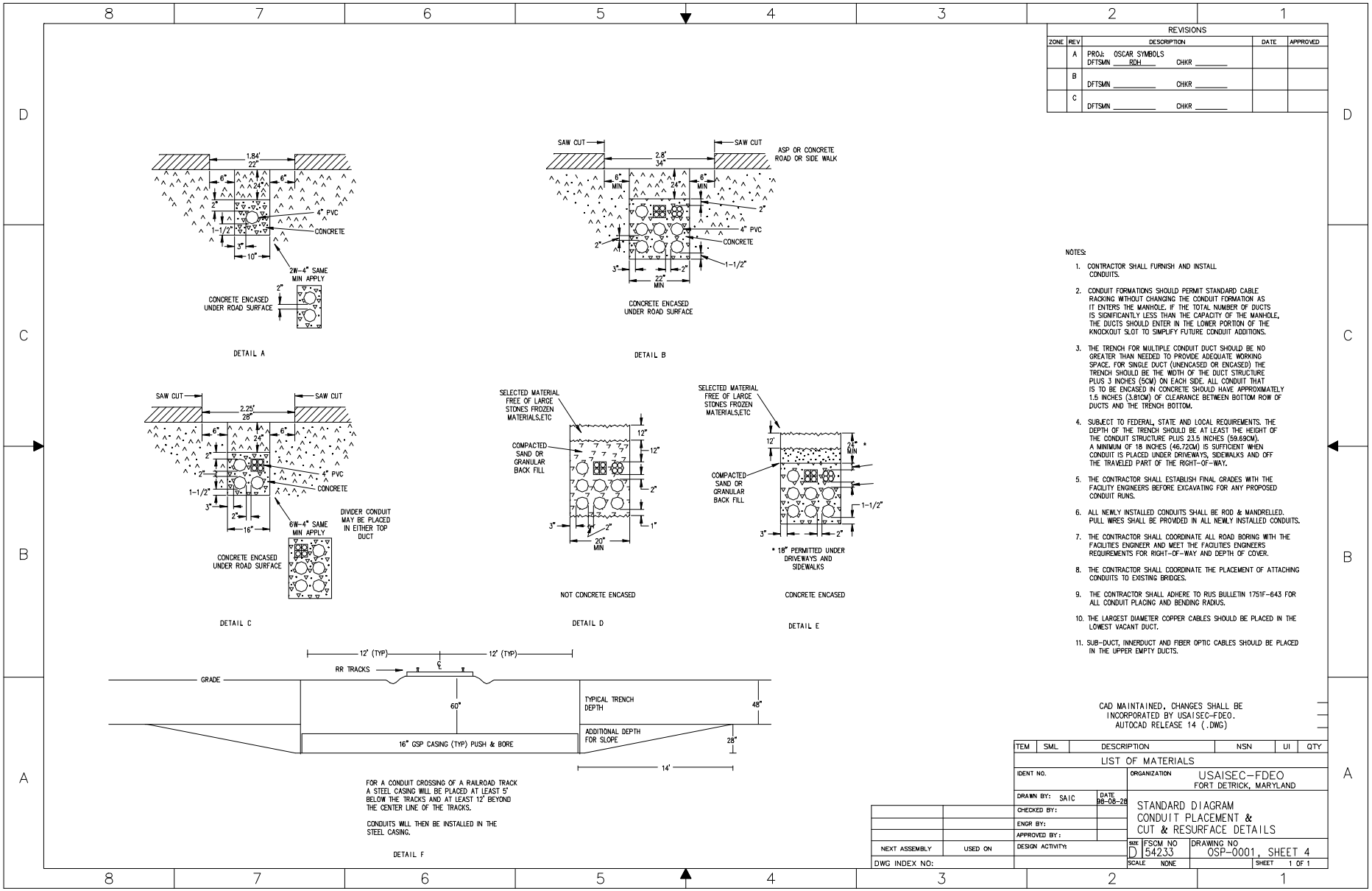


Figure 3-5: Conduit Placement and Cut & Resurface

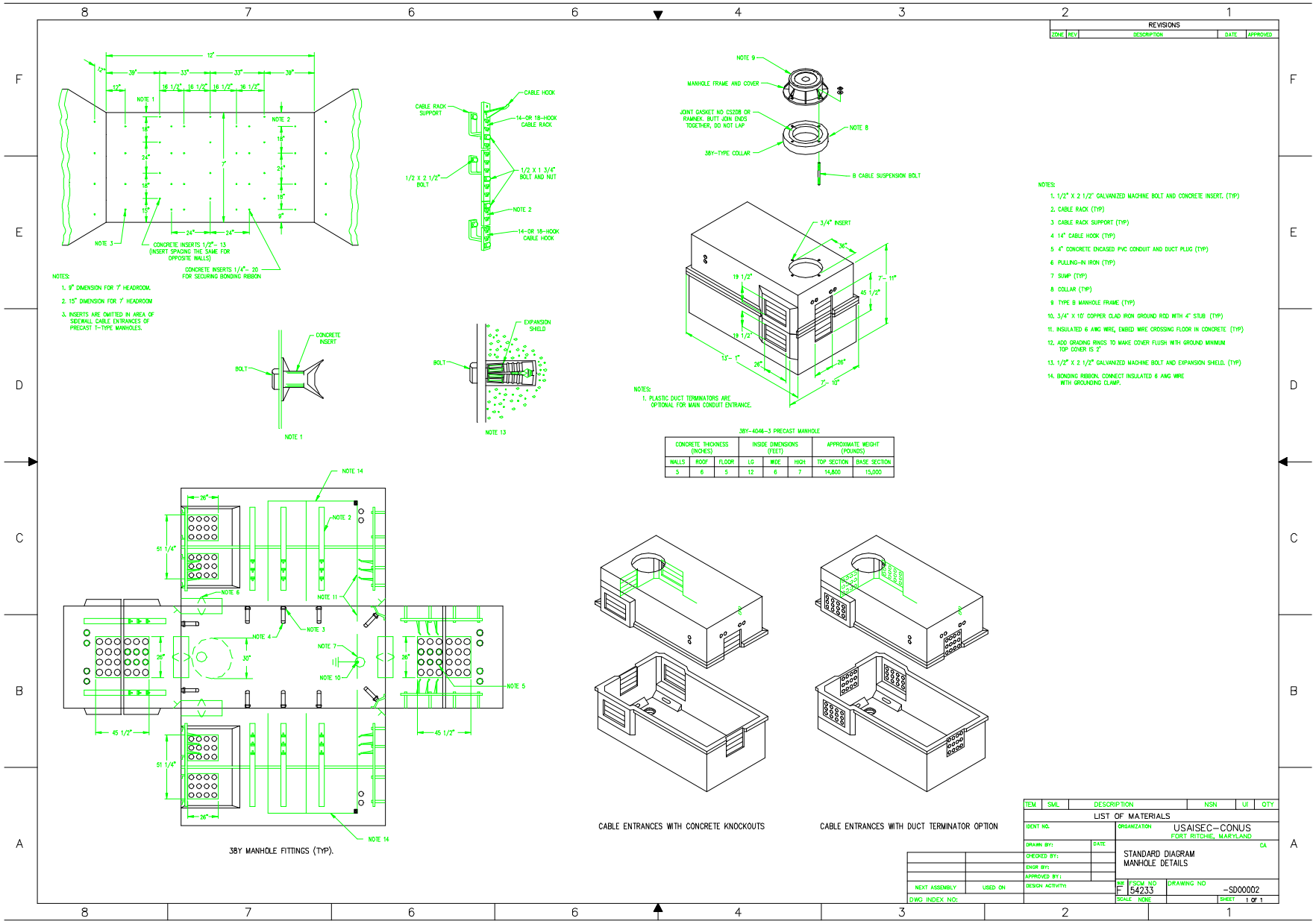


Figure 3-6: Manhole Typical

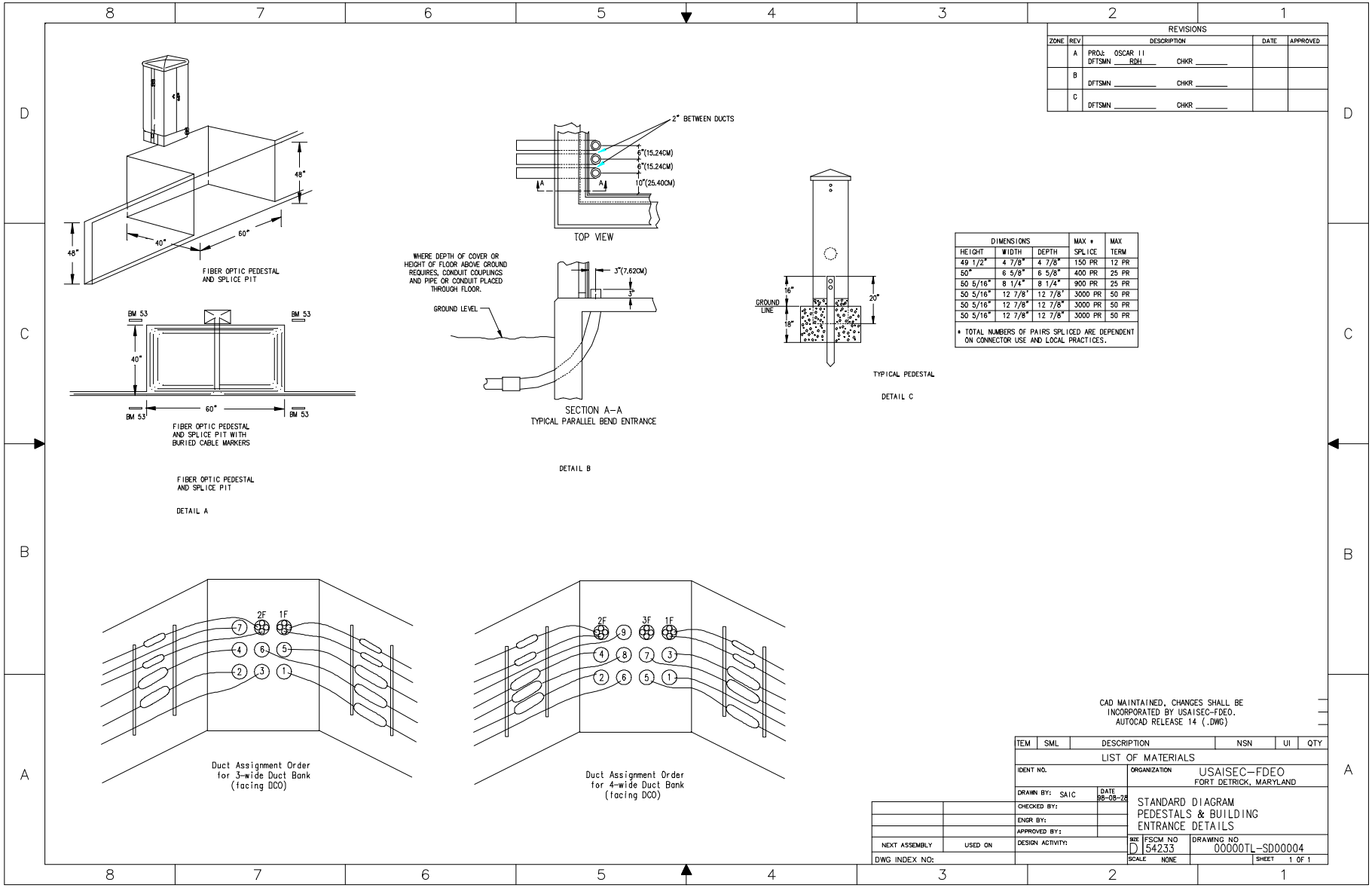


Figure 3-7: Pedestals and Building Entrance Details

4 Dial Central Office / Remote Switching Unit .

4.1 Dial Central Office Specifications.

Most of the information in this section was imported from Automated Information System (AIS) Design Guidance, Telephone Systems developed by United States Army Information Systems Engineering Command (USAISEC), October 1999 (http://www.isec-sig.army.mil/ISECTech/Guides/telesys/telesystg.htm). If you are accessing from a ".mil" location you won't need a log-on and password, but if you are accessing from address other than ".mil" click on the following site to obtain a log-on and password (ensure to include the organization that you represent and that it's for the I3A Implementation Guide). (http://www.isec-sig.army.mil/isectech/help.htm).

4.2 Switch Location and Layout.

An example of a Dial Central Office (DCO) switch room is included in Figure 4-2: Typical Switch Room Layout.

4.3 Site Preparation Design Parameters.

The following section lists generic floor space, power, heating, ventilation, and air- conditioning parameters that can be used when planning DCO or Remote Switching Unit (RSU) system installations. The manufacturer's specifications should be followed for the exact model of equipment actually being installed. The tables are based on the expansion size of the switch.

4.3.1 DCO Floor Space and Heat Loads.

DCO Air Conditioning Calculations:							
DCO SIZE (Lines)	Room Size Square ft	Switch BTU/hr	Ambient BTU/hr	Lights BTU/hr	Total BTU/hr	Convert to Tons Tons/12,000BTU	Required Tons
1920 to 2880	600	54,608	15,000	6,145	75,753	6.3	7.5
2880 to 3840	800	72,810	20,000	8,191	101,002	8.4	10
3840 to 4800	1,000	91,013	25,000	10,239	126,252	10.5	12
4800 to 5760	1,500	109,216	37,500	15,360	162,076	13.5	15
5760 to 6720	1,750	127,420	43,750	17,918	189,088	15.75	20
6720 to 7680	1,750	145,621	43,750	17,918	207,289	17.3	20
7680 to 8640	1,750	163,824	50,000	20,478	234,302	19.5	20
8640 to 9600	2,000	182,026	50,000	20,478	252,504	21	24
9600 to 10,560	2,000	200,229	50,000	20,478	270,707	22.5	24
10,560 to 11,520	2,500	218,432	62,500	25,600	306,532	25.5	30
11,520 to 12,480	2,500	236,635	62,500	25,600	324,735	27	30
12,480 to 13,440	2,500	254,837	62,500	25,600	342,937	28.5	30
13,440 to 14,400	2,750	273,040	68,750	28,157	369,947	30.8	36
14,400 to 15,360	2,750	291,243	68,750	28,157	388,150	32.5	36
15,360 and above	3,000	300,000	75,000	30,717	405,717	34	36

4.3.2 DCO Electrical Loads.

DCO Electrical Load Calculations:							
DCO SIZE (Lines)	Switch Load KW	Air Cond Load KW	Lights KW	Total KW	Growth Factor 1.25xKW	Generator Size KW	Transformer Size KVA
1920 to 2880	21	22.5	1.8	45.3	56.6	60	75
2880 to 3840	28	30	2.4	60.4	75	75	100
3840 to 4800	35	36	3	74	92.5	100	125
4800 to 5760	42	45	4.5	91.5	114.5	125	150
5760 to 6720	49	60	5.25	114.25	143	150	200
6720 to 7680	56	60	5.25	121.25	151	150	200
7680 to 8640	63	60	6	129	161	180	225
8640 to 9600	70	72	6	148	185	200	250
9600 to 10,560	77	72	6	155	193.75	200	250
10,560 to 11,520	85	90	7.5	182.5	228	250	300
11,520 to 12,480	92	90	7.5	189.5	237	250	300
12,480 to 13,440	99	90	7.5	196.5	245.5	250	300
13,440 to 14,400	106	108	8.25	222.25	278	300	400
14,400 to 15,360	113	108	8.25	229.25	286.5	300	400
15,360 and above	120	108	9	237	296.5	350	500

4.3.3 RSU Floor Space and Electrical Loads.

Electrical Load Calculations: Remote Switch Units								
RSU SIZE (Lines)	Room Size Sq ft	AC Load KW	Switch Load KW	Lights KW	Recept KW	Total KW	Growth Factor 1.25xKW	Recommended Generator Size KW
0 to 960	225	9	7	0.72	0.7	17.42	21.78	25
960 to 1920	350	9	14	1.12	1.05	25.17	31.46	50
1920 to 2880	500	15	21	1.6	1.5	39.1	48.88	50
2880 to 3840	600	15	28	1.92	1.8	46.72	58.4	60
3480 to 4800	800	18	35	2.56	2.4	57.96	72.45	80
4800 to 5760	1000	22.5	42	3.2	3	70.7	88.38	100
5760 to 6500	1200	22.5	49	3.84	3.6	78.94	98.67	100
6500 and up	over 1200	30	56	4.8	4.5	95.3	119.12	125

4.3.4 RSU Heat Loads.

Air Conditioning Load Calculations: Remote Switch Units									
RSU SIZE (Lines)	Line Cabinets	BTU/hr	Control Cabinets	BTU/hr	Rectifier BTU/hr	Misc BTU/hr	Total BTU/hr	Total Tons	Recommended AC Size Tons
0 to 960	1	3,547	1	4,433	5,184	6,468	19,632	1.64	3 Tons
960 to 1920	2	7,094	1	4,433	5,184	6,468	23,179	1.93	3 Tons
1920 to 2880	3	10,641	2	8,866	7,776	11,788	39,071	3.26	3 up to 5 tons
2880 to 3840	4	14,188	2	8,866	10,600	11,788	45,442	3.79	5 Tons
3480 to 4800	5	17,735	3	13,299	13,192	14,448	58,674	4.89	5 up to 6 tons
4800 to 5760	6	21,282	3	13,299	16,016	17,108	67,705	5.64	6 up to 7.5 tons
5760 to 6720	7	24,829	4	17,732	18,840	17,108	78,509	6.54	7.5 Tons

4.3.5 Batteries.

Generally, the batteries should be sized to support the expansion size of the switch. RUS Bulletin 1751E-302 (http://www.usda.gov/rus/telephone/regs/1751e302.htm), Power Requirements for Digital Central Office Equipment, also recommends that the battery provided should have the capacity to maintain the central office load for a period of 8 hours. In addition, it states that systems equipped with emergency generators are allowed to reduce the 8 hours to a 3-hour reserve time.

4.3.6 Generator.

The fuel tank should be sized for 2 days of operation. Other supporting design parameters can be found in RUS Bulletin 1751E-320 (http://www.usda.gov/rus/telephone/regs/1751e320.htm), Emergency Generating and Charging Equipment.

4.3.7 Main Distribution Frame.

The main distribution frame (MDF) is the interface between the OSP cable and the switch cables. The iron framework of the MDF supports the horizontal blocks and vertical connectors. If new vertical sections are required, a minimum of 30 inches of clearance is required for safety.

4.3.7.1 Horizontal Blocks.

The horizontal blocks terminate the tie cables between the switch and the MDF. Each connection corresponds to a telephone number on the switch. The switch contractor determines the number of horizontal blocks on the frame. All horizontals should be stenciled to show the termination identifications.

4.3.7.2 Vertical Connectors.

The vertical connectors are mounted on the vertical side of the MDF. Each connector protects 100 pairs of the OSP cables. The connector is equipped with tip cables that are pre-terminated on the connector. The tip cables are routed from the MDF, through the floor, to the cable vault and are spliced to the OSP cable. The vertical connectors protect the electronics in the DCO by providing lightning and surge protection. Each termination corresponds to a pair of the OSP. All OSP pairs should be terminated on connectors. All verticals should be stenciled to show the cable number and the pair count for all connectors on that vertical. All connectors should show the count terminated. A schematic showing the vertical side of the MDF is included in Figure 4-1: MDF and Cable Vault Schematic.

4.3.7.2.1 No more than six MDF connectors should be designed for frames less than 9 feet high.

4.3.7.2.2 No more than eight MDF connectors should be designed for frames 9 feet high.

4.3.7.3 Cross Connects.
Cross connects are installed between the OSP terminations on the vertical connectors and the switch terminations on the horizontal blocks. This process connects an OSP pair to a telephone number. Approximately 8 inches of slack should be left in the cross connect wire to allow re-termination for moves, adds, or changes.

4.3.7.4 Special Circuits.
Since special circuits (such as data circuits, T1s, or alarms) are usually non-switched, they should be treated differently than voice and modem circuits. The protector modules should be marked to indicate a special circuit. Various colors of protector modules are available to help in this differentiation. The special circuits should be cross connected to designated blocks on the horizontal side (not to the switch blocks).

4.3.7.5 Grounding.
Schematics showing the details of voice switch grounding are included on Figure 4-3: Grounding Schematic.

4.3.7.5.1 Maximum Impedance.
Most manufacturers require impedance from the ground ring to earth potential of ≤ 5 ohms. Impedance measurements should be made using a direct reading ground resistance meter.

4.3.7.5.2 Since the telephone system is usually installed by a commercial contractor and is warranted by that contractor, the system should be grounded in accordance with the manufacturer's practices. However, the manufacturer's practices, as shown on the construction drawings, should be reviewed for compliance with the following recommendations.

4.3.7.5.3 The components of a typical telephone central office grounding system are shown in Figure 4-3: Grounding Schematic, and include the following:

4.3.7.5.3.1 An earth electrode system, which consists of, ground rods driven into the earth around the perimeter of the switch building or in a triangular pattern in an open area just outside the switch room. These rods are exothermically bonded with a bare power wire (minimum size of 1/0 AWG). This system is commonly called the "ground ring".

4.3.7.5.3.2 The master ground bar (MGB) is usually mounted in the switch room on an outside wall and is the tie point for the ironwork, cabinet grounds, floor tile, and the reference ground for the -48V battery power plant. It is connected to the ground ring with an insulated wire, which is sized to meet the requirements of the National Electrical Code (NEC) Ordering information available at http://catalog.nfpa.org/ - 1. This system is the "single point" of the central office grounding scheme.

4.3.7.5.3.3 The cable entrance ground bar (CEGB) is a tie point in the cable vault or cable entrance area which facilitates bonding of the OSP cable sheaths directly to the ground ring.

4.3.7.5.3.4 The MDF ground bar is a tie point for cable pair protection and is usually isolated from the MDF ironwork. The MDF ground bar is usually connected to the MGB with an insulated (minimum #6 AWG) wire.

4.3.7.5.3.5 The power distribution board is the cabinet or frame, which contains fuses (or direct current (DC) circuit breakers) for the distribution of -48V DC circuits. Its ground bar serves as a tie point for all circuit returns and the power wires to the positive side of the battery string. This ground bar is also connected to the MGB.

4.3.7.5.3.6 The battery string is a group of individual cells strapped in an amount and with a configuration which should meet the ampere-hour requirements of the specification. The direct current is filtered by the battery string, which also provides no-break power to the switch. The positive side of the string is connected to the power distribution board ground bar.

4.3.7.5.3.7 The rectifiers, sometimes called "chargers," convert 208V AC (commercial power) to -48V DC. The positive side of the rectifier outputs connects to the power distribution board ground bar, thus is in parallel to the battery string.

4.3.8 Cable Vault.
A schematic of an MDF and cable vault is provided as Figure 4-1: MDF and Cable Vault Schematic.

4.3.8.1 Size.
The cable vault should extend the entire length of the MDF.

4.3.8.2 Layout.
A center rack is preferable for the splicing of the tip cables to the OSP cables. However, wall racking is allowable for small to medium central offices. The vault should be designed to allow ample space for splicing of the cables. For planning, a typical vault splice is 1 foot x 3 feet.

4.4 Voice Switch.

4.4.1 Terminology.

4.4.1.1 Installed Size.
The total number of lines needed to support user and non-user voice outlets requiring dial tone and a unique telephone number. Installed size accounts for user population at time of startup or cutover.

4.4.1.2 Equipped Size.
The total number of lines available on the installed backplane for user and non-user voice outlets when the switch is operating at its maximum installed capacity. Additional line cards may be required to reach this level. The equipped size provides for anticipated user population growth.

4.4.1.3 Expandable Size.
The total number of lines available for user and non-user voice outlets when the switch is expanded to its maximum design capacity. Expandable size describes the ultimate capacity of the switch in terms of lines when all possible expansions have been accomplished. The expandable size is used in the calculations for air-conditioning, batteries, generator, and power.

4.4.1.4 Single-Line Concept.
The single-line concept encompasses the requirement that each user will have a unique telephone number and a dedicated path to the telephone switch. Planners should implement single-line concept with all new construction projects, modernization projects, and routine upgrades to the voice system.

4.4.2 Consideration Factors in Choosing Distributed Switching.

4.4.2.1 There are several basic architectural considerations in the design, upgrade, or expansion of an Army telephone system. The designer should consider the geographical layout of the base, the availability of floor space, the existing cable routes, the existing system design, the location of the commercial telephone company point of presence, future growth, and the many other factors.

4.4.2.2 When at all possible, after consideration of the requirements and site survey of the location, a system design using one centrally located switching system is recommended. One centrally located switching system will serve a large number of subscribers more economically than multiple switches or remote switching units. The operation and maintenance (O&M) costs for HVAC and building maintenance will be minimized with this configuration. Software and hardware costs can be minimized if one central switch serves the maximum number of customers. The location of the central switch should be considered when siting construction for new buildings.

4.4.2.3 In many cases, however, evaluation of the site data will result in the determination that one centrally located switch can not serve the entire post. If a single main switch can not serve the entire post, then a main switch with remote switching units homed to the main switch is the recommended configuration.

4.4.3 Space Limitations.
Another condition that may prohibit the installation of one central switch would be lack of floor space with no possibility of additional space at the established central office site. While it is possible to change the point of presence, the local telephone company will usually charge a hefty fee for this relocation. Long established cable routes will have to be disrupted.

4.4.4 Community of Interest.

4.4.4.1 Due to the limited range of the feature telephone, a large number of users in a single building will often require a remote switching unit in that building in order to service feature telephones, even if the building is within cable range for 2500 sets.

4.4.4.2 Possible reasons or considerations for establishing a community of interest are:

a) Geographic Zones. If an area is geographically separated from the cantonment area, a remote switching unit may be more economical and easier to maintain than service from the DCO.

b) Hospital. Hospitals are treated as islands of service due to the differing types of requirements presented. Automated appointment, voice mail, and various other systems should be considered when installing a remote unit in a hospital.

c) Security Factors. Various security factors may result in the need for a remote switching unit in a building or particular area. An example is a Special Forces compound.

4.4.4.3 Multi-Vendor or Multiple Switches.

4.4.4.3.1 The O&M burden is a consideration when multiple switches are installed on a site. Each switch is considered as a separate entity by the vendor and each will require a separate software upgrade. Also, each type of switch (especially from different vendors) will require a separate complement of spares. There are generally no quantity discounts.

4.4.4.3.2 If optional features are to be extended across the site, the software should be purchased for all switches. Although switch networking software is being improved, there is generally some flexibility penalty to pay (i.e., reduced feature transparency across multiple switches).

4.4.4.3.3 Multiple switches also impose an administrative burden. In any given year, a number of personnel will be moved to different locations on post. If the move takes the user from the serving area of one switch into the serving area of another switch, changes will have to be made in the database of both switches, in addition to the jumper changes at two different locations.

4.4.4.3.4 Installation of switches from multiple vendors introduces various burdens in maintenance and equipment. Some of these areas include different spare complements, use of proprietary telephone sets, different software loads, different features, and different interfaces to telephone management system.

4.4.5 Type of Switch Based on Size.

4.4.5.1 There are typically two types of switching equipment that can be used for most applications.

a) For installations up to about 5,000 lines, there are several commercially available private branch exchange (PBX) switches that meet Army performance requirements. This PBX will be referred to as a Small Dial Central Office (SDCO).

b) For installations with initial sizes over 5,000 lines or for OCONUS locations, the selection of currently available PBXs with developed DISN software is much smaller. The larger switch will simply be referred to as the DCO.

4.4.5.1.2 The two sizes have many features in common. Both have redundant common control and supply similar user features. They differ in areas such as administrative capabilities, built-in test equipment, and trunk interfaces.

4.4.5.2 Small Dial Central Office.

4.4.5.2.1 For installations of less than 5,000 lines, small PBX equipment, with the capabilities of a PBX, as defined in Joint Interoperability and Engineering Organization (JIEO) Technical Report 8249 (Generic Switching Center Requirements), is generally installed.

4.4.5.2.2 The SDCO generally consists of one common control cabinet and a number of peripheral card cabinets. Lines and trunks are mixed within the shelves in the peripheral cabinets to load balance the system. The design is usually very compact, power efficient, and state of the art. The software is modern and very feature rich.

4.4.5.2.3 The main differences between the SDCO switch and the larger DCO switch are administrative capabilities and built-in diagnostics.

4.4.5.2.4 Trunking to the Defense Switched Network (DSN) is through PBX access lines. One or two specific trunks are used to support, and are reserved for only, multi-level precedence and pre-emption (MLPP). DSN interswitch trunks are not supported on the SDCO switch.

4.4.5.2.5 The maximum loop resistance design is often smaller than for the larger PBX. The loop resistance is generally dependent upon the manufacturer of the switch, but it ranges between 900 and 1500 ohms.

4.4.5.3 Dial Central Office Switch.

4.4.5.3.1 For initial installations larger than 5,000 lines, but in some cases as small as 2,000 or 3,000 lines, or for OCONUS locations, large PBX equipment, with the capabilities of an end office, as defined in JIEO Technical Report 8249 (Generic Switching Center Requirements), is generally installed.

4.4.5.3.2 The large switch typically consists of a common control cabinet, one or more switch matrix cabinets, a miscellaneous cabinet, a number of peripheral control cabinets, a trunk cabinet, and several line card cabinets.

4.4.5.3.3 The large switch has more administrative capabilities, but not necessarily more user features. It can be programmed to perform automatic OSP cable testing during off-hours.

4.4.5.3.4 It can support DSN inter-switch trunks and thus function at a higher network level in the DISN. Any member of the DSN interswitch trunk group can be used to carry MLPP traffic.

4.4.5.3.5 Although the smaller switch product lines seem to have more rapidly adopted new manufacturing technology, the newer interfaces such as Integrated Services Digital Network (ISDN), packet, and LAN are generally fielded first and more robustly on the larger switch.

4.4.5.4 RSU Choice.

4.4.5.4.1 Most of the PBX product lines have some kind of cabinet that can be remotely located to provide line cards for a remote group of users. This cabinet is supported by the common control in the main switch and usually connected by fiber optic cable.

4.4.5.4.2 The small PBX generally has the capability to remotely locate a cabinet of line cards over a limited distance. Most remote cabinets for the SDCO do not have stand-alone switching capability.

4.4.5.4.3 The larger switches have the capability to serve significantly larger remote switching units. They feature stand-alone switching capability in the event the links to the main switch are cut. They often support several thousand users at distances in excess of 100 miles.

4.4.5.4.3.1 All features available to the main switch subscribers are supported. Features are transparent to all users (same control codes).

4.4.5.4.3.2 Trunking is supported for local city trunks for backdoor connectivity (mainly for emergency).

4.4.5.4.3.3 In the stand alone mode, as occurs when links are cut, the remote switching unit does not have access to the software in the main switch; therefore, service is limited to Plain Old Telephone Service (POTS). Most of the control software for MLPP and ISDN resides at the main switch.

4.4.5.4.3.4 There are usually dialing plan restrictions that effect portability of numbers if standalone support is desired. Because of the programming complexity, stand-alone capability is only recommended for users who absolutely need immediate local telephone service.

4.4.5.4.4 Some large switches also support simple remote shelves similar to the capabilities of the smaller switch. These shelves can generally be remoted using standard multiplexing equipment. The shelves usually have no stand-alone switching capability and may or may not support electronic features or ISDN telephone instruments.

4.4.5.5 RSU vs. SLC.

4.4.5.5.1 Subscriber loop carrier (SLC) is now supported on several larger switches through direct interface. That is, the switch has software that allows standard remote terminal (RT) equipment to interface directly with switch T1 interface cards without the need for central office terminals (COT), line cabinets, line cards, or frame jumpers.

4.4.5.5.2 Since this interface at the switch side is still copper T1, there must be some sort of compatible multiplexer between the switch and the OSP cable. But line cabinets and distribution frame space are not needed, so there is generally a space savings in the switch room and a cost savings in line equipment if the RT already exists. This interface is now standardized.

4.4.6 Connectivity Between Nodes.

4.4.6.1 There are at least three different technologies in common use at this time: copper T-carrier, fiber optic DS3, and fiber optic Synchronous Optical Network (SONET).

4.4.6.2 Copper T-Carrier.
New systems seldom use copper T-carrier, although it is possible that a small upgrade to an existing system will have to use T-carrier for logistics reasons.

4.4.6.3 Fiber Optic DS3.
Most switching systems require DS1 transmission between the main switch and the remote switching units. Transmission systems have been installed for many years that transmit one, two, or three DS3 signals over fiber optic cable between those two points. Multiplexer shelves break the high-speed signal (45, 90, or 150 megabits) into multiple DS1s for interface to the switch. At the present time, fiber optic DS3 systems are generally only used as small upgrades to existing systems.

4.4.6.4 Fiber Optic SONET Ring.

4.4.6.4.1 Most manufacturers have ring software for their SONET hardware. If ring software is in use, a break in the active fiber optic cable will not cause an outage. The system will automatically reroute traffic back over the alternate cable. All points are still connected together.

4.4.6.4.2 One of the main selling points of SONET is that it is standards based. That is, theoretically, SONET multiplexers from different manufacturers can operate together in the same system. However, many manufacturers use different methods of implementing ring software. If a ring is to be implemented, all equipment should be the same model and run the same software load.

4.4.6.4.3 SONET rings require fiber optic cable routes that are diversely routed and physically connect the outlying sites into the ring. On a large installation, the cost of the fiber optic cable to complete the ring can total millions of dollars.

4.4.6.4.4 The problem is further compounded on larger sites by capacity issues. The ring architecture requires the entire ring to have the bandwidth to carry the sum of all the payloads of each remote site operating on the ring. At a small site with less than four nodes, a single OC12 system can be used to provide a ring. The advantage of this design is that the equipment in the central office is minimized. Only one chassis is required at the main switch to provide for four nodes.

4.4.6.5 Fiber Optic SONET Star.

4.4.6.5.1 SONET equipment operated in a star configuration is recommended for the transmission system. This architecture can generally be implemented at reasonable cost.

4.4.6.5.2 The star wired architecture is a nice fit with the structured wiring used by OSCAR-II for the copper distribution cables. It provides reasonable reliability at reasonable cost. Since each arm is required to carry only the traffic between the main switch and one node, ultra high-speed equipment is not needed.

4.4.6.5.3 The architecture also fits well with the design used by CUITN, so cable costs are minimized.

4.4.6.5.4 Using the star architecture also eliminates the problem of proprietary ring software. Equipment from different manufacturers can safely be mixed in the system, eliminating dependence on one vendor and allowing future replacement of equipment a piece at a time.

4.4.7 Telephone End Equipment.

4.4.7.1 Distance Limitations.
Standard 2500 sets and ISDN instruments can be located at fairly long distances (18,000 feet) from the serving switch, depending on wire gauge and loss, whereas electronic feature telephones generally have shorter reach (3,000 feet).

4.4.7.2 Features.
Electronic feature telephones and ISDN telephones are attractive to many users because they provide programmable feature buttons for ease of use and multiple lines. The additional lines, of course, are electronic and only provisioned in software. The instrument is served by only one or two pairs of wire regardless of the number of line appearances. The electronic feature telephone interface is generally proprietary in nature while the ISDN set is standard, but the feature telephone is often one half to one third of the cost of an ISDN set and is therefore more often chosen.

4.4.7.3 Portability.
The feature telephone can only be used on the model switch for which it was designed and so it can not be moved from post to post unless both posts have the same switch type. There can be problems moving even ISDN telephone sets from post to post. The early models were not interchangeable because the programming of the multiple buttons was not standardized.

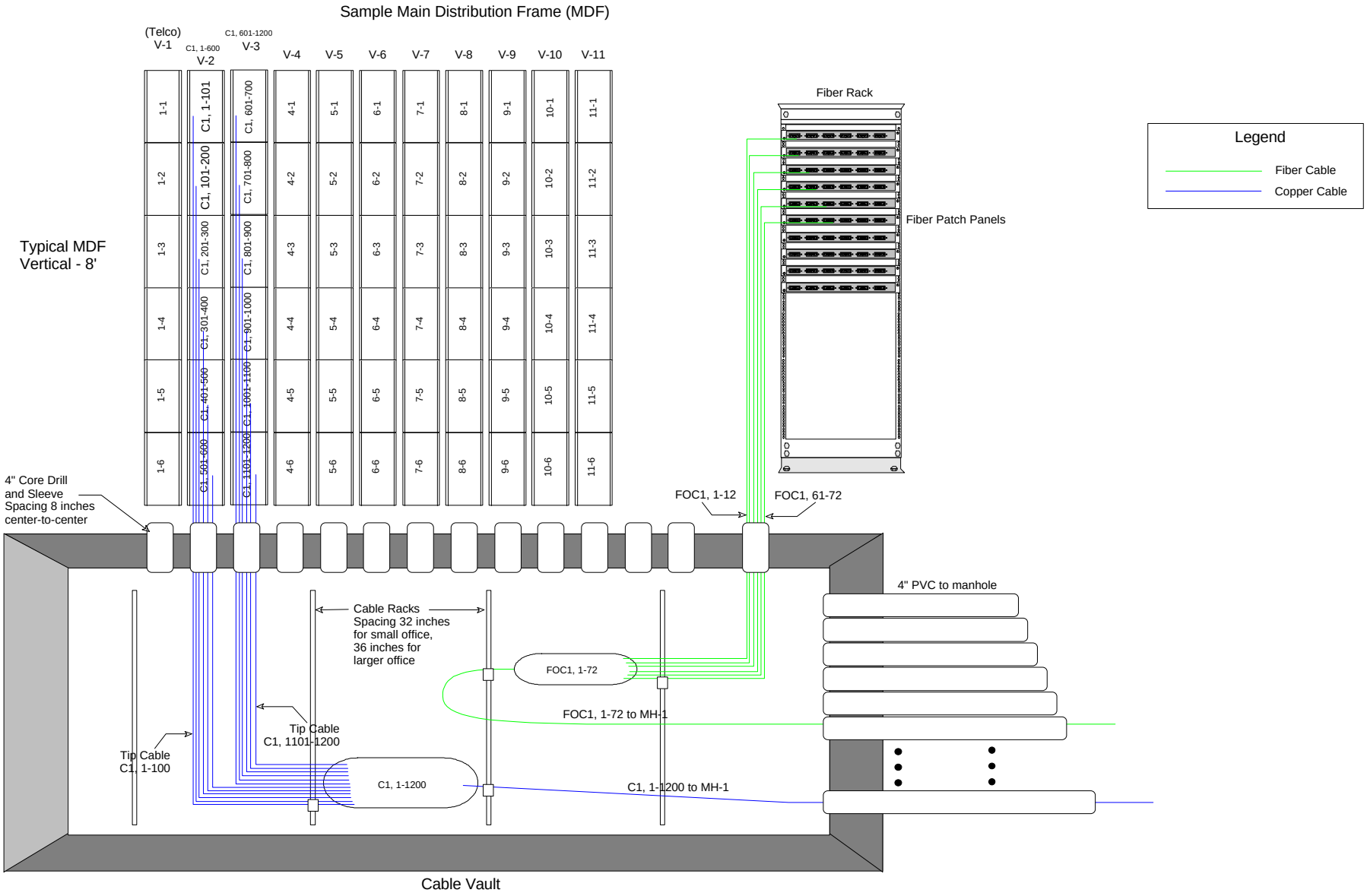


Figure 4-1: MDF and Cable Vault Schematic

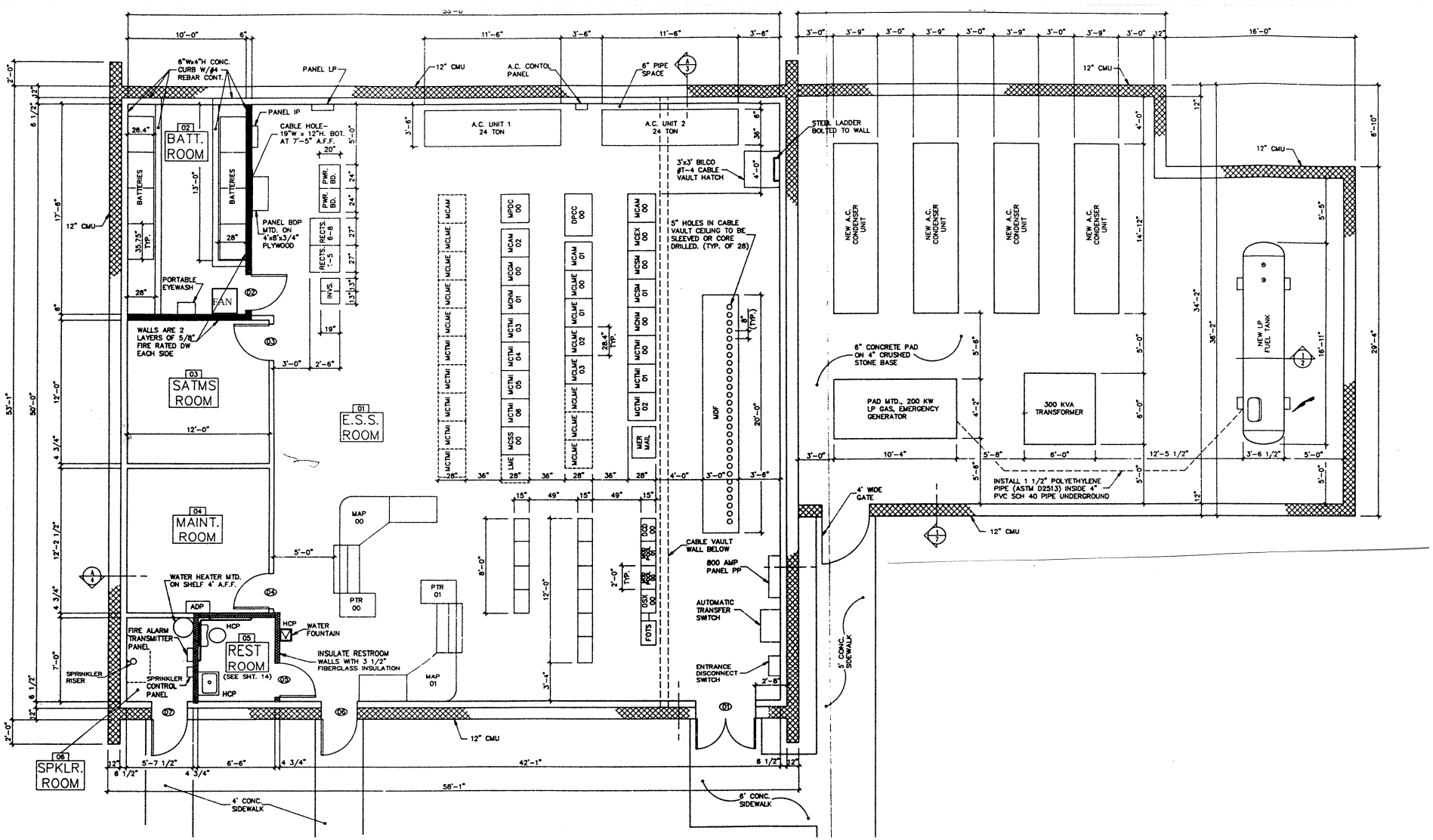


Figure 4-2: Typical Switch Room Layout

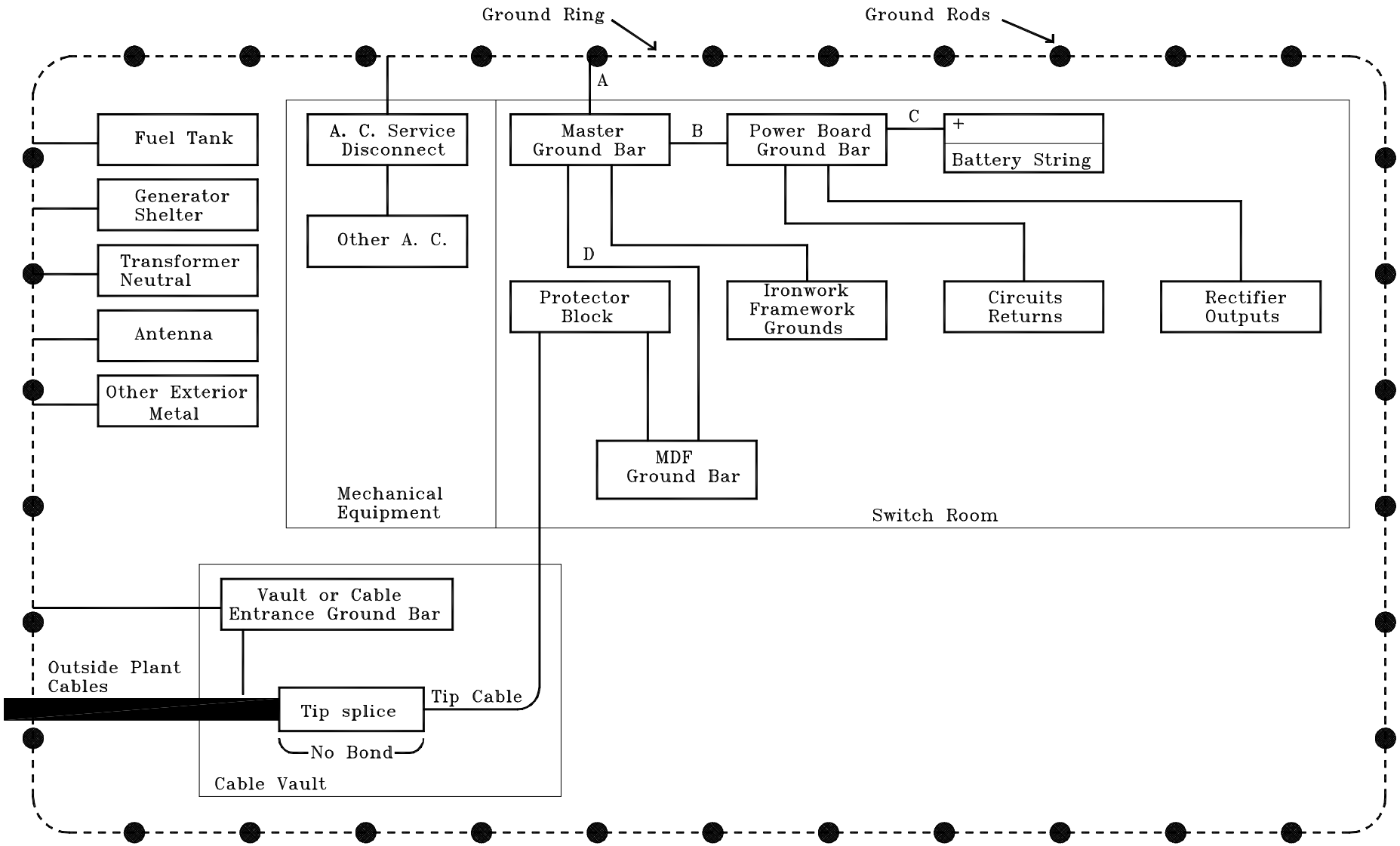


Figure 4-3: Grounding Schematic

5 Network Architecture

5.1 Network.

The planned network architecture is based on data switches at the MCN and ADN locations, and edge devices at the TCs. The transport technology has been ATM; however, GbE is now an approved alternative. These edge devices allow attachment of legacy switched or shared media LANs, by emulating the legacy protocols over the networks. Routers can be used to interface to non-Ethernet legacy LANs, like FDDI or token-ring, and to interconnect the emulated LANs created on top of the network.

5.2 Nodes.

The nodes of the installation telecommunications network consist of the MCNs, ADN, and primary and secondary EUB entrance facilities. Details on the TC and user work locations/work areas are found in the Premise Distribution Systems section.

5.2.1 Main Communication Node.

5.2.1.1 The MCN houses the main telephone switch, installation MDF, wide area network (WAN) gateway, primary installation backbone network switch, and ADN-level switch for connecting to primary EUB TCs in its local service area. Figure 5-1: Main Communications Node depicts a typical MCN. The alternate MCN houses a secondary telephone switch or RSU, alternate WAN gateway, the alternate installation backbone network switch, and ADN-level switch for connections to primary EUB TCs in its local service area. Collocating the data network equipment with the central telephone switch allows for the use of the existing manholes, duct system, and fiber cable plant, and provides the ability to integrate the telephone and data backbone networks when the technology becomes available. The MCN installation backbone switch interconnects all ADN backbone switches.

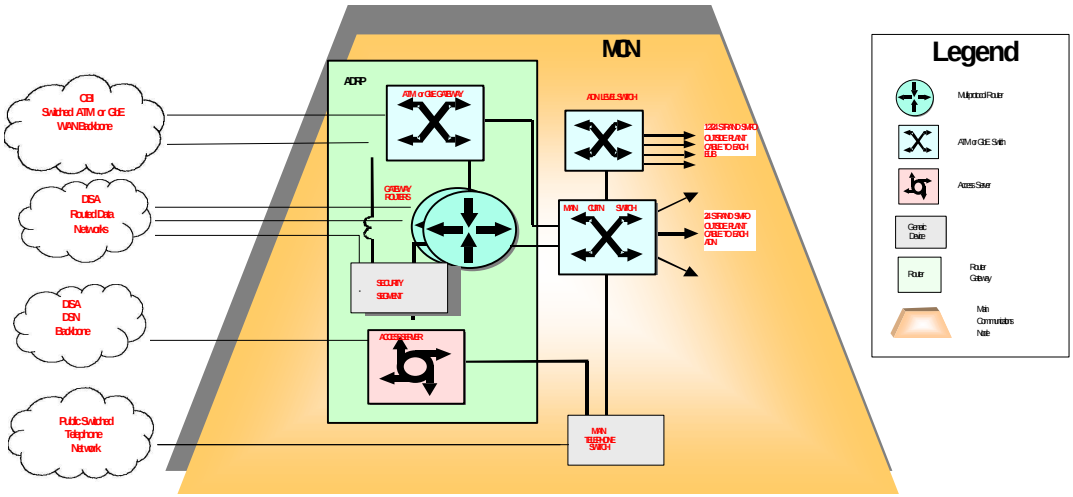


Figure 5-1: Main Communications Node

5.2.1.2 MCN Switches.

For GbE networks the main switch will be located at the MCN with 1000 megabits per second (Mb/s) single-mode fiber optic connection to the ADNs. For an ATM network the ATM switch

is typically located at the MCN and provides interconnectivity to the ADNs via point-to-point ATM link at a minimum of OC-3c rates (155 Mb/s).

5.2.1.3 Alternate MCN.
The A-MCN at each site should provide full backup to the MCN, with a full suite of standby equipment with automatic switch-over. The A-MCN should be configured and connected to the ADNs identically to the MCN.

5.2.1.4 Maximization of Existing Resources.
Any installation data communication network that is deployed (e.g., CUITN) should be collocated with the existing telecommunications resources. This allows for utilization of existing manhole and duct systems, cable plant, human resources, and most significantly, the ability to utilize network resources when the telecommunication and data communication networks become integrated onto one backbone network. The MCN at each site should be considered for use as the main point in the backbone. Because of its physical location, physical security, existing cable vaults and wiring plants, the MCN inherently lends itself as a focal point for network configuration. One network switch is typically located at the MCN and provides interconnectivity to the ADNs via point-to-point links. Figure 5-1: Main Communications Node depicts an MCN interconnection.

5.2.2 Area Distribution Node.

5.2.2.1 ADNs house the data network switches and/or the telephone RSU. They are connected to the main switches in the MCN and to switches/edge devices/hubs in each TC (Figure 5-2: Area Distribution Node). The telephone RSU and data switches/hubs should be collocated in ADNs to concentrate the cabling and traffic from user systems in the EUBs. Locations for ADNs should be based on both geographical considerations as well as the traffic load from the users. The maximum distance between the ADN and any customer station may not exceed a specified distance based on technology consideration cost trade-off. (Note: The current policy is for a nominal 10,000 to 13,500 feet and not to exceed 18,000 feet. These distances are based on signaling limitations of the data and telephone technologies as well as cable consolidation considerations.)

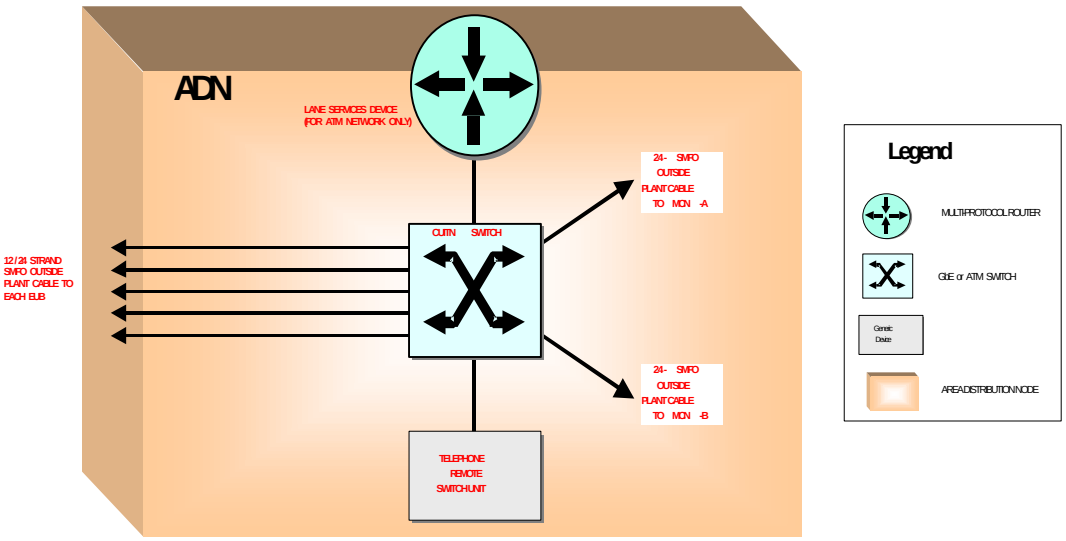


Figure 5-2: Area Distribution Node

5.2.2.2 ADNs provide backbone connectivity via data switches to the EUBs over fiber optic links. The equipment located at the ADNs should be able to provide connectivity for legacy systems as well as a migration path to future technologies. The data switch at the ADN connects the switches/edge devices/hub located in the EUB TC to the network backbone via OC-3c or higher links. ADNs will also house one-armed routers and LANE services devices, when required for support of legacy LANs.

5.2.2.3 The switches at all ADNs should be connected to both the primary MCN and the A-MCN. This interconnection configuration provides robust connection for capacity, scalability, full throughput, and redundancy. Every ADN should have a direct connection to the MCNs and at least two other ADNs. Reference paragraph 3.4.2 and subparagraphs of the OSP for fiber cable sizing.

5.2.3 End User Building Entrance Facility.

5.2.3.1 Primary EUB TC.
Primary EUB TCs support a full complement of data users (nominally 50), and are the termination point for the horizontal wiring with a maximum distance of 295 feet from the TC to the wall outlet. EUB TCs may concentrate telecommunications network connections from surrounding secondary EUB TCs in order to provide a cost effective distribution network.

5.2.3.2 Secondary EUB TC.
Secondary EUB TCs support a separate complement of data users. The maximum distance limitation of 295 feet from TC to wall outlet still applies. Secondary EUB TCs are connected to the edge device in the primary EUB TC for connection to the installation network. This configuration supports efficient cable and equipment utilization.

5.2.3.3 The preferred customer premises LAN is a data hub attached to an GbE edge device located in the TC with horizontal wiring to the user workstations and single-mode fiber riser cable to the other TCs and single-mode fiber OSP cable to the ADN. The EUB data hubs should be of modular design to allow for growth in size and changes in technologies and bandwidth.

5.2.3.4 Figure 5-8: Typical LAN, Administrative, shows the recommended basic components for an EUB. Stackable or small modular chassis can be used as noted on the sketch, for small user population with a small potential for growth. Uplink or high speed interfaces on the stackable hubs should be modular to allow for changes in connection speeds.

5.2.3.5 EUB LANs can consist of existing 10BaseT shared Ethernet. Switched 10 and 100 Mb Ethernet are now widely available, with Gigabit Ethernet also emerging for building and small campus environments. The US Army is currently migrating away from Token Ring, and the designer should consider replacing the Token Ring LAN with an 802.x switched network. Some general guidelines for designing and implementing EUB LANs are:

a) The equipment and hardware will be from manufacturers that have a minimum of 3 years experience in producing the types of systems and equipment specified.

b) The equipment should adhere to current or emerging standards accepted by the industry (802.x, etc.).

c) The LAN electronics and software should be fully compatible and interoperable with the existing EUB equipment, if the EUB equipment is not to be replaced.

d) Obsolete items or items no longer supported by the manufacturer should not be utilized to fulfill the requirements in the EUB.

5.3 Description of Networks.
Campus area networks (CANs) utilize a backbone (normally fiber optic cable,) to interconnect the LANs in several buildings or groups of buildings within a local area, such as an Army post. Metropolitan area networks (MANs), interconnect several CANs and/or LANs usually with leased commercial lines (normally fiber optic cable) over a larger area or region such as the DoD, DA and Army installations in the Military District of Washington. WANs interconnect LANs, CANs, and MANs through a non-homogeneous mix of transport media and communications protocols, encompassing national or international areas. WANs offer a wide range of services (such as DISN and commercial services) normally not available in smaller networks. Additional information can be found on the CUITN web-site (https://cuitn.hqisec.army.mil/).

5.4 Topology.

5.4.1 Mesh Connections.
The installation backbone network should be connected in a partial mesh topology for optimum configuration with switched technologies (for GbE and ATM). Interim logical bus or ring topologies can be configured using the physical star topology. The mesh connections provide survivability and load leveling.

5.4.2 Partial Mesh.
A partial mesh should be used to maintain scaleable-switched environment. At a minimum, all ADNs should have connections to both the primary and alternate MCNs and two adjacent ADNs.

5.4.3 Dual Connectivity.
The required full time availability is achieved by using primary and alternate MCNs and connecting each ADN to both MCNs. This supports the capacity required out of each ADN and provides the required full time availability. It is highly desirable to provide diverse fiber optic cable routings so that a single cable cut/break will not prohibit ADN connections to an MCN.

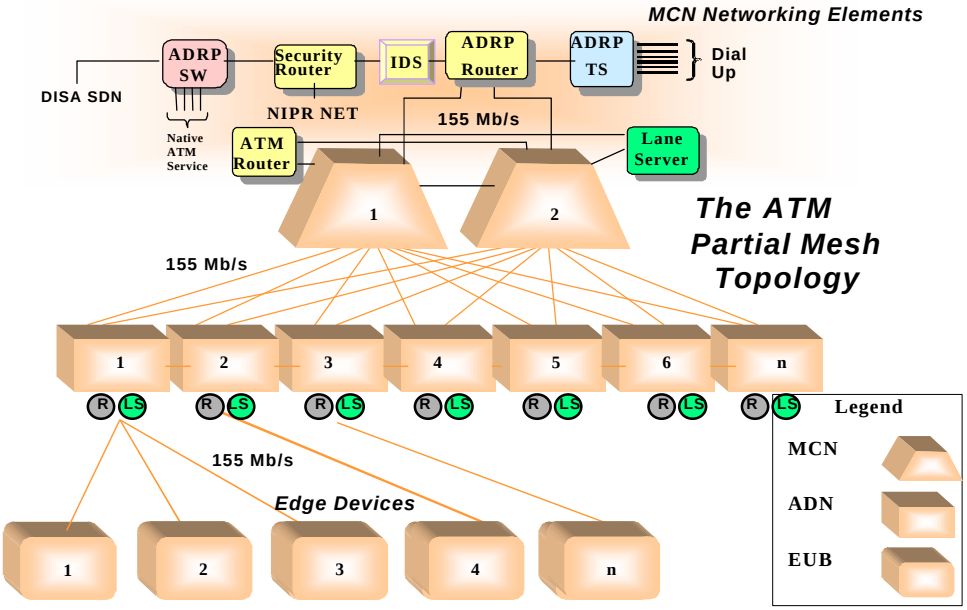


Figure 5-3a: Partial ATM Mesh Topology

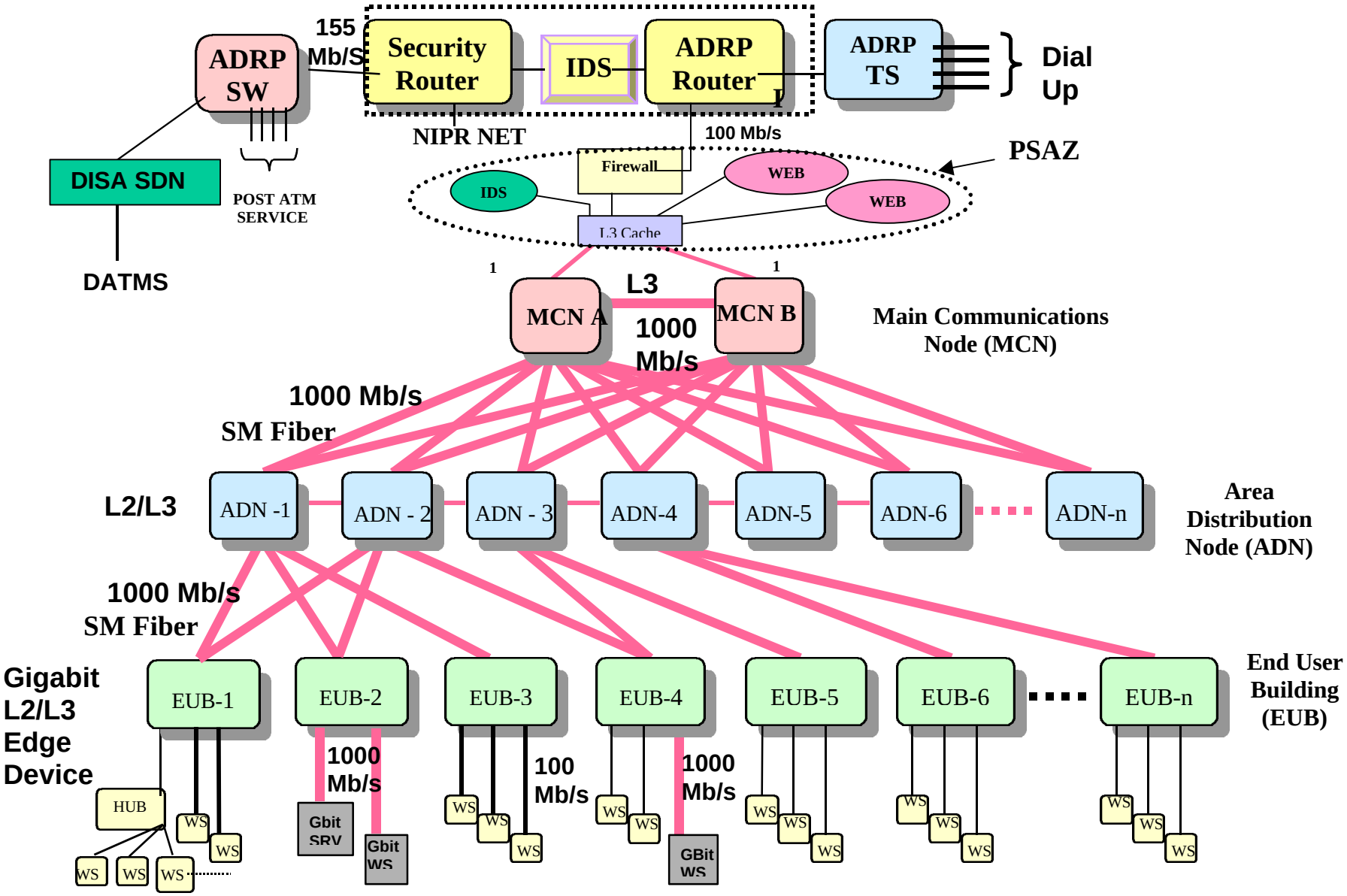


Figure 5-3b: Switched GbE Parital Mesh Topology

5.5 Local Area Network.

5.5.1 Area Limitations.

On a post the LANs are data networks that normally serve an EUB and in some instances serve a limited number of EUBs. Normal LANs are designed to only serve an area that is a few square kilometers.

5.5.2 LAN Configuration.

Within an EUB there are many options available in configuring a LAN. Depending on the number of end users LANs may stretch across buildings. In most cases a LAN will be established in each EUB and support about 25 to 150 end users. When EUBs have fewer than 25 users they can be tied into other EUBs and their LAN. Keeping the size of the LAN to a limited number allows optimizations to be made favoring greater data rates and placing less pressure on centrally located servers. Figure 5-4: LAN Topology is an example of a recommended LAN Topology. In this topology an EUB stacks hubs in a telecommunications closet supporting one to the variable number of floors in the building. Using this topology centralizes communications troubleshooting while isolating different floors of the LAN.

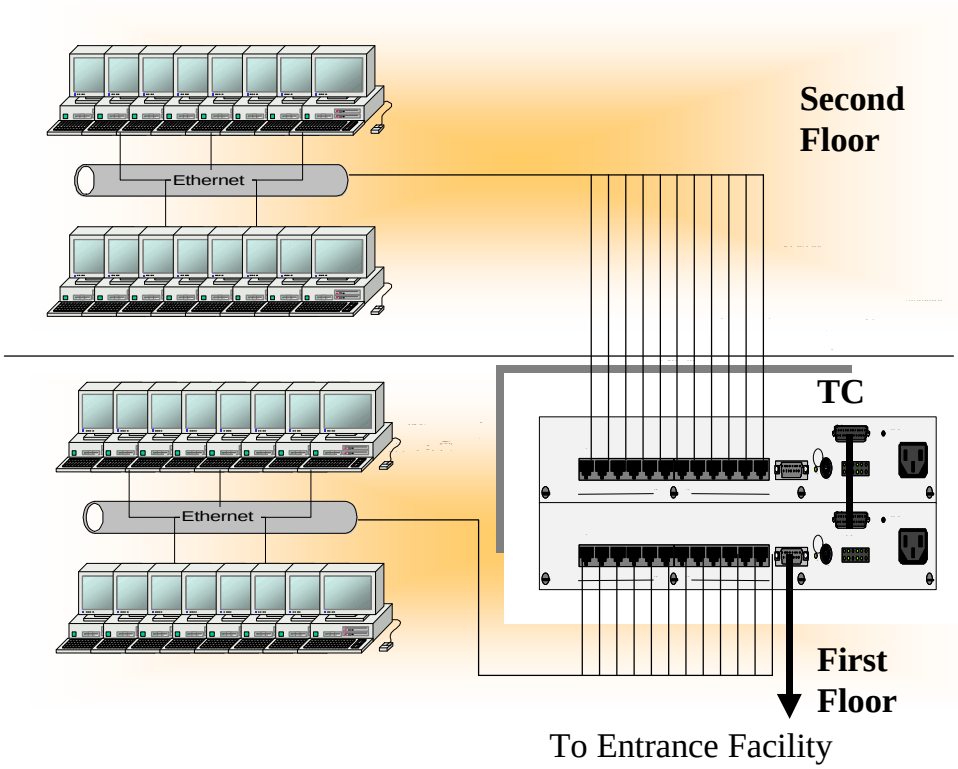


Figure 5-4: LAN Topology

5.6 Alternate Types of LANs.

5.6.1 Multimode Fiber Optics LAN.

The internal LAN cable plant will consist of UTP Cat 5, cable or multi-mode fiber optic cable from the hub to the end user device. When using fiber optic cabling the Building Entrance Facility will connect directly to the hub. Placing fiber optic patch panels within the TC may increase decibel (dB) loss affecting the performance of the fiber. Limit the number of splices necessary in any LAN, but especially using fiber optic cabling. Multimode fiber optics to the end user devices can be used in the LAN with either an edge device or a hub. To connect to an Ethernet hub you must have a fiber card in the hub or use an Ethernet to fiber optic transceiver. Figure 5-5. LAN Using Multimode Fiber Optics is a diagram of a LAN using multimode fiber optic cabling and an edge device. Only single-mode fiber will be used for riser cable.

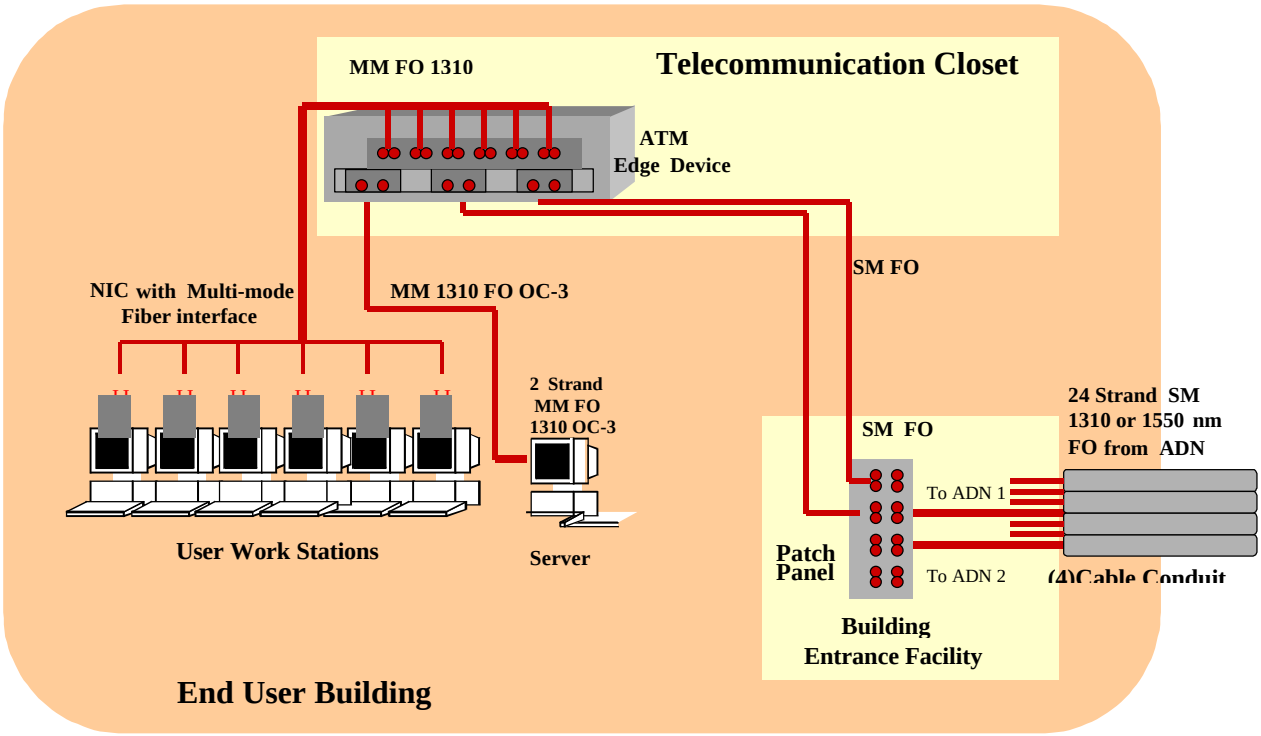


Figure 5-5. LAN Using Multimode Fiber Optics

5.6.2 Fiber Distributed Data Interface LAN.

In cases where there is limited funding available to procure current data networking hardware designers can make use of existing routers. Routers that were initially placed on the backbone of a network and removed when the network was upgraded, can be moved down to an EUB and used with Fiber Distributed Data Interface (FDDI) to improve the performance of a LAN. In order to do this it is necessary to have or install Single-mode fiber optic cabling from the EUB entrance facility into the router and between multiple routers used within the LAN. Figure 5-6: LAN Using FDDI shows a typical FDDI LAN.

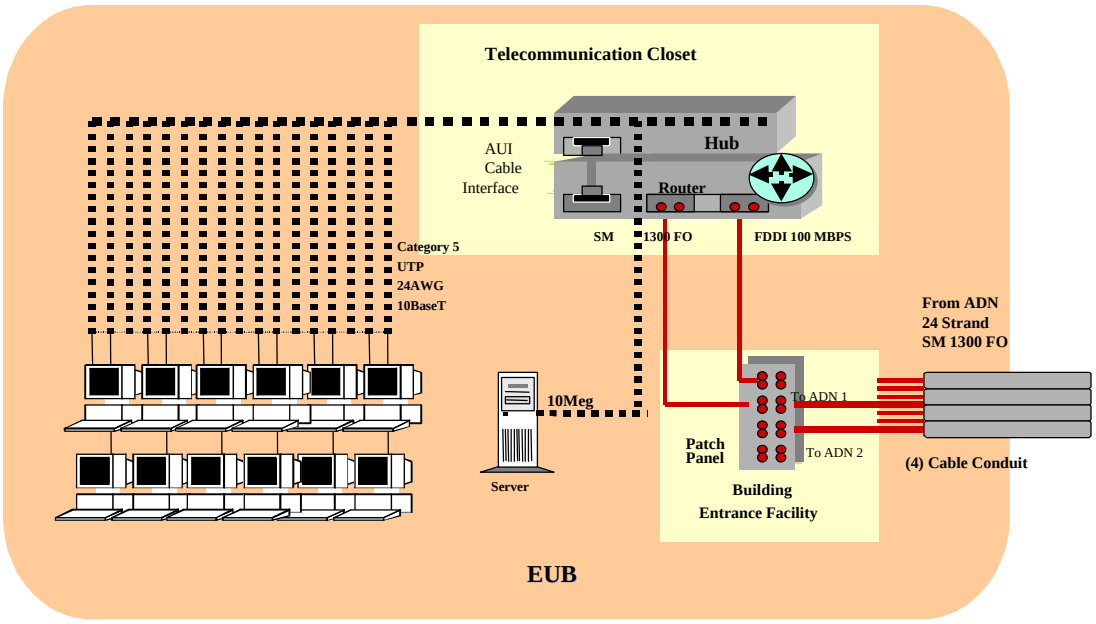


Figure 5-6: LAN Using FDDI

5.6.3 T1 Wire Line LAN.

One way to connect buildings that do not meet the minimum essential requirement qualifications, but still need network connectivity is using a T1. A T1 connection can be made via the voice backbone using a Digital Service Unit/Channel Service Unit (DSU/CSU) into a router. This defers cost from additional cable plant installations for data connectivity. The DSU/CSU connects to the voice patch panel via UTP and requires two pair. From the DSU/CSU a connection is made using a serial cable into a serial port on a router. The router then connects into a hub that provides Ethernet service to end users. Figure 5-7: LAN Using T1 Wire Line depicts a T1 Wire Line LAN.

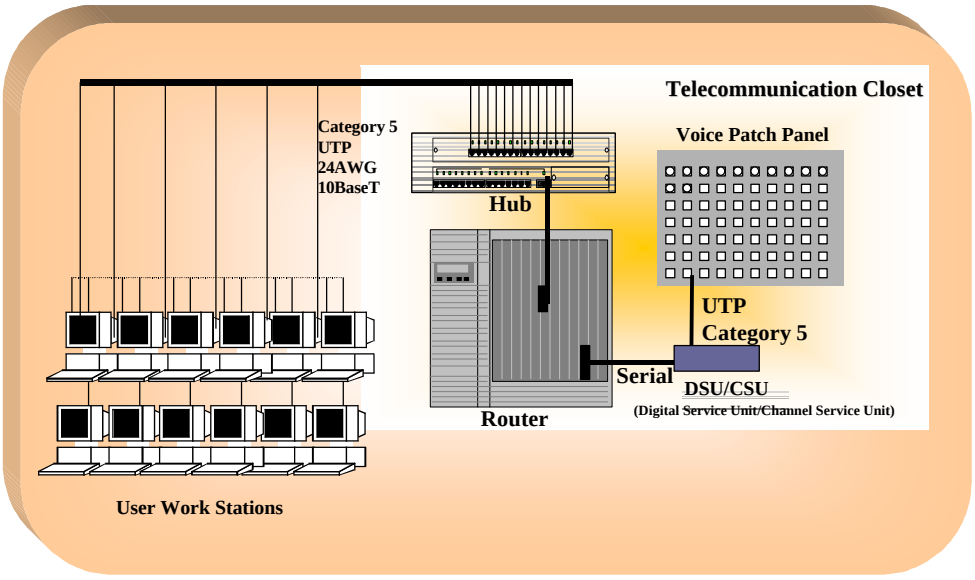


Figure 5-7: LAN Using T1 Wire Line

5.7 Growth.
All equipment hubs (including routers and switches) will be designed with at least a 25 percent growth factor to support future system enhancements. In addition, fiber optic cable installations will be of sufficient quantity to accommodate at least a 100 percent increase in requirements.

5.8 Interfaces.

5.8.1 Data Interface.

5.8.1.1 The primary data interface between the ADN and the TC is an ATM/SONET OC-3 or GbE signal on single-mode fiber optic cable operating at 1310 or 1550 nanometers (nm). Two separate fiber connections are required: one for transmit and one for receive.

5.8.1.2 The primary host/server interface at the ADN is an Institute of Electrical and Electronics Engineers (IEEE) 802.3 10BaseFL on multimode fiber optic cable (horizontal wiring operating at 850 and 1310 nm).

5.8.1.3 The projected future host/server interface at the ADN is a 100-Mb/s IEEE 802.X or an ATM/SONET OC-3c signal on multimode fiber optic cable (horizontal wiring operating at 850 and 1310 nm) or Cat 5E UTP.

5.8.1.4 An alternative data interface for existing multimode fiber optic cable is an IEEE 802.3 signal at an ST connector on multimode fiber optic cable operating at 850 and 1310 nm.

5.8.1.5 An alternative legacy LAN/host/server data interface is a FDDI at a network interface card (NIC) dual fiber connector on multimode fiber optic cable operating at 850 and 1310 nm. The multimode fiber optic cable is used for horizontal cabling to host computers or gateway devices at the ADN. Optionally, this provides the interface to existing FDDI subnetworks using existing multimode fiber optic cable.

5.8.1.6 An optional legacy LAN data interface is to extend the FDDI to a distant TC using single-mode fiber optic cable operating at 1310 and 1550 nm. Four separate connections using ST connectors are required for transmit and receive on both the "A" and "B" FDDI rings. Compatible single-mode equipment is required at both the TC and the ADN.

5.8.1.7 An alternative interface for legacy equipment with T1/T3 interfaces is an ATM cell adaptation multiplexer which converts the T1/T3 signal to an ATM/SONET OC-3c signal at an ST connector on single-mode fiber optic cable operating at 1310 and 1550 nm.

5.8.2 User Interface.
Users will interface with the network system from workstations. Connection to the individual workstation will be through the EUB LAN as described above, and the PDS. The EUB LAN is connected to the network backbone through the edge device.

5.9 Connection to OSP.
Data switches and edge devices connect to the OSP through the single-mode fiber optic patch panel installed as part of the OSP distribution system. The single-mode patch panel description and locations are specified in the PDS and OSP sections of this document. The data switches and edge devices should be collocated with the single-mode fiber optic patch panels in order to avoid having to run an extension of the fiber cabling.

5.10 Asymmetric Digital Subscriber Line Technology.

Asymmetric Digital Subscriber Line (ADSL) is a new modem technology that converts existing twisted-pair telephone lines into access paths for multimedia and high-speed data communications. The significant advantage that ADSL offers to users is an economical means of substantially increasing bandwidth in small offices. Therefore, ADSL may be an option for sites that are not connected to an Installation Infrastructure, and with limited connections, such as Reserve and Guard Units. ADSL transmits more than 6 Mb/s (optionally up to 8 Mb/s) to a subscriber, and as much as 640 kilobits per second (kb/s) (optionally up to 1 Mb/s) more in both directions. Such rates expand existing access capacity by a factor of 50 or more without new cabling. ADSL can literally transform the information network from one limited to voice, text, and low resolution graphics to a powerful, ubiquitous system capable of bringing multimedia, including full motion video, to every building.

5.11 Wireless Connections.

5.11.1 Wireless LAN Technologies.

Current wireless LANs use one of three technologies, narrowband radio frequency (RF) signaling, spread spectrum RF signaling, and infrared light signaling as the medium between computers, the web, or each other. The wireless LAN can be connected to an existing wired LAN as an extension, or can form the basis of a new network. Data rates for the most widespread commercial wireless LANs are in the 1.6 Mb/s range, with some reaching rates as high as 11 Mb/s.

5.11.2 Elements of Wireless LAN.

Three elements make up a wireless LAN: the distribution system, the access point and the portable unit or station. The distribution system will typically be an Ethernet or Token Ring wired LAN, which forms the backbone of the system. The access point is a stationary transceiver attached to a wired LAN that serves as a wired to wireless LAN bridge, or to the backbone of a wired Ethernet LAN via a simple cable. The portable unit or station can be a personal computer (PC), notebook, or any other type of input/output (I/O) device.

5.11.3 Cell.

The basic building block of the wireless LAN is the “cell”. This is the area in which the wireless communication takes place. The coverage area of a cell depends upon the strength of the propagated radio signal and the type and construction of walls, partitions, and other physical characteristics of the environment.

5.11.4 Access Point.

The access point connects the cells of the wireless LAN with one another and connects wireless LAN cells to a wired Ethernet LAN via a cable connection to an Ethernet LAN outlet. The basic cell comprises an access point and all the associated wireless stations. The number of wireless stations per cell depends on the amount and type of data traffic. In a "busy" environment a cell might contain 50 stations while in a more "relaxed" environment 200 stations might be supported. A stand-alone cell is an ideal method of setting up a small to medium sized wireless LAN between a number of workstations or workgroups. This type of cell requires no cabling. The stations communicate with each other via the access point, which manages the data traffic in the cell. The access point functions as a bridge between the cell and the wired LAN. Stations in the cell and in other linked cells can now access all the wired LAN facilities.

5.11.5 Standards.
Standards for wireless networking are included in IEEE 802.11.

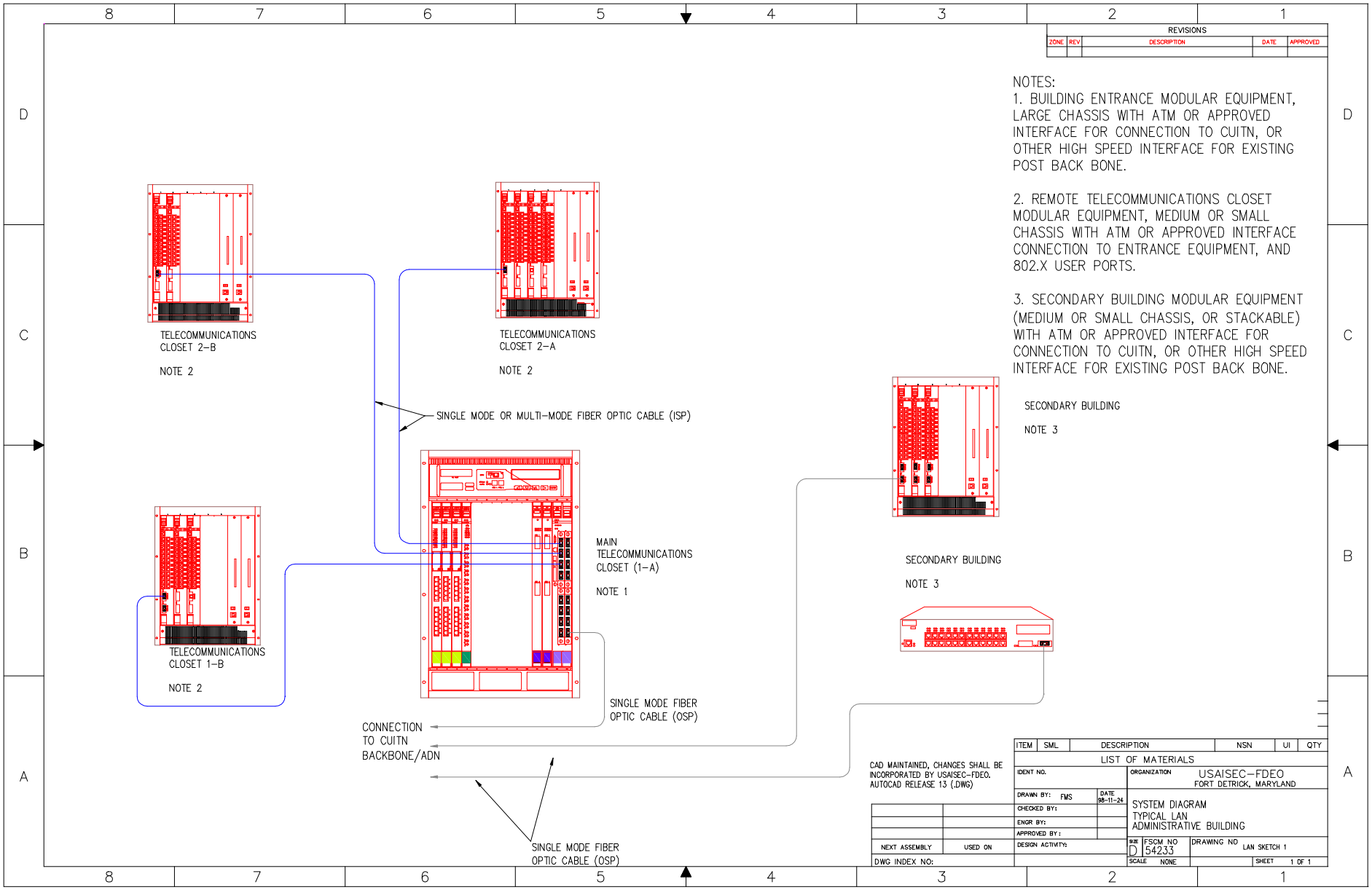


Figure 5-8: Typical LAN, Administrative

6 Network and Systems Management.

6.1 Network and Systems Management Objective.

The primary objective of Army Network and Systems Management (NSM) is to provide effective, responsive, and proactive management of Army I3A networks and systems with minimal life-cycle support costs. This includes the integration of management systems and subsystems to provide an enterprise view of Army network and system assets. NSM includes the five Open System Interconnection (OSI) management functional areas of fault management, configuration management, accounting management, performance management, and security management (FCAPS), as well as O&M functions.

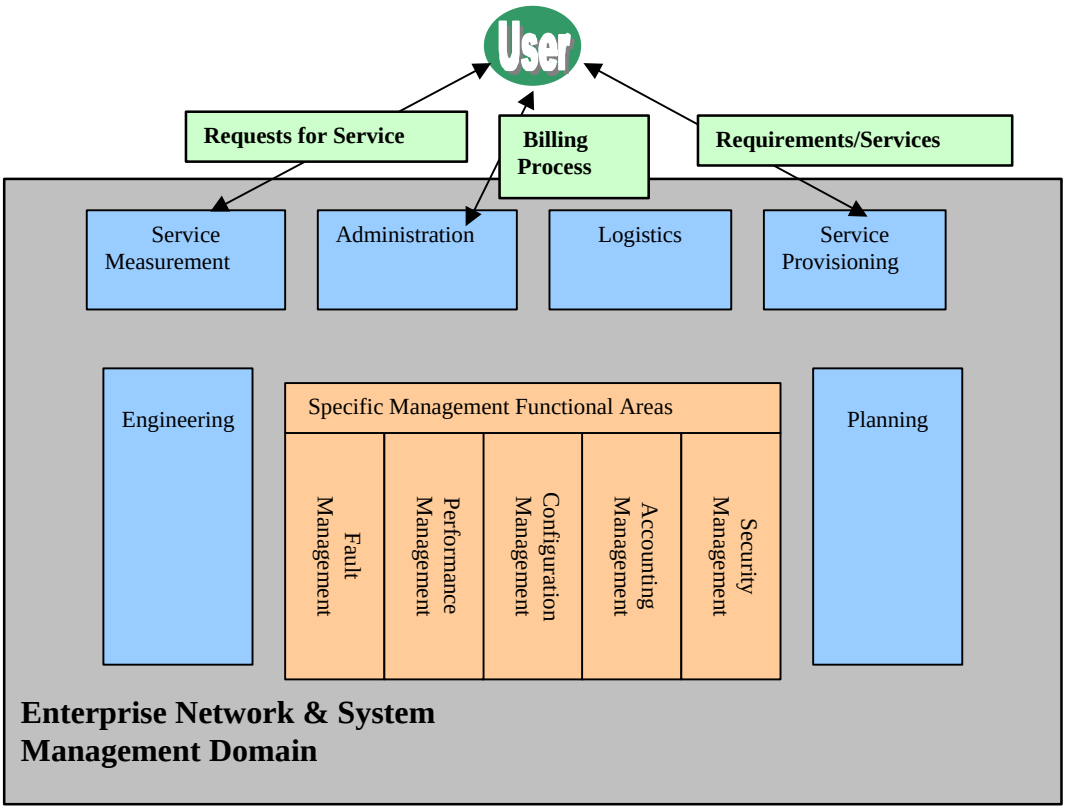


Figure 6-1: NSM Functional Definition

6.2 Management Functional Areas.

Installations will generally have similar NSM requirements. The main difference will be that some installations will require the capability to support all or most of the management functional areas while others will only require a subset of these capabilities. Commercial-off-the-shelf (COTS) NSM tools will be utilized to the greatest extent possible to support the NSM functional areas described in the following paragraphs.

6.2.1 Fault Management.
Fault management provides information on the status of the network and subnetworks to aid in the detection, isolation, and correction of problems in network and systems components. The primary benefit is an increase in network and system reliability since operations personnel are provided tools to enable them to quickly detect and correct problems.

6.2.2 Configuration Management.
Configuration management aids in the identification and control of managed resources. It enhances the network and system manager's control over managed resources by providing access to important configuration data. Configuration management also includes a capability to compare the actual operational configuration with an established baseline configuration in order to detect and report discrepancies.

6.2.3 Accounting Management.
Accounting management involves gathering data on the utilization of network and system resources and tracking the use of these resources by user or user group. It provides the ability to bill users, allocate resources based on usage, and plan for future network and system growth.

6.2.4 Performance Management.
Performance management provides the capability to evaluate and report on the behavior of managed devices and networks. It allows network and system managers to monitor, analyze, tune, control, and report on the health of network and system components and make changes as necessary.

6.2.5 Security Management.
Security management safeguards information and information systems against sabotage, tampering, denial of service, and misuse by unauthorized persons. It provides authentication, access control, encryption, and audit trail services for networks and systems.

6.3 Centralized NSM.
NSM can be performed locally, centrally, or with a combination of the two (flexible NSM). Under a flexible approach, the division of labor between a centralized facility and individual DOIM is determined on a case by case basis. This will be determined by a number of factors such as technical capabilities of the local and centralized management centers, network and system requirements, and mission.

6.4 Local NSM.

6.4.1 NSM Roles of DOIM.
Local NSM and touch labor is accomplished at each installation by the DOIM. DOIMs have responsibility for the information networks and systems on their installations or within an assigned geographic area. Field Manual FM 11-71 http://www.sysarch.gordon.army.mil/doctrine/statusdoctrine/pubstatus.htm, Network and Systems Management, defines the DOIMs NSM roles as follows:

a) Provide O&M of the common-user information systems infrastructure on their installation or in an assigned area.

b) Provide on-site support and problem resolution coordination for devices that provide access to Army or DoD level networks and systems.

c) Share information concerning installation-level information systems or their supporting environment.

d) Implement NSM practices in accordance with DoD, Army, and Major Command (MACOM) policy and guidance.

e) Establish policies and procedures for the O&M of information systems within their area of responsibility.

f) Establish interservice support agreements with the United States Army Signal Command (USASC).

6.4.2 Benefits.

NSM must be synchronized across the Army enterprise. Army programs fielding networks and/or systems to installations will coordinate NSM requirements with the Army I3A Enterprise Systems Management (ESM) Working Group (WG), the appropriate Theater Network and Systems Operations Center (TNSOC), and affected DOIMs. This will result in the following benefits:

a) Minimize duplication of existing functionality.

b) Reduce the need for multiple NSM servers at each installation.

c) Reduce hardware and software costs.

d) Increase integration.

6.4.3 Installation NSM Servers.

DOIMs will operate one or more NSM servers running a suite of COTS NSM software tools to support local NSM functional requirements as illustrated in Figure 6-2: NSM Block Diagram. The installation NSM servers will be capable of interacting with the TNSOC NSM system in order to exchange management information, as required. This will enable the TNSOCs to view the entire infrastructure in each theater and to assist DOIMs with local and/or WAN management issues. The installation NSM servers will be connected to the installation backbone data network to enable management of the installation network infrastructure. This will also enable remote monitoring and/or control of network and systems components from a centralized facility, as required. The installation NSM server software will also have the capability to filter NSM information in order to minimize traffic transmitted across the WAN to the central location.

6.4.4 Installation Managed Devices.

Simple Network Management Protocol (SNMP) agents will reside on installation servers and network communications devices in order to standardize management of components across the Army enterprise. In addition, installation servers will have COTS system management agents to allow remote management of system components in the functional areas of fault, configuration, accounting, performance, and security as required.

6.4.5 NSM Interface.

The primary NSM server interface will initially be 10/100BaseT at most installations. However, those installations that have an ATM LANE/VLAN architecture will use an ATM OC3c LANE interface for the NSM server. Two separate fiber connections will be required for transmit and receive. A separate virtual LAN (VLAN) will be setup for NSM traffic for all managed devices. Appropriate traffic filters will be installed to prevent access to this VLAN from non-authorized and non-NSM devices. Some backbone equipment (e.g., uninterruptible power systems) may

require 10/100BaseT or 10/100Base FL optical fiber connections to a hub to connect to this VLAN architecture.

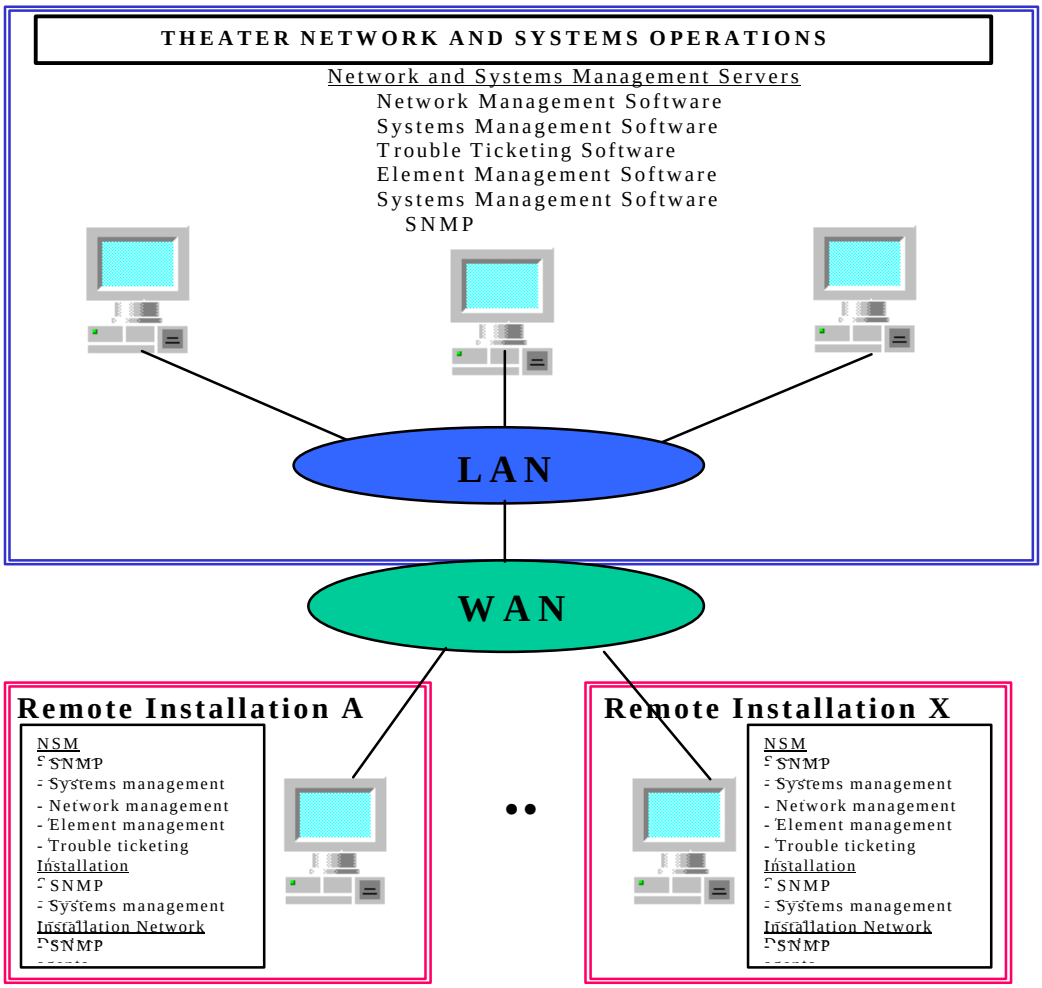


Figure 6-2: NSM Block Diagram

6.5 JTA-Army NSM Guidelines.

JTA-Army NSM Guidelines may be found at http://arch-odisc4.army.mil/aes/aea/jta-a/jtaa55/html/jtaa55.htm. Currently, the telephone systems and data systems are managed separately at Army installations (i.e., separate NSM servers and software for each). This is expected to gradually change over the next several years as the distinctions between voice and data diminish. The goal will be to consolidate voice and data management to the greatest extent possible. Army NSM mandates are found in Section 3 of the JTA-Army, version 5.5. Since data communications and telecommunications systems are currently following different migration paths the JTA-A breaks NSM mandates into two categories. JTA-Army paragraph 3.2.5.1 specifies the NSM standards for data communications and paragraph 3.2.5.2 specifies the NSM standards for telecommunications.

6.5.1 Data Communications NSM.

6.5.1.1 Installation network and system components will support the applicable JTA-Army SNMP mandates. Paragraph 3.2.5.1 of the JTA-Army specifies the data communications NSM standards for management stations and management agents (in end systems and networked elements). "Management stations and management agents (in end systems and networked elements) should support the SNMP. The following SNMP-related standard is mandated: IAB Standard 15/RFC-1157, Simple Network Management Protocol (SNMP), May 1990 (RFC site http://www.ietf.cnri.reston.va.us/rfc.html).

6.5.1.2 To standardize the management scope and view of end systems and networks, the following standards for Management Information Base (MIB) modules of the management information base are mandated:

a) IETF Standard 16/IETF RFC-1155, Structure of Management Information for Transmission Control Protocol/Internet Protocol (TCP/IP)-based Internets, May 1990/IETF RFC-1212, Concise MIB Definitions, March 1991.

b) IETF Standard 17/IETF RFC -1213, Management Information Base for network management of TCP/IP-based Internets: MIB-II, March 1991.

c) IETF RFC-1514, Host Resources MIB, September 1993.

d) STD-50/IETF RFC-1643, Definitions of Managed Objects for the Ethernet-like Interface Types, July 1994.

e) IETF RFC-1757, Remote Network Monitoring Management Information Base, (RMON version 1), February 1995.

f) IETF RFC-1850, Open Shortest Path First (OSPF) version 2 Management Information Base, November 1995."

6.5.2 Telecommunications NSM.

6.5.2.1 The JTA-Army, paragraph 3.2.5.2, defines the requirements for management of telecommunications voice switches. The Telecommunications Management Network (TMN) standards provide the architectural structure to manage and operate telecommunication networks and services. TMN has a layered logical architecture including the Network Element Layer, the Element Manager Layer, the Service Management Layer, the Business Management Layer, and the five Management Functional Areas similar to NSM. This structure allows telecommunication networks to be centrally managed.

6.5.2.2 Management systems for telecommunications voice switches will implement the TMN framework. To perform information exchange within a voice telephony network, the following Telecommunications Management Network framework standards are mandated:

a) ANSI T1.204, OAM&P, Lower Layer Protocols for TMN Interfaces Between Operations Systems and Network Elements, 1993.

b) ANSI T1.208, OAM&P, Upper Layer Protocols for TMN Interfaces Between Operations Systems and Network Elements, 1993.

c) ITU-TM.3207.1, TMN Management Service - Maintenance Aspects of Broadband Integrated Services Digital Network (BISDN) Management, 1996.
http://www.itu.int/publications/index.html

d) ITU-T M.3211.1, TMN Management Service: Fault and Performance Management of the ISDN Access, 1996.

e) ITU-T M.3400, TMN Management Functions, 1992.

f) ISO/IEC 9595, Information Technology Open-Systems Interconnection Common Management Information Services, December 1991.

g) ISO/IEC 9596-1:1991, Information Technology -- Open Systems Interconnection -- Common Management Information Protocol (CMIP) -- Part 1: Specification.

h) ISO/IEC 9596-2:1993, Information Technology -- Open Systems Interconnection -- Common Management Information Protocol: Protocol Implementation Conformance Statement (PICS) proforma.

6.6 NSM References

a) DISC4 Minimum Essential Requirements (MER) statement dated 23 September 1992, SUBJ: Connectivity for the Common User Installation Transport Network (CUITN) During FY 93.

b) Installation Information Transfer System Improvement Program (I3AIP) Policy, 29 August 1994.

c) Field Manual 11-71, Network and Systems Management (NSM), Final Draft, October 1999.

d) Automated Information System (AIS) Technical Guide, Network and Systems Management (NSM), Version 2.1, September 1999.

7 Security

7.1 Security Architecture.

This document concentrates on the data transport architecture for Army sustaining base operations. The security section will concentrate on the security capabilities that are rightfully the responsibility of the transport mechanism and infrastructure network. For the purposes of this discussion we will use the model architecture for discussing the appropriate places for security features.

7.2 Security Features.

At present there are few security features available for ATM-based networks. This is expected to change as infrastructures become more heavily invested in ATM and the user community demands security capabilities equal to, and surpassing, present routed TCP/IP-based Ethernet networks. Therefore, this architecture will discuss the requirements in terms of capabilities and leave the specific technologies out for further discussion in the implementation guides associated with specific fieldings.

7.3 Data Transport Security.

7.3.1 Transport Mechanism.

The Data Transport mechanism is responsible for insuring that data is delivered from the sending system to the receiving system in a manner that is timely and is free from eavesdropping and manipulation. The transport mechanism will employ devices that can enforce Department of the Army (DA) and local policies pertaining to acceptable information activities, e.g. services provided and acceptable source/destination addresses. However, the transport mechanism will largely work on the principle that it will ensure successful delivery of information, without regard for the content.

7.3.2 Physical Media and Networking Devices.

The Data Transport mechanism includes the physical media and connective network devices that route or switch data from end system to end system. The physical media will require protection to deny or detect any attempt to gain unauthorized access or any condition that results in a denial of service. The networking devices require protection much the same as the data processing systems described above. Physical and electronic access must be limited to those systems or individuals that require access to maintain the data transport, and no greater access. Physical security should be strictly enforced to deny local attempts at denial or service or unauthorized access. Remote management should only be accomplished if the system can provide for secure identification and authentication (I&A) and secure interaction.

7.4 Interfaces.

7.4.1 Gateway Interfaces.

7.4.1.1 The gateway interface is the installation infrastructure’s first line of defense against the electronic unknown. While the WAN services are provided by Defense Information System Agency (DISA), we cannot rely on them to insure that all users that cross the gateway are authorized and benevolent visitors. The gateway should prevent obvious malicious activity from

entering the installation. Additionally, the gateway interface should limit access to the installation to those who have legitimate, authorized business in the installation.

7.4.1.2 It is incumbent upon the network to halt all traffic that is openly of malicious intent. There are some specific commands and actions that only have the purpose of causing denial of service to the installation network or a host/server therein. These actions must not be allowed to enter the installation. There are also many protocols that are not required to extend beyond an installation. These should be prevented from leaving or entering the gateway. Traffic that is source-addressed from a network inside of the gateway, but is originating from outside the gateway, must be halted. The implied requirement in this action is that the malicious activity can be identified both by individual data units and the composite session data. Further implied is that this information can then be used to deny entry of the data unit and the session halted.

7.4.1.3 The gateway should limit access to the installation to those who have legitimate, authorized business on the installation. Based on positive control of all data needs of the installation any protocol and source or destination address combination that has not been identified as being required for the conduct of the installations business should be halted. The installation data transport provider must insure that the threat condition is accounted for and access limited to the prevalent condition. It is incumbent upon the Army to identify a set of threat conditions that will be used to limit access to the installation. DISA is presently working on such a system. It is envisioned that the threat conditions will dictate the openness of the installation. Under normal conditions access may be granted to Non-classified Internet Protocol Router Network (NIPRNET) and Internet sources. In a higher threat condition access may be limited to just NIPRNET users. In the highest level of threat condition access may be limited to that subset of activity that has been previously identified as being critical to the accomplishment of the Army's mission. These determinations have yet to be made but the gateway interface must be capable of rapidly supporting multiple access profiles. Establishment and maintenance of authorized users, protocols and activities will require the active involvement of the Security Management Operations Center (SMOC).

7.4.1.4 Physical security is an important aspect of gateway interface security. Access to the gateway devices must be limited to those individuals that require access to perform authorized function. Electronic access needs to be conducted over a secure link after proper identification. Across multiple installations care must be taken to insure that identical passwords are not used at various locations. A system of one-time passwords should be implemented across the Army.

7.5 Area Distribution Node.

7.5.1 ADN Interface.

The ADNs have the same requirements as the gateway interface. However at this level the granularity of the detail can become much finer. Whereas the installation gateway had to accommodate all required interfaces across the installation, the ADN can be limited to only those requirements within the scope of the ADN.

7.5.2 End User Building.

Like the ADNs, the EUB network devices have the same requirements as the Interface Gateway. The granularity at this level should have a high level of precision that allows for very specific filtering that matches specific data interfaces. It is important that the Infrastructure Network

managers maintain the network devices in the EUBs. This will allow for a configuration managed solution to be incorporated throughout the infrastructure.

7.6 Relationship Between Data Transport Security Responsibilities and System Security Responsibilities.

7.6.1 Delivery.

It is incumbent upon the data transport system to insure timely, reliable delivery of data. However, the data that is delivered can only be as reliable as that inserted into the transport system. The reliability of that data is directly related to the security of the system that uses the data transport mechanism.

7.6.2 Connectivity Requirements.

The installation infrastructure manager must insure that the networks linked into the EUBs meet minimum connectivity requirements. The minimum standards must define host/server requirements and limit the interfaces that the end systems may have. Minimum C2 Protect mechanisms much be incorporated into the end systems. Physical and business practice security must be enforced prior to connectivity to the installation infrastructure. Additionally, connectivity requirements must be identified by the end system to the End User Building network administrator. The EUB network administrator will compile this information and roll it up to the infrastructure network administrator so that interface requirements can be translated into access controls.

7.7 Secure Infrastructure Services.

The Installation Infrastructure has a responsibility to provide a secure networking environment in which systems can safely operate. In addition to the security specific functionality described above there are also key services, which are properly in the domain of the Installation Infrastructure, which must be secure. These services are typically those that are required for maintaining a secure, operating infrastructure.

7.7.1 Address to Name Resolution.

Address to Name resolution, currently embodied in Domain Name Service (DNS), is a central component of an infrastructure that allows human understandable addresses to be translated to specific hardware or protocol addresses that is understood by the transporting mechanism. A breach of security in this area could allow a threat actor to either reroute traffic entirely to the wrong address or to surreptitiously copy traffic to a listening post address. Either of these is totally unacceptable and must be prevented. Typical security functionality that will be used here is server hardening, intrusion detection, limited access, and automated mechanisms that will direct inquiries away from a suspect server to a known good backup server until the suspicious activity can be reconciled.

7.7.2 Remote Access.

It will likely remain a requirement that users who are distant from their installation infrastructure will require access back to their home station. Circumstances will require that remote access be obtained through means other than direct network connectivity. For the foreseeable future dial-up remains the most likely means of reaching back to the home installation. Unregulated dial-in access can pose serious security vulnerabilities to the infrastructure. In order to prevent this, the installation infrastructure will be required to provide for centralized remote access. The infrastructure will employ a series of dial-up servers that will centrally authenticate the remote

users. Upon authentication the remote users will be granted network access privileges based on the user remote privileges defined in Central Authentication Server (CAS). The infrastructure network will employ a capability to regulate access based on user privileges. Access attempts beyond authorized privileges will cause the current access to be terminated and will flag the database to temporarily deny access to the user until the situation can be resolved. As part of this capability a system will be put in place to monitor remote access network activity for actions that are detrimental to the network or systems. Security provisions at this network access point will be similar to those at the gateway interface.

7.7.3 Installation Security Management.
The installation will be required to man an established SMOC. This SMOC may be integrated into the Network and Systems Management Center. However, if it is, the leader of the SMOC must have a separate reporting line to the responsible commander. This will enforce the basic Army premise that personnel responsible for security cannot be the same personnel who are responsible for ensuring that the system is operational. There are many benefits to a combination of Network, Systems, and Security Management. Many problems are initially observed as one type of problem but may affect the other areas. Likewise, correcting a security problem usually involves the network or system operators. Functions of the SMOC include management of access control features, intrusion detection monitoring and correlation, security upgrades, and coordination with Army and Regional Computer Emergency Response Teams.

7.7.4 Central Authentication Server.
The installation infrastructure will be responsible for developing and maintaining a single, central, authentication server database. This CAS will maintain a complete database of all authorized users on the installation and their associated privileges. Single sign-on will also be employed on the installation and access coordinated with the CAS. Due to the power of the CAS it will require server hardening and additional security features that prevent modification of unauthorized access to, or denial of service of the CAS.

7.7.5 Microsoft New Technology Domain Controller.
Though it would be best to avoid discussing specific technologies in this paper this is an area where it cannot be avoided. The infrastructure of the near future will employ to a certain degree Microsoft New Technology (MS NT). An inherent feature of the NT networking is the concept of Domains. Presently there is no central authority for the establishment and management of Domains on installations. The installation of the future must have centralized Domain control to properly regulate trust relationships. Without central control the trust relationships become difficult to manage and are no longer under the control of the original domain. Like the CAS and DNS, the NT Domain Controller must be hardened and have additional safeguards to identify attempts at unauthorized access, modification, or denial of service. Automatic roll over to a secure backup Domain Controller must be envisioned.

7.7.6 Public Key Infrastructure.
The National Security Agency, with DISA support, has been assigned the lead within DoD to manage Public Key Infrastructure (PKI). Work continues on defining the actual infrastructure to support a Public Key capability and the architecture is not stable enough to discuss in this version of this document. Installations should coordinate with DISC4 to determine the latest guidance on PKI.

7.7.7 Physical Security.

In addition to the electronic and protocol aspects of information assurance the issue of physical security becomes critical in a fixed infrastructure. As has been documented in the early sections of this architecture the cable plant and associated equipment, e.g., manholes, ducts, distribution centers and Telecommunications Closets, all become single points of failure for buildings, organizations, or the entire installation. Very close attention must be paid to physically secure these locations from ground attack, acts of God, or unintentional activity. Typically Telecommunications Closets and distribution centers are contained in reasonably secure facilities. However, the campus cable run is typically left unprotected as it runs across the installation. A single malicious individual, or a coordinated assault on the ducts and manholes housing the installed cable, can quickly disrupt or destroy the transport capability. As a prelude to specific or general hostilities this would be devastating on the installations ability to respond to a crises. Therefore, a great deal of attention should be provided to insure that the appropriate physical security specialists have analyzed the various facilities and cable routing and applied appropriate physical security. The specific physical layout of the wiring and distribution capability needs to clearly indicate the location of the support mechanisms for high profile organizations. Further analysis should be given to identifying those locations that become high risk due to the exposed nature of the duct work or manholes, or where the cabling becomes concentrated and a single act could cause greater damage.

7.7.8 Wireless Connection Security.

As addressed in paragraph 5.10 Wireless Connections are become somewhat common place on Army installations. Prior to designing a Wireless LAN or other wireless connection specific attention must be paid to various areas of information assurance. Most of today's data used by the Army has been deemed to be Sensitive, But Unclassified (SBU). All SBU data, in accordance with AR 380-19, must be encrypted. Care must be taken to select a solution that satisfies AR 380-19 encryption requirements or appropriate Risk Management Reviews and waivers must be obtained. In addition to the privacy afforded by encryption, additional consideration must be given to Operations Security (OPSEC) and criticality of service availability. An analysis should include considering whether or not the intended environment, e.g., retail or wholesale logistics points, can be used as an indicator of military preparedness. Even with encryption the level of data transmission might indicate a heightened state of activity which could be used, along with other indicators, to confirm a specific readiness activity. Additionally, analysis must be given to determine if the function being accommodated by Wireless Connections is critical to the operational mission of the organization. If it is critical, then care must be taken to insure that simple jamming activities cannot be used to create a denial of service. Solutions may include the use of spread spectrum technologies, frequency hopping, or a good Continuity of Operations Plan (COOP) status that can easily be implemented without significant loss of function.

8 List of Acronyms and Abbreviations

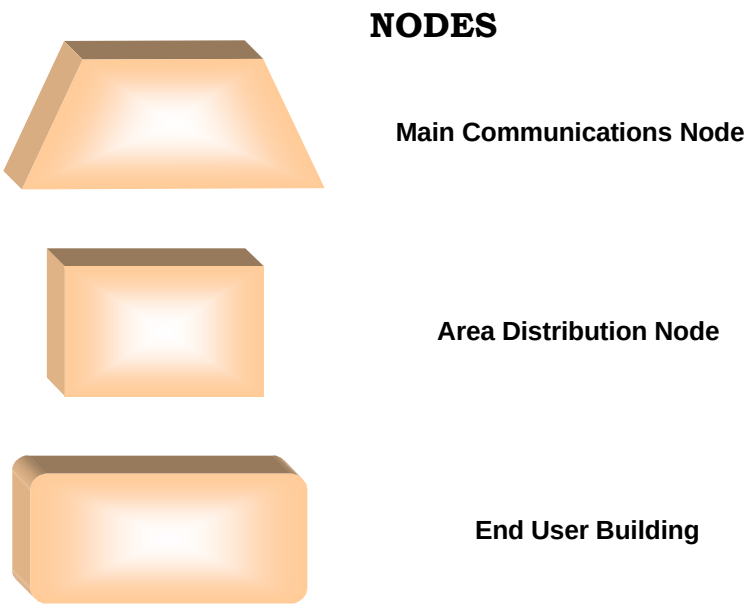
Acronym	Definition	Paragraph (first used)
AC	alternating current	2.4.13
ADN	Area Distribution Node	2.7.2
ADRP	Army DISN Router Program	1.4.3
ADSL	Asymmetric Digital Subscriber Line	5.10
AFH	Army Family Housing	2.2.6
AIS	Automated Information System	4.1
A-MCN	Alternate Main Communications Node	3.4.2.1
ATM	Asynchronous Transfer Mode	2.7.1
AWG	American Wire Gauge	2.3.1.1
BISDN	Broadband Integrated Services Digital Network	6.5.2.2c
BTU	British Thermal Unit	4.3.1
C^3I	Command, Control, Communications, and Intelligence	1.8
CAN	campus area networks	5.3
CAS	Central Authentication Server	7.7.2
Cat 3	Category 3	2.2.3.1
Cat 5E	Enhanced Category 5	2.2.3.1
CATV	cable television	2.2.1
CC	center-to-center	3.2.2.1.3
CCTV	closed circuit television	2.2.1
CEGB	cable entrance ground bar	4.3.7.5.3.3
CMIP	Common Management Information Protocol	6.5.2.2g
CONUS	Continental United States	1.1
COOP	Continuity of Operations Plan	7.7.8
COT	central office terminal	4.4.5.5.1
COTS	commercial-off-the-shelf	6.2
CP	Consolidation Point	2.3.5.6.2
CP	center-to-point	3.2.2.1.3
CSU	Channel Service Unit	5.6.3
CUITN	Common User Installation Transport Network	1.4.3
DA	Department of the Army	7.3.1
dB	decibel	5.6.1
DC	direct current	4.3.7.5.3.5
DCO	Dial Central Office	4.2
DDN	Defense Data Network	2.7.2
DISA	Defense Information System Agency	7.4.1.1
DISN	Defense Information Systems Network	1.4.3

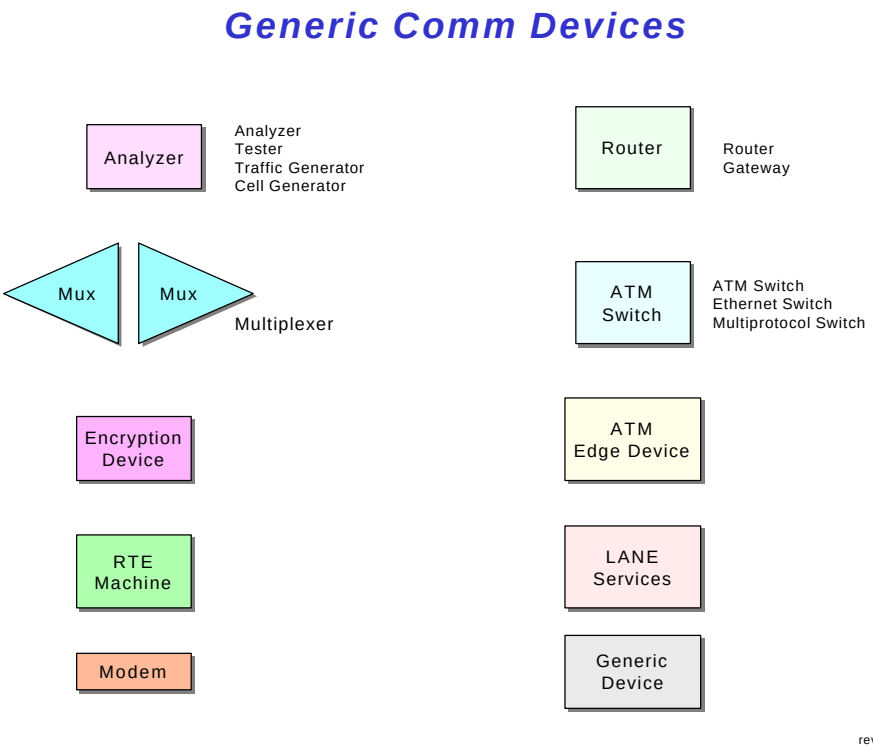
Acronym	Definition	Paragraph (first used)
DNS	Domain Name Service	7.7.1
DoD	Department of Defense	1.7
DoDD	Department of Defense Directive	1.8
DoDI	Department of Defense Instructions	1.8
DOIM	Director of Information Management	2.6.2
DPW	Department of Public Works	3.2.2.3.14.1
DSN	Defense Switched Network	4.4.5.2.4
DSSMP	Digital Switched Systems Modernization Program	1.4.3
DSU	Digital Service Unit	5.6.3
EIA	Electronics Industry Association	2.1
EMT	electrical metallic tubing	2.3.5.3
ESM	Enterprise Systems Management	6.4.2
EUB	end user building	2.7.1
FCAPS	fault management, configuration management, accounting management, performance management, and security management	6.1
FDDI	Fiber Distributed Data Interface	5.6.2
ft	foot	Table 3-2
GbE	Gigabit Ethernet	1.4.3
GSP	galvanized steel pipe	3.2.2.3.14
HQDA	Headquarters, Department of the Army	3.2.2.3.8
HVAC	heating, ventilation, and air-conditioning	2.7
I&A	identification and authentication	7.3.2
I/O	input/output	5.11.2
I3A	Installation Information Infrastructure Architecture	1.1
I3AIP	Installation Information Transfer System Improvement Program	6.6b
ICEA	Insulated Cable Engineers Association	2.3.3.1
IEEE	Institute of Electrical and Electronics Engineers	5.8.1.2
IMA	Information Mission Area	2.8.2.2
in	inch	Table 3-2
IS	information system	2.1
ISDN	Integrated Services Digital Network	4.4.5.3.5
JIEO	Joint Interoperability and Engineering Organization	4.4.5.2.1
JTA	Joint Technical Architecture	1.7
JTA-A	Joint Technical Architecture-Army	1.7
kb/s	kilobits per second	5.1
LAN	local area network	1.6.3
LANE	LAN Emulation	2.7.1

Acronym	Definition	Paragraph (first used)
MACOM	Major Command	6.4.1d
MAN	metropolitan area network	5.3
Mb/s	megabits per second	5.2.1.2
MCA	Military Construction-Army	1.4.3
MCN	Main Communications Node	2.7.3
MDF	main distribution frame	4.3.7
MER	Minimum Essential Requirements	3.2.2.3.8
MGB	master ground bar	4.3.7.5.3.2
MIB	Management Information Base	6.5.1.2
MLPP	multi-level precedence and pre-emption	4.4.5.2.4
MPOA	Multi-Protocol Over ATM	2.7.1
MS NT	Microsoft New Technology	7.7.5
MUTOA	Multi-User Telecommunication Outlet Assembly	2.3.5.6.2
NEC	National Electrical Code	4.3.7.5.3.2
NIC	network interface card	5.8.1.5
NIPRNET	Non-classified Internet Protocol Router Network	7.4.1.3
N-ISDN	Narrowband-Integrated Services Digital Network	1.4.3
nm	nanometers	5.8.1.1
NSM	Network and Systems Management	6.1
O&M	operation and maintenance	4.4.2.2
OCONUS	Outside Continental United States	1.9
OPSEC	Operations Security	7.7.8
OSCAR II	Outside Cable Rehabilitation-II	1.4.3
OSI	Open System Interconnection	6.1
OSP	outside plant	2.8.1
OSPF	Open Shortest Path First	6.5.1.2f
PBX	private branch exchange	4.4.5.1a
PC	personal computer	5.11.2
PDS	Premises Distribution System	2
PET	protected entrance terminal	2.4.6
PICS	Protocol Implementation Conformance Statement	6.5.2.2h
PKI	Public Key Infrastructure	7.7.6
POTS	Plain Old Telephone Service	4.4.5.4.3.3
PP	point-to-point	3.3.1.2
PVC	polyvinyl chloride	2.3.5.7
REA	Rural Electrification Administration	3
RF	radio frequency	5.11.1
RMON	Remote Monitoring	6.5.1.2e
RSU	Remote Switching Unit	4.3

Acronym	Definition	Paragraph (first used)
RT	remote terminal	4.4.5.5.1
RUS	Rural Utilities Service	3
SBU	Sensitive, But Unclassified	7.7.8
SDCO	Small Dial Central Office	4.4.5.1a
SF	square feet	2.2.6
SLC	subscriber loop carrier	4.4.5.5.1
SMOC	Security Management Operations Center	7.4.1.3
SNMP	Simple Network Management Protocol	6.4.4
SONET	Synchronous Optical Network	4.4.6.1
TC	telecommunications closet	2.2.4
TCP/IP	Transmission Control Protocol/Internet Protocol	6.5.1.2a
TIA	Telecommunications Industry Association	2.1
TMN	Telecommunications Management Network	6.5.2.1
TNSOC	Theater Network and Systems Operations Center	6.4.2
UL	Underwriters Laboratory	2.3.1.1
USAISEC	United States Army Information Systems Engineering Command	4.1
USASC	United States Army Signal Command	6.4.1f
UTP	unshielded twisted pair	2.3.1.1
VLAN	virtual LAN	6.4.5
WAN	wide area network	5.2.1.1
WG	Working Group	6.4.2
www	world wide web	1.7

9 Legend for I3A Symbols





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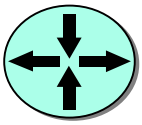

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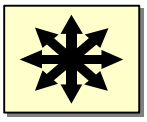
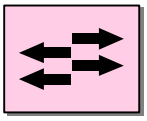


Multi-layer Switch



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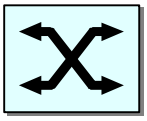

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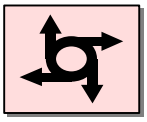

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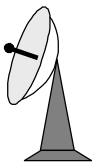

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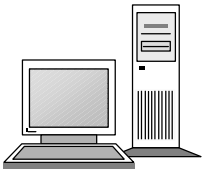
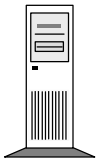


Workstation, Server, Network Mgmt Station



Mail Host or Server

ATTACHMENT 22

QUAD F AS-BUILT DRAWINGS

(REFER TO COMPACT DISK 2 OF 2, INCLUDED IN THIS SOLICITATION)

ATTACHMENT
MISCELLANEOUS PROVISIONS
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Attachment 15
MISCELLANEOUS PROVISIONS

PROTECTION AND SAFETY

The Contractor shall take all necessary precautions to insure that no damages to private or public property will result from his operations. Any such damages shall be repaired or replaced by the Contractor in accordance with the SECTION I: CONTRACT CLAUSES entitled "PERMITS AND RESPONSIBILITIES" and "PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS", without delay, and at no cost to the Government.

a. Protection of Grassed and Landscaped Areas: Contractor vehicles shall be restricted to paved roadways and driveways. Vehicles shall not be driven or parked on grassed and/or landscaped areas except when absolutely necessary for the performance of the work and approved in advance by the Contracting Officer. Grassed or landscaped areas damaged by the Contractor shall be restored to their original condition without delay and at no cost to the Government.

b. Restoration Work: Existing conditions or areas damaged or disturbed by the Contractor's operations shall be restored to their original condition,

or to near original condition as possible, to the satisfaction of the Contracting Officer.

c. Warning Signs and Barricades: The Contractor shall be responsible for posting warning signs or erecting temporary barricades to provide for safe conduct of work and protection of property. The Contractor shall also be responsible for covering, securing, and providing physical barricades to open excavations for safety purposes.

d. Rubbish and Debris: At the end of each working day, the work area shall be maintained free of loose debris and debris that may attract children. Debris stored at the job site shall be placed in dumpsters or other closed containers to prevent distribution by wind.

PROTECTION OF ENVIRONMENTAL RESOURCES

a. The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The Contractor shall confine his activities to areas defined by the drawings and specifications. Environmental protection shall be as stated in the following subparagraphs.

(1) Protection of Land Resources. Prior to the beginning of any construction, the Contractor shall identify all land resources to be preserved

within the Contractor's work area. Except in areas specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without special permission from the Contracting Officer.

The contractor is notified that under and immediately around existing buildings, there is a potential for residual amounts of a insecticides and rodenticides. In accordance to 40 CFR 261.1 (c), the commercial application of insecticides, if applied on the land for its ordinary and intended purposes, does not constitute hazardous solid waste. Recognizing that the existing construction practices and final disposition of soil may result in human contact with residual insecticides and rodenticides, the following practices shall be accomplished:

(a) Dust control measures shall be enforced throughout areas of demolition activity (Schofield Barracks, Quad “F”Area). A 4.6 m (15 foot) high minimum dust/environmental screen barrier shall be provided where construction activity occurs adjacent to occupied housing and other activities and facilities. Dust barriers shall be equipped with posts and bracing to maintain the barrier in a plumb position. Barrier fabric shall be of sufficient strength to resist wear and tear for the duration of the construction activity. Dust barriers shall be approved by the Contracting Officer.

(b) For any trenching work which is required under or within 10 feet of former building sites, the excavated material shall be redeposited into the original trench as nearly as practicable.

(c) Stockpiling of top-soil shall be avoided. Any excess material derived from the first one foot of surface under or within 10 feet of existing buildings shall be placed, graded, and a minimum of 4 inches of clean imported topsoil shall be deposited. Material which cannot be utilized effectively in grading shall be disposed in usual disposal sites.

(d) In areas formerly occupied by buildings, and which will remain as landscaped areas 4 inches of imported clean topsoil shall be deposited prior to completion of landscaping work.

(2) Disposal of Solid Wastes. Solid wastes (excluding clearing debris) shall be placed in containers which are emptied daily. All handling and disposal shall be conducted to prevent contamination. Dwelling units to be demolished under this contract may contain asbestos materials and lead based paint on substrate. All friable and non-friable asbestos material, such as transite paneling defined in the survey data must be removed prior to general demolition and disposed of in accordance with Federal and State regulatory requirements. LCP on substrate will be disposed thereof accordingly. Refer also to requirements in demolition section of the Statement of Work. Worker respiratory protection and air monitoring pursuant to OSHA 29 CFR 1910.134 Respiratory monitoring Protection Program for ACM and LCP will be required. The Contractor shall engage the services of a certified Industrial Hygienist (CIH) who is certified as an AHERA contractor/supervisor to direct and be responsible for these activities. The CIH shall prepare an asbestos and lead paint work plan that shall provide items such as personal monitoring, area

monitoring, work tasks and personnel protection related to abatement of asbestos prior to building demolition and protection from lead paint exposure during demolition. The plan shall indicate work practices and engineering controls to reduce contamination beyond the work area to below the action level for lead and permissible exposure level for asbestos. All submittals shall be signed by the CIH. Monitoring results shall be provided to the Contracting Officer within three calendar days of their collection. The monitoring results shall provided all information provided in record keeping sections of 29 CFR 1926.61 (exposure assessment) and 29 CFR 1926.1101 (exposure measurements).

The survey data, Asbestos Survey of Real Property Facilities and Asbestos and Lead Survey Family Housing Areas, are available for review at the Programs & Project Management Division, CEPOH-PP-P, Building 230, Room 318.

(3) Disposal of Chemical Waste. Chemical waste shall be stored in corrosion resistant containers, removed from the work area and disposed of in accordance with Federal, State, and local laws and regulations.

(4) Preservation and Recovery of Historical, Archeological, and Cultural Resources. Existing historical, archeological, and cultural resources within the Contractor's work area will be so designated by the Contracting Officer if any has been identified. The Contractor shall take precautions to preserve all such resources as they existed at the time they were pointed out to him. The Contractor shall provide and install all protection for these resources so designated and shall be responsible for their preservation during this contract. If during excavation or other construction activities in areas with existing or known resources, as well as in any other work area, any previously unidentified or unanticipated resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. These resources or cultural remains (prehistoric or historic surface or subsurface) include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rocks or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other uses. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer. When so notified, the Contracting Officer will initiate action so that prompt and proper data recovery can be accomplished. In the mean time, recording and preservation of historical and archeological finds during construction activities shall be reported.

(5) Protection of Water Resources.

(a) The Contractor shall keep construction activities under surveillance, management and control to avoid pollution of surface and ground waters. In particular, toxic or hazardous chemicals shall not be applied to soil or vegetation in a manner that may cause contamination of the fresh water reserve. Monitoring of water areas affected by construction activities shall be the responsibility of the Contractor. All water areas affected by construction activities shall be monitored by the Contractor.

(b) The Contractor shall prepare, coordinate and submit applicable "Notification of Intent" (NOI) including all applicable Best Management Practice plans for coverage of this project under the following State of Hawaii general permits under the NPDES (National Pollutant Discharge Elimination System) where Contractor operations and the project will result in water discharge to State of Hawaii waters: storm water - construction; hydrotesting waters (to include disinfection water); and construction dewatering. Separate NOI submissions are required for the different general permits, and as may be required by the State of Hawaii due to activities at different sites/installations or due to different Military Services control (Army, Navy, Air Force, etc). The Contractor shall prepare and submit all documents and supporting data/analyses/sketches/ drawings required for the NOI's to the Contracting Officer for review and signature by the appropriate Govenment official. NOI submissions shall indicate future housing projects that are adjacent to this project. The Government has submitted to the State of Hawaii Department of Health the Part I, or basic Notice of Intent application for only the Storm Water-Construction requirements. The Contractor will be required, following award and during the design process to complete the qualitative and a quantitative data requirements, including providing a description of the storm water pollution control plan and monitoring. Contractor shall when directed by the Contracting Officer submit by letter signed NOI documents to the appropriate State of Hawaii Office. The Contracting Officer will provide the Contractor a signed document authorizing the Contractor to submit the same on behalf of the Government as required permits when received directly from the State of Hawaii shall be fowarded to the Contracting Officer and a copy of the same maintained at the Contractor's project field Office. The Contractor shall comply with all supplemental submittal requirements as called for by the Contracting Officer. The Contractor shall schedule, prepare, coordinate and submit required NOI's so that project site work will not be delayed. The Government period for signature of the NOI's and submissions to the State or return to the Contractor for His submission of the State of Hawaii shall be 30 calendar days. The State of Hawaii requirement is submission 90 days prior to start of the applicable construction activity.

(6) Protection of Fish and Wildlife Resources. The Contractor shall keep construction activities under surveillance, management and control to minimize interference with, disturbance to, and damage of fish and wildlife. Species that require specific attention, along with measures for their protection, will be listed by the Contractor prior to the beginning of construction operations. An Environmental Assessment has been prepared for this area of construction. A copy of it can be obtained from the USACE by calling (808) 438-7038.

(7) Protection of Air Resources. The Contractor shall keep construction activities under surveillance, management, and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with the State of Hawaii Department of Health Administrative Rules, Chapter 59, "Ambient Air Quality Standards", and Chapter 60, "Air Pollution Control", and all Federal emission and performance laws and standards. Monitoring of air quality shall be the

responsibility of the Contractor. All air areas affected by the construction activities shall be monitored by the Contractor.

(8) Protection From Sound Intrusions. The Contractor shall keep construction activities under surveillance and control to minimize damage to the environment by noise. The Contractor shall comply with the provisions of the State of Hawaii Department of Health Administrative Rules, Title 11, Chapter 43, "Community Noise Control for Oahu".

b. The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the aforementioned Federal, State or local laws or regulations, permits, and other elements of the Contractor's environmental protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspension.

c. The Contractor shall submit an environmental protection plan to the Contracting Officer for approval. Approval of the environmental protection plan will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures. The environmental protection plan shall include but not be limited to the following:

(1) A List of Federal, State and Local Laws, Regulations, and Permits concerning environmental protection, pollution control, and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.

(2) Methods for Protection of Features to be preserved within authorized work areas. The Contractor shall prepare a listing of methods to protect resources needing protection; i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archeological, and cultural resources.

(3) Procedures to be Implemented to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures set out in accordance with the environmental protection plan.

(4) Location of the solid waste disposal area.

(5) Drawings Showing Locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

(6) Environmental Monitoring Plans for the job site, including land, water, air, and noise monitoring.

(7) Methods of Protecting surface and ground water during construction activities. De-watering plan shall be submitted as sites require.

(8) Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas.

(9) Plans showing the method of protection and placement of such protection to protect occupants of Solomon Elementary School from dust and noise related to construction activities in Area U.

(10) Training for his personnel during the construction period. Training shall not only include that related to predemolition removal of asbestos and protection of lead dust during demolition, but shall also include hazard awareness training for all workers who may work in areas where these hazards may exist but whose work is not directly related to them.

(11) The Contractor shall include as part of the environmental protection plan all applicable "Notification of Intent" providing project coverage under the State of Hawaii NPDES storm water general permits for construction activities (construction, construction dewatering, hydrotesting waters) as required by this contract under "Permits And Responsibilities" of the Special Clauses. All submissions and State of Hawaii responses and approvals shall be included. The Plan shall be updated as necessary and revisions or the updated plan submitted as directed by the Contracting Officer's Representative.

STAKING AND FLAGGING EXISTING UTILITIES

The Contractor, prior to the start of any excavation or trenching work, shall verify the location of all utility lines shown on the Request for Proposals (RFP) drawings which are within the areas of work, and shall mark, stake, or flag each utility line along trench alignments and under areas of excavation under this project, as approved. Existing utility lines shall be located by walking trench alignments with calibrated toning equipment for locating underground pipes and cables. Any additional utility lines or cables discovered during the walking of the trench alignments or excavations shall be marked, staked or flagged as above. Prior to start of any excavation or trenching work, the Contractor shall obtain clearance, in writing, from the appropriate communications agency and base or area engineer. Copies of all correspondence shall be provided to the Contracting Officer (for information only). Normal coordination time for obtaining the necessary permits is approximately 15 calendar days. The Contractor shall advise the Contracting Officer promptly when it appears that the normal coordination time will be exceeded.

GOVERNMENT PROJECT OFFICE

Schofield Barracks: The Contractor shall provide, for use by Government supervisory and inspection personnel, a job-site office space at Schofield Barracks with a floor area not less than 300 square feet based upon a 10-foot width. This office space may be within the Contractor's project office building if adjacent to the job site and if separated by a solid partition; otherwise a separate facility, adjacent to the job site, shall be provided with windows and screens, electricity (including a minimum of four (4) wall outlets and two (2) ceiling lights), two (2) telephones with separate lines, two (2) desks with drawers, one (1) 3-foot by 7-foot layout table, two (2) chairs, two (2) legal and two (2) letter size four-drawer locking file cabinets, two (2) plan holding racks, air conditioning, and a fire extinguisher. Potable drinking water and temporary toilet facilities shall be made available to Government personnel, not necessarily within the project office, but in close proximity thereof. The cost of utilities including telephone, and operation and maintenance costs of the Government project office shall be borne by the Contractor. The Government will be responsible for its long-distance calls. Upon completion of the project, the project office and furnishings shall be removed and disposed of by the Contractor.

PRECONSTRUCTION CONFERENCE

The Contractor shall meet with the Contracting Officer within thirty (30) days after design approvals or as determined by the Contracting Officer to discuss design and construction schedules, and to resolve any procedural questions affecting the administration of the contract. The Contractor shall bring a proposed construction schedule to this meeting. If significant design issues are surfaced, the meeting may be reconvened at POH by the Contracting Officer. The Contractor shall designate his representatives and the limits of their authority. At the completion of this conference, the Contractor shall reduce to writing any questions pertaining to the Contractor and/or mutual understandings as a result of the conference and shall submit the documentation to the Contracting Officer, the general intent being that both parties will be fully apprised of all factors affecting the contract. The Contractor shall also be responsible for taking minutes of the meeting and attaching them to the documentation.

OPERATION OR STORAGE AREA

An open operation or storage area at an exact location to be determined by the Government will be available. The Contractor shall be responsible for the security necessary for protection of his equipment and materials and shall maintain the area free of debris. No rusty or unsightly materials shall be used for providing the secure measure and such measure shall be erected in a worklike manner. Upon completion and prior to the final acceptance of the contract work, the Contractor shall restore the area to its original condition. Covered storage will not be provided to the contractor by the Government. The construction/storage area security fence shall have sign on each entrance with the following information:

Contractor's or Government Agency:
Telephone number (In an emergency):

a. Schofield Barracks: The Contractor's operation and storage area(s) shall be located as shown on Attachment 9, New Construction Site Plan, the drawings or as designated by the Contracting Officer. Contractor shall maintain the area. Grass and weeds in the operations and storage areas and at the fence lines of the project site, as well as storage sites, will be cut and maintained to provide a neat appearance.

WORKING HOURS

All work shall be performed between the hours of 0730 to 1600 HST, Monday through Friday. No work shall be accomplished on Saturdays, Sundays, and the following holidays: New Year's Day, Dr. Martin Luther King Jr.'s Day Presidents' Day, Memorial Day, Independence Day, Labor Day, Discoverers' Day, Veterans' Day, Thanksgiving Day and during the period between and including 24 December and 2 January, without written permission from the Contracting Officer; such written permission shall be maintained at the job site at all times during which it is required.

SUBMISSION OF STATEMENT BY PRIME CONTRACTOR FOR SUBCONTRACT WORK AFTER AWARD.

The form submittal listed under LIST OF ATTACHMENTS, will be used after award in conjunction with CONTRACT CLAUSES, Contract Clause Number 29. DFARS 252/219-7003 - Small Business and Small Disadvantaged Business Subcontracting Plan (DOD Contracts).

DPW - UTILITY RATES FOR PROJECTS

The fees for utility use by contractors shall be as follows:

(1) Elec Rate - $0.11180/KWH

(2) Water Rate - $2.32 per 1,000 gallons

(3) Sewer Rate - $4.74 per 1,000 gallons

VEHICLE PARKING FOR CONTRACTOR AND EMPLOYEES

Parking within Quad F area is limited. Parking for vehicles owned by the contractor, subcontractor(s) and employees will be limited to within the project limits.

END OF SECTION

Document	Issue	Description
462-070-015	3	DROP AND BLOCK WIRING~~~DEDICATED PLANT AND C RURAL WIRE INDEXES, DATA SHEETS, STANDARD MATERIAL CLEARANCES AND CIRs Clearances Drop Wire Clearances

Document	Issue	Description
500-000-000	49	NUMERICAL INDEX DIVISION 500 GENERAL CONSIDERATIONS FOR STATION INSTALLATIONS CUSTOMER EQUIPMENT ISSUE 49
500-001	4	ESD INSPECTION GUIDE
500-0 LAYER	PHANTOM	
500-100	1998	MANUFACTURING THE FUTURE
500-110-100	6	SELECTION OF APPARATUS BY CLASS OF SERVICE AND ZONE
500-112-100	10	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT TRANSMISSION ZONING, INDUCTIVE NOISE, RINGING BRIDGE LIMITATIONS, SELECTION OF APPARATUS, RADIO SUPPRESSION, SPECIAL CONNECTIONS, AND DIAL RESTRICTION Reference -- Inductive Noise
500-114-100	6	STATION RINGING APPARATUS SELECTION AND LIMITATIONS ISSUE 6
500-120-100	5	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT TRANSMISSION ZONING, INDUCTIVE NOISE, RINGING BRIDGE LIMITATIONS, SELECTION OF APPARATUS, RADIO SUPPRESSION, SPECIAL CONNECTIONS, AND DIAL RESTRICTION Telephone Apparatus and Materials -- Color
500-124-180	5	STATION SETS AND APPARATUS FOR SPECIAL APPLICATIONS SELECTION
500-128-180	8	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT TRANSMISSION ZONING, INDUCTIVE NOISE, RINGING BRIDGE LIMITATIONS, SELECTION OF APPARATUS, RADIO SUPPRESSION, SPECIAL CONNECTIONS, AND DIAL RESTRICTION Selection of Telephone Apparatus for Impaired Hearing, Speech, and Sight
500-130-180	4	SUBSCRIBER SETS AND EXTERNALLY MOUNTED RINGERS SELECTION FOR GENERAL USE
500-150-100	11	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT TRANSMISSION ZONING, INDUCTIVE NOISE, RINGING BRIDGE LIMITATIONS, SELECTION OF APPARATUS, RADIO SUPPRESSION, SPECIAL CONNECTIONS, AND DIAL RESTRICTION Radio Signal Suppression -- For Telephone Sets -- Identification, Installation,
500-155-100	6	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT TRANSMISSION ZONING, INDUCTIVE NOISE, RINGING BRIDGE LIMITATIONS, SELECTION OF APPARATUS, RADIO SUPPRESSION, SPECIAL CONNECTIONS, AND DIAL RESTRICTION Key Telephone Sets Dial Restriction -- Identification, Connections, and Testing
500-1 LAYER	PHANTOM	
500-200-011	1	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT PLANT FIELD STATION ADMINISTRATION Administration of the Kit Plan and Field Turnaround of Telephone Sets and Bases
500-206	Jan-90	CIU User Guide -- Issue II
500-2 LAYER	PHANTOM	
5004FS	20196	FIBER GRATING FILTERS SPECIALTY FIBER PRODUCTS
500-532	1	HOLONOMIC CUBE
5005FS	20196	PLANAR WAVEGUIDE PRODUCTS DENSE WAVELENGTH DIVISION MULTIPLEXERS (DWDM) INCREASE CAPACITY SIGNIFICANTLY WITHOUT ADDING FIBER

Document	Issue	Description
5007FS	30196	ADVANCED NETWORK SERVICES FOR NEW REVENUES AND IMPROVED NETWORKING, CREATE AND DEPLOY SERVICES QUICKLY AND EFFICIENTLY.... WITH FREEDOM OF CHOICE
500-810-200	2	PACKAGING AND HANDLING DISCONNECTED STATION APPARATUS
500-815-200	1	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT PACKAGING AND HANDLING -- DISCONNECTED APPARATUS Disconnected 400-Type KTUs
500-820-200	1	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT PACKAGING AND HANDLING -- DISCONNECTED APPARATUS Disconnected 1-Type Telephone Answering Sets
500-820-201	1	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT PACKAGING AND HANDLING -- DISCONNECTED APPARATUS Disconnected 2-Type Telephone Answering Sets
500-820-203	1	PACKAGING AND HANDLING DISCONNECTED KS-16378 TELEPHONE ANSWERING SETS
500-820-205	1	PACKAGING AND HANDLING DISCONNECTED KS-16923, LIST 1 TELEPHONE ANSWERINGSETS
500-820-207	1	PACKAGING AND HANDLING DISCONNECTED KS-19245, LIST 1 TELEPHONE ANSWERINGSETS
500-830-200	1	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT PACKAGING AND HANDLING -- DISCONNECTED APPARATUS Disconnected KS-16765, List 1 Announcement Sets
500-840-200	1	GENERAL CONSIDERATIONS FORSTATION INSTALLATIONS~~~CUSTOMER EQUIPMENT PACKAGING AND HANDLING -- DISCONNECTED APPARATUS Disconnected KS-16844 Rapidial
5008FS	80196	INTERNATIONAL SMARTPHONE SERIES
500-8 LAYER	PHANTOM	
500 DIV	PHANTOM	GENERAL /FOR STATION INSTL

Document	Issue	Description
6183	1	FiberGrafix Network Design Software for Windows, Users Guide
620-000-000	88	OUTSIDE PLANT, GENERAL
620-000-005	21	PERMUTED ALPHABETICAL INDEX CONSTRUCTION AND MAINTENANCE OUTSIDE PLANT
620-020-005	1	CABLE SHEATH OPENINGS REPORTING OF OPENINGS AND CLOSINGS TO THE CABLE TEST DESK
620-020-020	3	SIGNALS FOR USE BY OUTSIDE PLANT FORCES
620-040-012	3	OUTSIDE PLANT SYMBOLS POLES AND ASSOCIATED EQUIPMENT
620-040-013	4	OUTSIDE PLANT SYMBOLS WIRE
620-040-017	3	OUTSIDE PLANT SYMBOLS AND ABBREVIATIONS CARRIER SYSTEMS
620-040-018	2	CABLE PRESSURIZATION SYSTEMS OUTSIDE PLANT SYMBOLS
620-040-019	1	OUTSIDE PLANT SYMBOLS CLOSED CIRCUIT TELEVISION SYSTEMS
620-040-020	1	OUTSIDE PLANT ABBREVIATIONS GENERAL
620-050-005	2	ED-01 DRAWINGS OUTSIDE PLANT SYSTEMS
620-050-010	2	CONSTRUCTION FORCE MANAGEMENT SYSTEM GENERAL
620-050-011	2	STANDARD TIME INCREMENTS DESCRIPTION AND APPLICATION CONSTRUCTION FORCE MANAGEMENT SYSTEM
620-050-012	2	CONSTRUCTION FORCE MANAGEMENT SYSTEM CONSTRUCTION MANAGEMENT CENTER
620-050-013	1	CONSTRUCTION FORCE MANAGEMENT SYSTEM JOB SCHEDULING AND DISPATCHING
620-050-014	1	CONSTRUCTION FORCE MANAGEMENT SYSTEM FIELD ADMINISTRATION
620-050-015	1	CONSTRUCTION FORCE MANAGEMENT SYSTEM ADMINISTRATION OF OVERRUN HOURS
620-050-021	1	OUTSIDE PLANT, GENERAL INDEXES, GENERAL INFORMATION, SYMBOLS AND ABBREVIATIONS, ADMINISTRATION, AND VEHICLES Outside Plant Construction Administration Quality Review Plan Cable Transfer Procedures -- 1 ESSTM Switching Office -- Delayed Order Method
620-050-030	2	QUALITY REVIEW PLAN ADMINISTRATION AND PROCEDURES OUTSIDE PLANT CONSTRUCTION AND ENGINEERING
620-050-031	2	QUALITY REVIEW PLAN INSPECTION REFERENCE MATERIAL OUTSIDE PLANT CONSTRUCTION AND ENGINEERING
620-050-100	1	OPERATIONAL REVIEWS FOR OUTSIDE PLANT CONSTRUCTION FORCES
620-050-101	1	OUTSIDE PLANT, GENERAL INDEXES, GENERAL INFORMATION, SYMBOLS AND ABBREVIATIONS, ADMINISTRATION, AND VEHICLES Outside Plant Construction Administration MSTIC (Mechanized Standard Time Increment Calculation) General Description
620-060-020	2	CABLE REPAIR FORCE MANAGEMENT PLAN ORDERING INFORMATION
620-060-025	1	TROUBLE ANALYSIS FOR CABLE MAINTENANCE ORDERING INFORMATION
620-060-030	1	QUALITY CONTROL FOR CABLE MAINTENANCE
620-060-510	3	JOINT UTILITY COORDINATION AND DAMAGE PREVENTION PLAN FOR BELOW-GROUND FACILITIES (ONE-CALL SYSTEM)
620-060-511	1	SUBSURFACE FACILITIES STANDARD MARKING AND STAKING PROCEDURES
620-070-110	1	STANDARD LOADING AND RESTOCKING OF TOOLS AND MATERIALS SPLICING VEHICLES
620-0 LAYER	PHANTOM	INDEXES, GENERAL INFORMA-
620-100-001	3	FIRE SAFETY CONSIDERATIONS OF CABLE IN BUILDINGS
620-100-005	1	FIRESTOPS FOR OUTSIDE PLANT CABLES THAT PENETRATE BUILDING FLOORS AND WALLS METHODS AND MATERIALS
620-100-010	1	OCCUPATIONAL EXPOSURE TO LEAD CABLE REMOVAL
620-100-011	1	CONDUCTORS
620-100-015	1	PROTECTIVE MEASURES FOR WORKING IN THE VICINITY OF EXTRA HIGH VOLTAGE POWER LINES

Document	Issue	Description
620-102-010	7	OUTSIDE PLANT PRECAUTIONS UNDERGROUND AND BURIED WORK
620-103-010	4	ELECTRICAL PROTECTION WHEN USING PORTABLE AC OPERATED TOOLS AND EQUIPMENT
620-105-010	7	B-VOLTAGE TESTER USE ON JOINT-USE POLES AND OTHER EQUIPMENT
620-131-010	4	PRECAUTIONS TO BE TAKEN BEFORE CLIMBING POLES OR WORKING FROM STRAND-OR POLE-SUPPORTED EQUIPMENT
620-134-010	1	STANDARDS FOR SAFE POLE CLIMBING UNSTEPPED POLES
620-134-020	1	Poles
620-135-010	6	WARNING DEVICES USE GUARDING WORK AREAS
620-135-100	6	OUTSIDE PLANT GUARDING WORK AREAS STANDARD WARNING DEVICES DESCRIPTION AND USE
620-135-100 ADD	6-Jan	OUTSIDE PLANT GUARDING WORK AREAS STANDARD WARNING DEVICES DESCRIPTION AND USE
620-145-010	3	PETROLEUM PRODUCTS UNDERGROUND CONDUIT SYSTEMS REMOVAL PROCEDURES
620-150-010	4	MANHOLE COVERS REMOVING AND REPLACING
620-1 LAYER	PHANTOM	PRECAUTIONS
620-210-011	2	CLEARANCES AND SEPARATIONS FOR AERIAL PLANT GENERAL
620-210-012	3	CLEARANCES FOR TELEPHONE POLES AND STUBS
620-249-011	1	CLEARANCE ATTACHMENTS FOR AERIAL CROSSING GENERAL
620-2 LAYER	PHANTOM	CLEARANCES
620-300-011	3	AERIAL RAILROAD CROSSINGS
620-310-100	2	TREE PRUNING TOOLS
620-310-200	2	TREE TRIMMING AND PRUNING METHODS
620-3 LAYER	PHANTOM	RAILROAD CROSSINGS, TREE
620 DIV	PHANTOM	OUTSIDE PLANT, GENERAL
621-000-000	62	POLE LINES
621-020-013	6	POLE LINES ORDERING, DELIVERY, STORAGE, AND MARKINGS ON POLES AND STUBS
621-020-111	5	DIMENSIONS AND WEIGHTS OF NEW POLES AND REINFORCING STUBS
621-0 LAYER	PHANTOM	INDEXES AND GENERAL INFORM
621-200-011	2	POLES LOCATING, PREPARING, AND SOIL BRACING
621-200-200	2	PLACING POLES UNLOADING AT SIDINGS
621-200-203	2	LOADING AND BINDING POLES ON POLE TRAILERS
621-200-205	2	POLES MARKINGS AND INSIGNIA
621-205-010	8	POLE LINES POLES Poles -- Erecting Placing or Removing Poles Near Electric Power Wires
621-205-010 ADD	8-Jan	PLACING OR REMOVING POLES NEAR ELECTRIC POWER WIRES
621-205-200	2	ERECTING POLES AND STUBS
621-205-211	3	PLACING POLE BRACES AND H FIXTURES
621-205-215	2	ERECTING POLES INSTALLING LIGHTNING PROTECTION
621-210-012	1	STEPPING POLES GENERAL
621-215-011	6	POLE LINES USE OF TABLES OF MINIMUM CIRCUMFERENCES AT CRITICAL SECTIONS USE OF POLE INSPECTION RULE
621-215-015	6	POLE LINES INSPECTION OF POLES
621-220-011	3	SALVAGE OF USED POLES
621-220-200	2	POLE LINES POLES Poles -- Removal Pole Removal
621-295-300	7	PRESERVATIVE TREATMENT OF STANDING POLES
621-295-305	3	POLE LINES POLES Pole Maintenance Reinforcement
621-295-320	3	POLE REPLACING
621-2 LAYER	PHANTOM	POLES
621-400-011	3	GUYING DEFINITIONS

Document	Issue	Description
621-400-013	5	GUYING USE OF GUY RULE SIZES OF GUYS
621-400-015	3	GUYING INSULATED WIRES
621-405-201	4	GUYING METHODS OF INSULATING
621-405-201 ADD	4-Jan	GUYING METHODS OF INSULATING
621-410-200	5	GUYING METHODS OF INSTALLATION
621-410-206	4	Guying Aerial Cable Lines
621-410-220	4	Guying Sidewalk Anchor Guys
621-415-011	1	PATENT GUY ANCHORS GENERAL
621-415-200	5	PATENT GUY ANCHORS EXPANDING ANCHORS
621-415-201	1	PATENT GUY ANCHORS SCREW TYPE ANCHORS
621-415-202	1	PATENT GUY ANCHORS SWAMP ANCHORS
621-415-203	3	PATENT GUY ANCHORS PLATE ANCHORS
621-415-204	2	C GUY ANCHOR (AT-8891) POWER INSTALLATION
621-415-211	3	NONPATENT ANCHORS PLANK ANCHORS
621-415-215	3	ROCK ANCHORS PLACING
621-415-217	5	GUYING EXTENDING LENGTH OF OR ADDING ADDITIONAL EYE TO EXISTING GUY RODS
621-420-241	3	Removal of Guys and Anchors
621-4 LAYER	PHANTOM	GUYS
621 DIV	PHANTOM	POLE LINES
622-000-000	64	CONDUIT, MANHOLES AND CABLE VAULTS
622-020-020	3	CONDUIT AND MANHOLE CONSTRUCTION GENERAL
622-020-100	5	CONDUIT, MANHOLES AND CABLE VAULTS INDEXES AND GENERAL INFORMATION General Conduit and Conduit Couplings -- Description
622-0 LAYER	PHANTOM	INDEXES AND GENERAL INFORM
622-100-010	2	CONDUIT AND MANHOLES PRECAUTIONS
622-1 LAYER	PHANTOM	PRECAUTIONS
622-300-205	1	MAIN CONDUIT SPECIAL CONSTRUCTION
622-300-211	1	MAIN CONDUIT REINFORCING
622-300-300	2	MAIN CONDUIT RESTORATION AND REARRANGEMENT
622-340-200	4	B PLASTIC POLYVINYL CHLORIDE (PVC) AND B POLYPROPYLENE CONDUIT CONCRETE ENCASED MAIN CONDUIT
622-340-201	4	C PLASTIC POLYVINYL CHLORIDE (pvc) AND C POLYPROPELENE CONDUIT DIRECT BURIED IN SOIL MAIN CONDUIT
622-395-300	1	CONDUIT, MANHOLES AND CABLE VAULTS MAIN CONDUIT Main Conduit, Repair Conduit Repair
622-3 LAYER	PHANTOM	MAIN CONDUIT
622-400-100	3	SUBSIDIARY CONDUIT FITTINGS DESCRIPTION AND USE
622-400-300	2	SUBSIDIARY CONDUIT REPAIRING
622-4 LAYER	PHANTOM	SUBSIDIARY CONDUIT
622-500-011	4	MANHOLES - GENERAL
622-505-210	2	CONCRETE MANHOLES CAST-IN-PLACE CONSTRUCTION
622-506-050	1	CONTROLLED ENVIRONMENT VAULTS (CEVs) DESCRIPTION
622-506-051	1	24-FOOT CONTROLLED ENVIRONMENT VAULT (CEV) DESCRIPTION
622-506-052	1	KS-23038 CEV (CONTROLLED ENVIRONMENT VAULT)
622-506-100	2	PRECAST CONCRETE MANHOLES 38Y TYPES DESCRIPTION
622-506-200	2	CONDUIT, MANHOLES AND CABLE VAULTS MANHOLES Manholes, Precast Concrete 38Y-Type Installation
622-506-225	1	16-FOOT CONTROLLED ENVIRONMENT VAULT (CEV) INSTALLATION
622-506-226	1	16-FOOT CONTROLLED ENVIRONMENT VAULT (CEV) OPERATION AND MAINTENANCE
622-506-227	1	24-FOOT CONTROLLED ENVIRONMENT VAULT (CEV) INSTALLATION

Document	Issue	Description
622-506-228	1	24-FOOT CONTROLLED ENVIRONMENT VAULT (CEV) OPERATION AND MAINTENANCE
622-506-230	1	CONDUIT, MANHOLES AND CABLE VAULTS MANHOLES Manholes, Precast Concrete Below Ground Electronics Remote Terminal (BERT) -- Installation -- SLC*-96 Carrier System
622-506-235	2	CONCRETE HUT ED7C285-30 DESCRIPTION AND INSTALLATION
622-506-236	1	KS-23038 CEV (CONTROLLED ENVIROMENT VAULT) INSTALLATION
622-506-237	1	KS-23038 CEV (CONTROLLED ENVIRONMENT VAULT) OPERATION AND MAINTENANCE
622-507-100	2	PRECAST MANHOLES FOR HARDENED SYSTEMS GENERAL
622-507-206	3	CONDUIT, MANHOLES AND CABLE VAULTS MANHOLES Manholes, Hardened Systems C and D Precast Manholes
622-507-216	3	CONDUIT, MANHOLES AND CABLE VAULTS MANHOLES Manholes, Hardened Systems F and G Precast Manholes
622-507-226	1	CONDUIT, MANHOLES AND CABLE VAULTS MANHOLES Manholes, Hardened Systems K and L Precast Manholes
622-507-236	1	MANHOLES HARDENED CAST-IN-PLACE-CONSTRUCTION
622-510-200	1	BRICK MANHOLES CONSTRUCTION
622-512-200	2	MANHOLES SEALING WALLS AT CONDUIT ENTRANCES
622-520-100	7	MANHOLES - EQUIPPING
622-520-100 ADD	7-Jan	MANHOLES - EQUIPPING
622-520-111	1	CONDUIT, MANHOLES AND CABLE VAULTS MANHOLES Manhole, Hardware Loading Manhole Racking
622-5 LAYER	PHANTOM	MANHOLES
622-600-011	1	UNDERGROUND CONDUIT FOR SERVICE CONNECTIONS GENERAL
622-600-012	1	UNDERGROUND CONDUIT FOR SERVICE CONNECTIONS LOCATING RUN
622-600-200	1	UNDERGROUND CONDUIT FOR SERVICE CONNECTIONS PLACING AND TERMINATING DUCTS
622-600-202	1	CONDUIT FOR SERVICE CONNECTIONS PLACING CONDUIT BOXES
622-6 LAYER	PHANTOM	CONDUIT FOR SERVICE CONNEC
622-700-100	1	CENTRAL OFFICE CABLE VAULTS LIST OF UNISTRUT MATERIAL
622-700-102	1	KS-21947 CABLE PENETRATION MODULE DESCRIPTION AND FIRE SEALING PROCEDURES
622-700-200	1	CENTRAL OFFICE CABLE VAULTS CONSTRUCTION OF UNISTRUT FRAME
622-7 LAYER	PHANTOM	CABLE VAULTS
622 DIV	PHANTOM	CONDUIT, MANHOLES AND CA-
623-000-000	14	NUMERICAL INDEX DIVISION 623 OPEN WIRE
626-000-005	2	CAD CABLE DESCRIPTIONS NUMERICAL AND PERMITTED INDEXES OUTSIDE PLANT CABLES
626-020-002	1	CAD CABLE DESCRIPTIONS MICROFILM DISTRIBUTION SYSTEM AND ORDERING INFORMATION OUTSIDE PLANT CABLE
626-020-002 ADD	1-Jan	
626-020-006	1	SERVICE WIRE, AND CABLE PACKAGING AND SHIPPING General Cable Conductors
626-020-007	1	METALLIC SHIELDS AND SHEATHS RESISTANCE CABLES
626-020-009	1	GENERAL
626-020-010	2	FEEDER AND DISTRIBUTION CABLES SELECTION
626-020-011	5	DESIGNATIONS FOR CABLE CONDUCTORS CONDUCTOR INSULATIONS, SHEATHS, AND PROTECTIVE COVERINGS
626-020-020	4	STANDARD PLASTIC-JACKETED SHEATHS
626-020-020 ADD	3-Jan	

Document	Issue	Description
626-020-021	1	SERVICE WIRE, AND CABLE PACKAGING AND SHIPPING General Superseded Plastic Sheaths
626-020-050	1	CABLES, WIRE, AND APPARATUS INDEXES, GENERAL INFORMATION, SERVICE WIRE, AND CABLE PACKAGING AND SHIPPING General Provision of End Seals, End Caps, Pulling Eyes, Bond Wires; Air Pressure, and Reel Protection
626-020-101	3	CABLES, WIRE, AND APPARATUS INDEXES, GENERAL INFORMATION, SERVICE WIRE, AND CABLE PACKAGING AND SHIPPING General Empty Reels -- Loading Arrangements
626-021-101	1	LARGE CAPACITY REELS OF WIRE HANDLING METHODS
626-030-005	1	CABLE SHIPPING REELS DESCRIPTION, DIMENSIONS, AND WEIGHTS
626-100-006	5	MISCELLANEOUS, AND LIGHTGUIDE CABLES 83nF/M Conductor Cables Pulp-Insulated CD and DD Series of Multiunit Pulp (MUP) -- Description, Use, and Reel Lengths
626-101-005	5	AIR CORE POLYETHYLENE-INSULATED NONSCREENED AND SCREENED CABLES DESCRIPTION, USE, AND REEL LENGTHS
626-101-010	4	WATERPROOF NONSCREENED AND SCREENED PLASTIC-INSULATED CABLES DESCRIPTION, USE, AND REEL LENGTHS
626-101-010 ADD	4-Jan	WATERPROOF NONSCREENED AND SCREENED PLASTIC-INSULATED CABLES DESCRIPTION, USE, AND REEL LENGTHS
626-101-015	3	WATERPROOF CGAW PLASTIC-INSULATED CONDUCTOR (PIC) HIGH-DIELECTRIC STRENGTH CABLES DESCRIPTION, USE, AND REEL LENGTHS
626-101-030	2	PIC AND PULP STEAMPETH CABLES DESCRIPTION, USE, AND REEL LENGTHS
626-105-007	2	MAT MCR CABLE DESCRIPTION, USE, AND REEL LENGTHS
626-105-008	2	LENGTHS
626-107-005	2	CABLES, WIRE, AND APPARATUS STANDARD CONDUCTOR, CARRIER, MISCELLANEOUS, AND LIGHTGUIDE CABLES Miscellaneous Cables PE-PVC Insulated Terminating Cables -- 22- and 24-Gauge
626-107-006	3	AR-SERIES RISER CABLES DESCRIPTION, USE, AND REEL LENGTHS
626-108-000	2	LUCENT FIBER OPTIC OUTSIDE
626-108-003	4	Fiber Optic Premises Cable Specifications
626-108-004	1	Fiber Optic Interconnect Cable Specifications
626-108-101	4	MULTIMODE AND SINGLE-MODE LIGHTGUIDE CABLES DESCRIPTION AND REEL-LENGTH INFORMATION UNDERGROUND, AERIAL ,BURIED PLANT AND RISERS IN BUILDINGS
626-108-102	1	STRANDED SINGLE-MODE AND MULTIMODE LIGHTGUIDE CABLES DESCRIPTION, USE, AND REEL-LENGTH INFORMATION UNDERGROUND, AERIAL, AND BURIED PLANT APPLICATIONS
626-108-103	1	LIGHTPACK LIGHTGUIDE CABLE DESCRIPTION, USE, AND REEL-LENGTH INFORMATION UNDERGROUND, AERIAL, AND BURIED PLANT APPLICATIONS
626-108-103-1	1	FIBER-READY SERVICE CABLE SHEATH PREPARATION
626-1 LAYER	PHANTOM	
626-200-114	4	CABLES, WIRE, AND APPARATUS Cable Sizes and Reel Lengths PIC Cables -- CA-1727 Type
626-200-135	3	CABLE SIZES AND REEL LENGTHS CCTV COAXIAL CABLE
626-200-136	2	CABLES, WIRE, AND APPARATUS Cable Sizes and Reel Lengths SS (Serrated Seam) 0.375-Inch Coaxial Cables
626-200-137	1	CABLES, WIRE, AND APPARATUS Cable Sizes and Reel Lengths Video Pair Cables
626-200-138	1	CABLES, WIRE, AND APPARATUS Cable Sizes and Reel Lengths Nonquadded Composite Exchange Cables
626-200-400	1	CABLES, WIRE, AND APPARATUS Cable Sizes and Reel Lengths Filled Bonded ASP Cable
626-200-500	2	DUCTPIC CABLE PRODUCT APPLICATION BULLETIN
626-300-100	7	BURIED WIRE DESCRIPTION
626-300-126	6	CABLES, WIRE, AND APPARATUS AERIAL AND BURIED WIRE Aerial Service Wire--Signal and Multiple Pair -- Description
626-300-127	1	FIBERGLASS REINFORCED

Document	Issue	Description
626-500-101	3	CONNECTORIZED EXCHANGE CABLE SPLICING (CONECS) SYSTEM DESCRIPTION, PLANNING, AND INSTALLATION
626-500-115	5	90-Type Business Remote Terminal (BRT) Cabinets, Coding Scheme and Ordering Information
626-500-125	6	40- AND 42-TYPE CABINETS CODING
626-500-128	2	51A Cabinets Description, Installation, Splicing, SLC Series 5 with DDM-Plus Cabinet Distant Terminal
626-759-005	2	CA-DRAWING INDEX
626-759-020	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL General Lead Sheaths
626-759-020 ADD	1-Jan	
626-759-025	3	AND USE
626-759-025 ADD	3-Jan	OUTER PROTECTION BURIED, UNDERGROUND, AND AERIAL DESCRIPTION AND USE
626-759-030	2	WIRE ARMOR PROTECTION
626-759-040	1	CABLE DIAMETERS AND WEIGHTS
626-759-050	1	CABLE REELS CAPACITY OF LAND AND WIRE-ARMORED (SUBMARINE) CABLE REELS
626-759-130	2	STANDARD NONQUADDED COMPOSITE EXCHANGE CABLES
626-759-131	1	SUPERSEDED NONQUADDED COMPOSITE EXCHANGE CABLES
626-759-152	2	1727
626-759-157	2	POLYETHYLENE-INSULATED CONDUCTOR (AIR CORE) CABLE 17-GAUGE 83nF-TYPE AHC
626-759-158	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Standard Exchange Cables Polyethylene-Insulated Conductor (Air Core) Cable -- 20-Gauge 83nF-Type AHD
626-759-171	2	CABLES
626-759-190	3	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Standard Exchange Cables Standard Video Pair
626-759-191	1	REPLACEMENT VIDEO PAIR CABLES
626-759-192	1	SUPERSEDED VIDEO PAIR CABLE
626-759-195	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Standard Exchange Cables Standard Stub
626-759-196	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Standard Exchange Cables Superseded Stub
626-759-201	3	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Wire Armored Cables Disc-Insulated
626-759-202	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Wire Armored Cables Expanded Insulation
626-759-203	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Wire Armored Cables Solid Insulation
626-759-250	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Wire Armored Cables Exchange Type
626-759-300	4	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Toll Cables Quadded Toll Cable -- General
626-759-301	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Toll Cables Standard Quadded Cables
626-759-302	2	SUPERSEDED QUADDED AND NONQUADDED TOLL CABLES
626-759-302 ADD	2-Feb	SUPERSEDED QUADDED AND NONQUADDED TOLL CABLES
626-759-303	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Toll Cables Superseded Spiral-Four Disc-Insulated Quadded Cable
626-759-304	2	BUILDING OUT CABLES
626-759-305	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Toll Cables 24-Gauge Quadded Protective Cables

Document	Issue	Description
626-759-306	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Toll Cables Emergency Toll Cable -- 22-Gauge Quads
626-759-350	3	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Toll Cables Standard SS (Serrated Seam) Coaxial Toll Cables
626-759-351	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Toll Cables Replacement SS (Serrated Seam) Coaxial (0.375-Inch)
626-759-352	1	CABLES
626-759-400	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables Superseded Exchange Cables
626-759-405	4	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 16-Gauge Cable -- Type NH
626-759-408	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 19-Gauge Cable -- Type ANB
626-759-409	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 19-Gauge Cable -- Type DNB
626-759-410	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 19-Gauge Cable -- Type GNB
626-759-415	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 19-Gauge Cable -- Type CBN
626-759-416	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 19-Gauge Cable -- Type ENB
626-759-417	2	EXCHANGE CABLES 19-GAUGE CABLE-TYPE FNB
626-759-425	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 22-Gauge Cable -- Type BSA
626-759-426	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 22-Gauge Cable -- Type CSA
626-759-427	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 22-Gauge Cable -- Type DSA
626-759-428	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 22-Gauge Cable -- Type ESA
626-759-429	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables Service Cables
626-759-440	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 24-Gauge Cable -- Type ASM
626-759-441	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 24-Gauge Cable -- Type BSM
626-759-442	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 24-Gauge Cable -- Type CSM
626-759-443	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 24-Gauge Cable -- Type DSM
626-759-444	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 24-Gauge Cable -- Type ESM
626-759-445	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 24-Gauge Cable -- Type FSM
626-759-460	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 26-Gauge Cable -- Type AST
626-759-461	2	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 26-Gauge Cable -- Type BST
626-759-462	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 26-Gauge Cable -- Type CST
626-759-463	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 26-Gauge Cable -- Type DST
626-759-470	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 28-Gauge Cable -- Type SW
626-759-481	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 17-Gauge Aluminum Cable -- Type ANC
626-759-482	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 20-Gauge Aluminum Cable -- Type AND

Document	Issue	Description
626-759-483	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables 22-Gauge Aluminum Cable -- Type ASF
626-759-490	1	Superseded Exchange Cables Superseded Plastic-Insulated Conductor (Air Core) Cable -- General
626-759-491	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables Superseded Plastic-Insulated Conductor (Air Core) PIC -- Cable 19-Gauge 83nf
626-759-492	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables Superseded Plastic-Insulated Conductor (Air Core) PIC -- Cable 19-Gauge 66nf
626-759-493	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables Superseded Plastic-Insulated Conductor (Air Core) PIC -- Cable 22-Guage
626-759-494	1	SUPERSEDED PLASTIC-INSULATED CONDUCTOR (AIR CORE) PIC CABLE 24-GAUGE 83 nF
626-759-495	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables Superseded Plastic-Insulated Conductor (Air Core) PIC -- Cable 26-Guage 83nf
626-759-496	1	CABLES, WIRE, AND APPARATUS CABLE CHARACTERISTICS, PHYSICAL Superseded Exchange Cables Superseded Plastic-Insulated Conductor (Air Core) PIC -- Cable Self-Supporting Type
626-7 LAYER	PHANTOM	
626-800-090	3	CABLES, WIRE, AND APPARATUS NONSTANDARD-LIMITED AVAILABILITY (NS-LA) CABLES Nonscreened and Screened Pulp-Insulated Conductor Cables -- Description, Use, and Reel Lengths
626-800-095	1	SCREENED, AIR CORE, AND WATERPROOF PLASTIC-INSULATED CONDUCTOR CABLE DESCRIPTION, USE, AND REEL LENGTHS NON-STANDARD/LIMITED AVAILABILITY (NS/LA)
627-000-000	89	AERIAL, BLOCK, AND HOUSE CABLE
627-020-005	3	Bonding and Grounding Aerial Plant General
627-070-015	3	CLEARANCES FOR AERIAL CABLE AND GUYS LIGHT LOADING AREA
627-070-016	3	CLEARANCES FOR AERIAL CABLE AND GUS MEDIUM LOADING AREA
627-070-017	3	CLEARANCES FOR AERIAL CABLE AND GUYS HEAVY LOADING AREA
627-200-015	2	SUSPENSION STRAND SELECTION COPPER CONDUCTOR CABLES ALL LOADING AREAS
627-200-016	1	SUSPENSION STRAND SELECTION ALUMINUM CONDUCTOR CABLES ALL LOADING AREAS
627-210-018	2	SUSPENSION STRAND TENSION AND SAGS COPPER CONDUCTOR CABLES
627-210-019	1	AERIAL, BLOCK, AND HOUSE CABLE SUSPENSION STRAND Tensions and Sags Aluminum Conductor Cables
627-210-019 ADD	1-Jan	
627-220-200	4	SUSPENSION STRAND ATTACHMENTS--GENERAL
627-220-200 ADD	4-Jan	SUSPENSION STRAND ATTACH-
627-220-202	3	SUSPENSION STRAND ATTACHMENTS CABLE EXTENSION ARMS
627-220-204	2	AERIAL, BLOCK, AND HOUSE CABLE SUSPENSION STRAND Attachments B Clamp Support
627-230-201	3	SUSPENSION STRAND PLACING METHODS
627-230-205	5	AERIAL, BLOCK, AND HOUSE CABLE SUSPENSION STRAND Placing Strand Connectors
627-230-208	3	SUSPENSION STRAND B STRAND CONNECTOR
627-230-210	1	SUSPENSION STRAND B STRAND REDUCER
627-240-200	3	SUSPENSION STRAND TENSIONING USE OF STRAND DYNAMOMETER
627-240-205	4	SUSPENSION STRAND TENSIONING USE OF STRAND PULLERS

Document	Issue	Description
627-240-211	3	SUSPENSION STRAND PULLING UP AND TENSIONING
627-240-212	7	SUSPENSION STRAND DEAD ENDING GENERAL
627-240-213	5	SUSPENSION STRAND FALSE DEAD ENDING
627-240-225	3	SUSPENSION STRAND SLACK SPAN CONSTRUCTION
627-295-301	1	STRAND TRANSFER TOOLS DESCRIPTION AND USE
627-295-305	3	REPLACING DETERIORATED STRAND
627-295-500	4	Testing
627-295-600	2	INSPECTION OF CORRODED GALVANIZED STRAND
627-2 LAYER	PHANTOM	
627-300-200	2	AERIAL, BLOCK, AND HOUSE CABLE AERIAL CABLE -- PLACING AND MAINTENANCE Placing Cable-In Rings Corner Cable Guide -- Use
627-300-211	2	AERIAL, BLOCK, AND HOUSE CABLE AERIAL CABLE -- PLACING AND MAINTENANCE Placing Cable-In Rings Grade Clamps
627-310-205	2	CABLE LASHERS -- USE
627-310-205 ADD	2-Jan	CABLE LASHERS - USE
627-320-010	1	CONNECTORIZED EXCHANGE CABLE SPLICING SYSTEM (CONECS) AERIAL CABLE PLACING
627-320-011	7	PLACING LASHED AERIAL CABLE GENERAL
627-320-201	1	LASHED AERIAL CABLE CABLE LIFTER AND CORNER CABLE JACK DESCRIPTION AND USE
627-320-205	5	PLACING LASHED AERIAL CABLE MOVING REEL METHOD
627-320-206	7	LASHED AERIAL CABLE PLACING STATIONARY REEL METHOD
627-330-202	3	LASHED AERIAL CABLE TERMINATING LASHING WIRE
627-340-101	4	AERIAL CABLE SUPPORTS AND SPACERS DESCRIPTION AND USE
627-340-205	5	LASHED AERIAL CABLE ARRANGEMENT OF SUPPORTS
627-350-200	2	AERIAL, BLOCK, AND HOUSE CABLE AERIAL CABLE -- PLACING AND MAINTENANCE Prelashing Cable General
627-350-212	2	PRELASHING USE OF B AND C SHEAVE SUPPORTS
627-360-200	2	AERIAL CABLE MECHANICAL PROTECTION
627-360-200 ADD	2-Jan	AERIAL CABLE MECHANICAL PROTECTION
627-360-210	2	BIRDS
627-360-210 ADD	2-Jan	AERIAL CABLE - D & E CABLE
627-365-100	1	AERIAL CABLE 1530-TYPE INDUCTORS
627-370-200	2	LENGTH
627-370-205	2	AERIAL CABLE LONG SPAN CONSTRUCTION SPANS LONGER THAN 250 FEET
627-380-240	2	AERIAL CABLE REMOVAL
627-380-245	1	REMOVING LASHING WIRE
627-390-011	4	CABLE DANCING-GENERAL
627-390-205	2	CABLE DANCING PREVENTION METHODS
627-395-320	2	AERIAL CABLE MAINTENANCE REMOVING BOWS FROM AERIAL CABLES ON 10M AND 16M STRAND
627-400-001	1	CATV AERIAL LIGHTGUIDE CABLE Planning, Engineering, and Installation Construction Reference Guide
627-610-200	2	AERIAL, BLOCK, AND HOUSE CABLE BLOCK AND HOUSE CABLE Block and House Cable -- Attaching Anchoring Devices for Attaching Cables to Walls
627-610-200 ADD	2-Jan	BLOCK AND BUILDING CABLE -
627-610-205	2	AERIAL, BLOCK, AND HOUSE CABLE BLOCK AND HOUSE CABLE Block and House Cable -- Attaching Block and Building Cable Placing
627-610-225	4	PLACING METALLIC RISER AND BUILDING CABLE
627-610-230	3	Placing Lightguide Cable in Risers, Conduit, and Plenums

Document	Issue	Description
627-700-011	2	SELF-SUPPORTING CABLE STRINGING SAGS AND TENSIONS
627-700-014	5	SELF-SUPPORTING CABLE PLACING GENERAL
627-700-015	1	Figure-8 Self-Supporting Fiber Optic Cable Placing General
627-700-017	1	INSTALLATION
627-700-020	1	CABLE SUPPORTS DESCRIPTION AND USE SELF-SUPPORTING CABLE
627-700-020 ADD	1-Jan	
627 DIV	PHANTOM	AERIAL,BLOCK,& HOUSE CABLE
628-000-000	35	Underground Cable
628-0 LAYER	PHANTOM	INDEXES AND GENERAL INFORM
628-200-200	2	UNDERGROUND CABLE PLACING RODDING AND CLEANING DUCTS
628-200-201	1	STEAMPETH SHEATH CABLE PLACING
628-200-205	1	CONNECTORIZED EXCHANGE CABLE SPLICING SYSTEM (CONECS) UNDERGROUND CABLE PLACING
628-200-206	4	UNDERGROUND CABLE PULLING CABLE INTO SUBSIDIARY DUCTS
628-200-207	2	UNDERGROUND CABLE PLACING Underground Cable -- Placing Placing Feeder and Riser Cable -- Central Office Buildings
628-200-208	7	UNDERGROUND CABLE PLACING
628-200-209	3	UNDERGROUND CABLE PLACING HIGH-PRODUCTION METHODS
628-200-210	1	UNDERGROUND COAXIAL CABLE PLACING
628-200-215	1	INNERDUCT PLACING UNDERGROUND
628-220-200	3	SEALING DUCTS GENERAL REQUIREMENTS
628-220-201	4	RUBBER CONDUIT PLUGS
628-220-203	1	SEALING DUCTS WOODEN CONDUIT PLUGS
628-220-204	4	SEALING DUCTS CALKING MATERIALS
628-220-205	1	PLASTIC CONDUIT PLUGS
628-240-242	3	REMOVING UNDERGROUND CABLE HIGH PRODUCTION METHOD
628-2 LAYER	PHANTOM	PLACING
628-800-305	2	PREVENTION OF CABLE CREEPAGE IN UNDERGROUND CONDUIT
628-8 LAYER	PHANTOM	MAINTENANCE
628 DIV	PHANTOM	UNDERGROUND CABLE
629-000-000	66	BURIED PLANT INDEX
629-020-009	1	BURIED PLANT INDEXES AND GENERAL INFORMATION B Wire Storage Closure - Description and Use
629-020-010	1	BURIED PLANT INDEXES AND GENERAL INFORMATION Buried Cable -- Sheath Bonding -- Nonpressurized Cables
629-020-012	2	BURIED PLANT URBAN INSTALLATIONS TELEPHONE ONLY
629-020-100	4	BURIED PLANT--INSTALLATION TELEPHONE AND POWER IN SAME TRENCH AND IN SEPARATE TRENCHES IN SAME EASEMENT
629-020-100 ADD	4-Jan	BURIED PLANT - INSTALLATION TELEPHONE AND POWER IN SAME TRENCH AND IN SEPARATE TRENCHES IN SAME EASEMENT
629-020-102	4	BURIED PLANT MAINTENANCE TO EXISTING SYSTEMS PROCEDURES
629-0 LAYER	PHANTOM	INDEXES AND GENERAL INFORM
629-1 LAYER	PHANTOM	PRECAUTIONS
629-200-204	1	BURIED PLANT BURIED CABLE Buried Plant -- Placing Connectorized Exchange Cable Splicing System (CONECS)
629-200-205	4	GUIDELINES FOR TRENCHING, BACKFILILNG, AND GROUND RESTORATION OF BURIED PLANT
629-200-206	4	GUIDELINES FOR PLACING BURIED PLANT
629-200-215	2	BURIED PLANT PLOWING
629-200-220	2	BURIED PLANT SOIL EROSION CONTROL
629-230-201	5	JUNCTIONS BURIED CABLE AERIAL SERVICE

Document	Issue	Description
629-230-201 ADD	4-Jan	JUNCTIONS BURIED CABLE - AERIAL SERVICE
629-250-200	1	BURIED PLANT BURIED CABLE Aerial Cable to Buried Cable Lowering Aerial Cable
629-250-201	3	BURIED PLANT BURIED CABLE Aerial Cable to Buried Cable Wrapping Lead Sheath Cable
629-250-201 ADD	3-Jan	WRAPPING LEAD SHEATH CABLE
629-2 LAYER	PHANTOM	BURIED CABLE
629-720-205	6	BURIED PLANT BURIED WIRE Buried Wire -- Terminating Buried Plant -- Terminations of Buried Wire at Junctions With Buried Plant
629-720-215	4	Terminals
629-760-215	1	BURIED PLANT BURIED WIRE Buried Wire-Splicing Installation of 179A1 Coil Case
629-795-500	1	BURIED PLANT BURIED WIRE Buried Wire Maintenance Testing
629-7 LAYER	PHANTOM	BURIED WIRE
629 DIV	PHANTOM	BURIED PLANT
630-000-000	6	NUMERICAL INDEX DIVISION 630 SUBMARINE CABLE
630-0 LAYER	PHANTOM	INDEXES AND GENERAL INFORM
630-100-010	3	SUBMARINE CABLE PRECAUTIONS
630-1 LAYER	PHANTOM	PRECAUTIONS
630-200-200	2	SUBMARINE CABLE PLACING Placing -- General
630-200-205	1	SUBMARINE CABLE PLACING PLACING FROM A BARGE
630-200-211	1	SUBMARINE CABLE PLACING PLACING FROM A BOAT
630-200-215	1	SUBMARINE CABLE PLACING PULLING ACROSS WATERWAY
630-200-220	3	Installation
630-2 LAYER	PHANTOM	PLACING
630-300-010	1	SUBMARINE CABLE SPLICING Splice Case Method
630-300-010 ADD	1-Jan	SPLICE CASE METHOD
630-300-100	1	Cable
630-300-100 ADD	1-Jan	INSTALLATION & SPLICING
630-3 LAYER	PHANTOM	SPLICING
630-800-300	1	SUBMARINE CABLE REPAIRING
630-8 LAYER	PHANTOM	MAINTENANCE
630 DIV	PHANTOM	SUBMARINE CABLE
631-000-000	4	Cable Terminals
631-005-050	3	CABLE TERMINALS INDEX AND GENERAL INFORMATION 2-, 6-, and 11-Type Protector Units -- Description and Maintenance
631-005-100	6	FACILITIES
631-005-102	2	CABLE TERMINALS INDEX AND GENERAL INFORMATION Superceded and/or Manufacture Discontinued Terminating Facilities
631-020-101	8	10-TYPE AND 12B1 CABLE STUBS DESCRIPTION AND INSTALLATION
631-020-200	5	BRACKETS 51B AND 38-Y-3913 DESCRIPTION AND USE
631-040-200	4	TERMINALS MARKING OUTSIDE CROSS-CONNECTING TERMINALS BINDING POST METHOD
631-040-201	1	TERMINALS MARKING INSIDE CROSS-CONNECTING TERMINALS BINDING POST METHOD
631-040-225	4	TERMINALS MARKING 1B-TYPE CABLE TERMINAL BLOCKS
631-050-108	3	66-TYPE CONNECTING BLOCK DESCRIPTION AND USE
631-050-108 ADD	3-Jan	66-TYPE CONNECTING BLOCK DESCRIPTION AND USE

Document	Issue	Description
631-050-110	3	CABLE TERMINALS INDEX AND GENERAL INFORMATION Connecting Blocks, Terminal Blocks, and Connectors 5A-Type Terminal Block -- Description and Use
631-050-120	3	CABLE TERMINALS INDEX AND GENERAL INFORMATION Connecting Blocks, Terminal Blocks, and Connectors 88-Type Connecting Blocks and Associated Hardware in Building Applications -- Description and Use
631-210-101	4	N-Type and 53-Type Terminals N-Type and 53-Type Description and Installation
631-210-102	3	N-Type and 53-Type Terminals N-Type Description and Installation
631-215-200	5	CABLE TERMINALS Closure Type 5-Type Closures -- Description and Installation
631-215-300	4	CABLE TERMINALS Closure Type 6-Type Closures -- Description and Installation
631-240-100	7	CABLE TERMINALS 49-Type Terminals 49-Type -- Description
631-240-211	8	CABLE TERMINALS 49-Type Terminals 1A1 and 1B1 Terminal Stubs -- Description and Installation in 105-Type Cable Terminals
631-250-100	5	105-Type Terminals 105-Type Cable Terminals Description and Installation
631-250-100-7	2	CABLE TERMINALS 105-Type Terminals
631-250-210	2	AT&T FLEXTERM 5000 AERIAL CABLE DISTRIBUTION TERMINAL DESCRIPTION AND INSTALLATION
631-250-211	1	Lucent Switched Digital Broadband Flexterm 5000 Aerial Cable Distribution Terminal Description and Installation
631-250-215	2	AT&T FLEXTERM 6000 AERIAL CABLE DISTRIBUTION TERMINAL DESCRIPTION AND INSTALLATION
631-300-100	6	CABLE TERMINALS OUTSIDE CROSS-CONNECTING TERMINALS, CABINETS, AND INTERFACES Outside Cross-Connecting Terminals B-Type Cable Terminals -- Description and Installation
631-300-212	1	B CABINET BALCONY, AT-7928 DESCRIPTION AND INSTALLATION
631-300-213	6	CABLE TERMINALS OUTSIDE CROSS-CONNECTING TERMINALS, CABINETS, AND INTERFACES Outside Cross-Connecting Terminals B-Type Terminals -- Placin S Pole Seat and B Terminal Balcony
631-310-201	5	CABLE TERMINALS OUTSIDE CROSS-CONNECTING TERMINALS, CABINETS, AND INTERFACES 29-Type Cabinets Description and Installation
631-310-202	1	CABLE TERMINALS OUTSIDE CROSS-CONNECTING TERMINALS, CABINETS, AND INTERFACES 29-Type Cabinets Skirt Assembly
631-340-105	2	CABLE TERMINALS OUTSIDE CROSS-CONNECTING TERMINALS, CABINETS, AND INTERFACES SAC (Serving Area Concept) Interfaces B Aerial Interface (AT-8685) -- Description and Installation
631-3 LAYER	PHANTOM	
631-400-101	6	CABLE TERMINALS INSIDE TERMINALS Distribution Terminals Building Terminals Mechanical Protection -- Description and Installation
631-400-102	3	GENERAL
631-400-105	2	CABLE TERMINALS INSIDE TERMINALS Distribution Terminals B Cable Terminal Frame -- AT-8640 -- Description and Installation
631-400-110	1	110 PATCH PANEL SYSTEM DESCRIPTION AND INSTALLATION
631-400-111	4	110 Connector Systems for Premises Application Product Application Guide
631-400-116	4	110C Connector Block
631-400-117	3	110D Connector Block with Solder Pin
631-400-119	2	110D Connector Block Compliant Pin
631-440-211	4	CABLE TERMINALS INSIDE TERMINALS Protected Terminals Terminal Blocks -- Description and Installation -- Building Terminals Inside Protected Building Terminals
631-460-111	5	134-TYPE PROTECTORS DESCRIPTION AND USE
631-460-113	3	CABLE TERMINALS INSIDE TERMINALS Building Terminals 188-Type Protectors -- Description and Installation
631-460-114	5	189-TYPE PROTECTORS E/W 66-TYPE CONNECTOR BLOCKS OR FEMALE MICRORIBBON CONNECTOR OUTPUTS DESCRIPTION AND INSTALLATION
631-460-115	1	190-TYPE PROTECTORS DESCRIPTION AND USE
631-460-115 ADD	1-Jan	190-TYPE PROTECTORS DESCRIPTION AND USE

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631-460-116	1	CABLE TERMINALS INSIDE TERMINALS Building Terminals 189P-Type Protectors E/W 76-Type Connecting Block Output -- Description and Installation
631-460-117	1	CABLE TERMINALS INSIDE TERMINALS Building Terminals 189M-Type Protectors Equipped with RJ11 Jacks or RJ21 Connector Outputs -- Description and Installation
631-460-118	1	CABLE TERMINALS INSIDE TERMINALS Building Terminals 195-Type Protector Description and Installation
631-460-119	1	CABLE TERMINALS INSIDE TERMINALS Building Terminals 199 E6A Type Protector Description and Installation
631-460-120	1	CABLE TERMINALS INSIDE TERMINALS Building Terminals 300-Type Building Entrance Cabe Terminals -- Description and Installation
631-460-120-1	2	INSTRUCTION SHEETS 5/PKG
631-460-122	1	CABLE TERMINALS INSIDE TERMINALS Building Terminals 1500-Type Building Entrance Cable Terminal -- Description and Installation
631-460-124	1	CABLE TERMINALS INSIDE TERMINALS Building Terminals 189F1-Type Protectors E/W RJ11 Jacks and Customer Bridge Outputs -- Description and Installation
631-460-124-3	1	INSTRUCTION SHEET 5/PKG
631-460-125	2	CABLE TERMINALS INSIDE TERMINALS Building Terminals
631-460-130	1	CABLE TERMINALS INSIDE TERMINALS Building Terminals 188-E Type Protectors Description and Installation
631-460-201	3	BUILDING TERMINALS-MAIN TERMINALS USING 66-TYPE QUICK-CONNECT HARDWARE
631-460-202	2	CABLE TERMINALS INSIDE TERMINALS Building Terminals Building Entrance Terminals Using 88- Type Quick-Connect Hardware
631-460-205	1	110-TYPE CONNECTING BLOCKS DESCRIPTION AND INSTALLATION BUILDING ENTRANCE TERMINALS
631-470-201	1	BUILDING TERMINALS RISER AND DISTRIBUTION
631-470-202	2	CABLE TERMINALS INSIDE TERMINALS Building Terminals Riser and Distribution Using 88-Type Quick-Connect Hardware
631-470-204	4	MC-10/48 CABLE CLOSURE - DESCRIPTION AND USE
631-470-205	1	CABLE TERMINALS INSIDE TERMINALS Building Terminals MC-12/40 Closure -- Description and Installation
631-470-206	1	CABLE TERMINALS INSIDE TERMINALS Building Terminals MC NP Type Closures - Description and Installation
631-4 LAYER	PHANTOM	
631-600-003	1	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant Gravel in Pedestal Closures -- Description and Use -- Buried Plant
631-600-007	2	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant B Flood Cove -- Description and Installation
631-600-204	2	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant 3A1 Closure Description and Installation
631-600-205	3	AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant E Cable Closure
631-600-205 ADD	3-Jan	
631-600-214	2	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant 16AA2 Closure -- Description and Use
631-600-221	3	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant G and H Cable Closures
631-600-221 ADD	3-Jan	

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631-600-222	2	38-y-b AND 38-y-c CABLE CLOSURES GAS TIGHT CLOSURES
631-600-225	4	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant UP-1248 (UP-1200) Cable Closure -- Description and Installation
631-600-226	3	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant UP-1254 and LG-10/43 Cable Closures -- Description and Installation
631-600-228	3	40-TYPE CABINETS DESCRIPTION AND PLACING
631-600-229	3	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant 76-Type Terminal Block -- Installation -- 40-Type Cabinet
631-600-230	1	ORDERING GD FOR PEDESTAL &
631-600-231	2	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant 40-Type Cabinet Installation of 108-Type Connecting Blocks
631-600-232	1	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant 40-Type Cabinets With Protectors -- Description
631-600-233	1	40-TYPE CABINET DESCRIPTION AND SPLICING RURAL AREA INTERFACE
631-600-236	1	42-TYPE CABINETS DESCRIPTION AND INSTALLATION)Vol 1 of 1 631-600-236
631-600-237	2	42-Type Cabinets Splicing, Wiring, and Termination
631-600-239	4	80D-BP AND 80D-HX (HEAT EXCHANGER) CABINET INSTALLATION
631-600-240	7	80D AND 80E (DISTRIBUTED POWER) CABINETS INSTALLATION
631-600-241	4	80B, 80C, AND 80D CABINETS FEEDER DISTRIBUTION INTERFACE SPLICING
631-600-243	4	80E-BP REMOTE TERMINAL CABINET GENERAL DESCRIPTION AND ORDERING INFORMATION
631-600-243 ADD	4-Jan	80E-BP (BULK POWER) CABINET GENERAL DESCRIPTION AND ORDERING INFORMATION
631-600-244	2	80E-BP (BULK POWER) CABINET INSTALLATION
631-600-245	1	LETTERING GUIDELINES FOR 80-TYPE CABINETS
631-600-246	4	80A-BP (BULK POWER) AND 80A-HX (BULK POWER WITH HEAT EXCHANGER) CABINETS INSTALLATION
631-600-247	5	80A-BP (BULK POWER) REMOTE TERMINAL CABINET GENERAL DESCRIPTION
631-600-248	6	80A (BLK PWR) CAB DOCTN
631-600-249	4	80D-BP (BULK POWER) CABINET GENERAL DESCRIPTION AND ORDERING INFORMATION
631-600-250	4	80D-BP (BULK POWER) CABINE
631-600-251	1	80A-HX (BULK POWER) REMOTE TERMINAL CABINET GENERAL DESCRIPTION AND ORDERING INFORMATION
631-600-252	2	40/41/42/841-Type Cabinets Replacement Parts Lists and Associated Hardware
631-600-253	1	81C (BULK POWER) REMOTE
631-600-254	1	80D-HX (BULK POWER WITH HEAT EXCHANGE) CABINET GENERAL DESCRIPTION AND ORDERING INFORMATION
631-600-255	2	80E CABINET (BULK POWER)
631-600-256	2	80A-HX CABINET (BULK POWER
631-600-257	2	80D-HX (BULK POWER WITH
631-600-259	1	81C-HX/HRISLU2 Cabinet Description and Ordering Information
631-600-260	4	40 EP4-, EP5-, AND EP6-TYPE CABINETS DESCRIPTION AND INSTALLATION
631-600-261	1	81C/81C-HX/81C-HX-XC Cabinet Installation
631-600-262	1	80A OTN (OPTICAL TRANSITION NODE) CABINET INSTALLATION
631-600-263	1	80G CABINET DESCRIPTION AND ORDERING INFORMATION
631-600-264	1	80G AND 80G-HX (HEAT EXCHANGER) CABINET INSTALLATION
631-600-265	1	80G (Bulk Power) Cabinet ED-7C755-30
631-600-266	2	INFORMATION

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631-600-267	1	80D-HX (HEAT EXCHANGER) CABINET WITH CABINET POWER SYSTEM (CPS) GENERAL DESCRIPTION AND ORDERING INFORMATION
631-600-268	1	80G-HX (Heat Exchanger) Cabinet ED-7C756-30
631-600-269	1	80D-BP (BULK POWER) CABINET WITH CPS GENERAL DESCRIPTION AND ORDERING INFORMATION
631-600-270	2	80-TYPE CABINETS REPLACEME
631-600-271	3	80A and 80A-HX (Heat Exchanger) Cabinet Replacement Parts List and Associated Hardware
631-600-272	2	Hardware
631-600-273	2	Hardware
631-600-274	3	80D-BP (Bulk Power) and 80D-HX (Heat Exchanger) Cabinets ReplacementParts List and Associated Hardware
631-600-275	2	Hardware
631-600-276	4	80E-BP (Bulk Power) Cabinet Replacement Parts List and Associated Hardware)Vol 1 of 1 631-600-276
631-600-278	1	80G and 80G-HX (Heat Exchanger) Cabinets Replacement Parts List and Associated Hardware
631-600-279	1	81C, 81C-HX (Heat Exchanger) and 81C-HX-XC (Cross-Connect) Cabinets Replacement Parts List and Associated Hardware)Vol 1 of 1 631-600-279
631-600-281	1	80A-BP CABINET GENL DESC
631-600-282	1	80A-HX (HEAT EXCHANGER) CABINET WITH CABINET POWER SYSTEM (CPS) GENERAL DESCRIPTION AND ORDERING INFORMATION
631-600-290	2	82-Type Outdoor Electronics Cabinets
631-600-293	1	52B and 52E Outdoor Electronics Cabinets 52B-ED-1T304-30 52E-ED-1T307-30
631-600-294	1	52C and 52D Outdoor Electronics Cabinets 52C - ED-1T305-30 52D - ED-1T306-30
631-600-295	1	52F OUTDOOR ELECTRONIC
631-600-296	1	83-Type Outdoor Electronics Cabinet, 83C-ED-1T301-30
631-600-305	1	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant Pedestal Closures -- Moisture Plugs at Cable Ends
631-600-305 ADD	1-Jan	PEDESTAL CLOSURES - MOIS-
631-600-326	1	Remote Power Enhanced Cooling (RPEC) Battery Cabinet (Version 2) Description, Installation, and Operation
631-600-332	1	66EC-G POWER CABINET DESCR
631-600-601	1	81C-HX/HRISLU2 CABINET ED-7C760-30
631-601-201	2	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant J Cable Closure -- Description and Installation
631-604-205	1	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant LD- and LE-Type Cable Closures -- Description and Installation
631-604-205 ADD	1-Jan	LD- AND LE-TYPE CABLE CLO-
631-604-210	4	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant PC-Type Cable Closures -- Description and Installation
631-604-210 ADD	4-Jan	PC-TYPE CABLE CLOSURES -
631-604-212	1	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant RC4/72 Cable Closure -- Description and Installation
631-604-215	3	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant 85-Type Closures -- Description and Installation

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631-605-206	1	CABLE TERMINALS BURIED AND UNDERGROUND TERMINALS, CLOSURES, AND INTERFACES Terminals, Closures, and Interfaces -- Buried Plant Below ground Control Point -- 12A1 Cable Closure
631-650-200	4	AND INTERFACES UG Terminals UG-16 Cable Terminal -- Description and Installation
631-6 LAYER	PHANTOM	
631-700-101	2	CABLE TERMINALS BROADBAND TERMINALS Video and Coaxial Cable Terminals Description of Video Terminals -- Paired and Coaxial
631-700-115	1	CABLE TERMINALS BROADBAND TERMINALS Video and Coaxial Cable Terminals Cable Terminals -- K Carrier Systems
631-700-205	2	CABLE TERMINALS BROADBAND TERMINALS Video and Coaxial Cable Terminals Mounting -- Paired and Coaxial
631-700-205 ADD	2-Jan	
631-710-210	7	CABLE TERMINALS BROADBAND TERMINALS Video and Coaxial Cable Terminals Coaxial Terminals -- Coaxial Cable Systems
631-710-220	4	CABLE TERMINALS BROADBAND TERMINALS Video and Coaxial Cable Terminals Carrier Systems -- Noncoaxial Terminals
631-7 LAYER	PHANTOM	
631 DIV	PHANTOM	
632-000-000	32	CABLE SPLICING
632-020-101	6	CABLE TAGS UNDERGROUND CABLE
632-020-105	3	FACTORY FURNISHED RECORDS OF CABLE PAIR DEFECTS DESCRIPTION
632-020-200	5	DEFECTIVE PAIRS LOCATING AND HANDLING CABLE SPLICING
632-020-240	3	CABLE SPLICING INDEX AND GENERAL INFORMATION Cable Removal -- Cutting Splice Closures From Plant
632-020-250	4	CABLE SPLICING INDEX AND GENERAL INFORMATION Connectorized Exchange Cable Splicing System (CONECS) -- Description
632-020-260	1	INSULATING JOINTS AND CAPACITOR INSTALLATION ON LEAD AND POLYETHYLENE SHEATH CABLES
632-032-110	5	CABLES
632-032-110 ADD	5-Jan	CABLE SPLICING---GENERAL MULTIPLE UNIT AD-TYPE PULP-INSULATED CABLES
632-032-111	2	CABLE SPLICING GENERAL MULTIUNIT PULP-INSULATED CD-TYPE CABLES
632-032-112	1	CABLE SPLICING GENERAL PIC AND PULP STREAMPETH CABLES
632-032-201	1	CABLE SPLICING GENERAL PLASTIC INSULATED CONDUCTOR (PIC) CABLES DESCRIPTION
632-033-153	1	1727 Type
632-035-111	2	CABLE SPLICING INDEX AND GENERAL INFORMATION Cable, Special Types Video Cables -- Description
632-035-120	4	CABLE SPLICING INDEX AND GENERAL INFORMATION Cable, Special Types Standard (Serrated Seam) Coaxial Cables -- Description
632-050-200	2	CABLE SPLICING GENERAL PARAFFIN AND SPLICING OIL
632-050-205	5	DESICCANTS DESCRIPTION AND USE
632-055-205	3	CABLE SPLICING INDEX AND GENERAL INFORMATION Cotton Sleeves Cable Splicing -- General Clearing and Insulating Conductor Ends
632-0 LAYER	PHANTOM	
632-115-101	1	Method
632-1 LAYER	PHANTOM	
632-200-200	1	CABLE SPLICING GENERAL TWISTED STRAIGHT JOINT
632-200-201	1	CABLE SPLICING GENERAL TWISTED BRIDGE JOINT
632-200-202	1	CABLE SPLICING GENERAL TRIMMING OUT BRIDGE
632-200-204	2	CABLE SPLICING Twisted Joints Twisted and Solder Dipped Joints -- Nonworking Cable
632-200-205	1	CABLE SPLICING Twisted Joints Twisted Butt Joint

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632-205-200	4	CABLE SPLICING GENERAL JOINTS IN ALUMINUM CONDUCTORS
632-205-201	5	CABLE SPLICING Pressed and Punched Joints B Wire Connector -- Description and Approved Conductor Combinations
632-205-205	2	CABLE SPLICING Pressed and Punched Joints Fold-Back Splicing Using D Connector Presser
632-205-206	2	CABLE SPLICING Pressed and Punched Joints Wire Joining Using Pair-A-Tester Splicing System
632-205-207	1	CABLE SPLICING Pressed and Punched Joints Splicing Strip-Paper Insulated Wires Using B Wire Connectors
632-205-211	1	CABLE SPLICING Pressed and Punched Joints UG Scotchlok Connector -- Bridging Small Branch Cables and Terminal Stub Cables
632-205-211 ADD	1-Jan	
632-205-215	6	CABLE SPLICING Pressed and Punched Joints 700-, 701-, 702-Type Connectors -- Wire Joining
632-205-216	3	709-Type Connectors (Quick Snap Connectors) Description and Use
632-205-220	5	WIRE JOINING 710 CONNECTOR SYSTEM
632-205-222	1	WIRE JOINING SYSTEM 711 CONNECTOR SYSTEM DESCRIPTION AND USE
632-205-222 ADD	1-Jan	WIRE JOINING SYSTEM 711 CONNECTOR SYSTEM DESCRIPTION AND USE
632-205-235	2	WIRE JOINING WITH 3M BRAND MODULAR SYSTEM SPLICING
632-210-200	2	CABLE SPLICING Soldered Joints Soldered Twisted Joints
632-2 LAYER	PHANTOM	
632-300-200	2	CABLE SPLICING AERIAL PREPARATION AND ARRANGEMENT
632-300-205	4	CABLE SPLICING Aerial, Block and House Cable Aerial Slack Pullers -- Use
632-305-015	3	CABLE SPLICING Cable in Manholes and Vaults Underground -- Setting Up Cable
632-305-216	1	MANHOLES
632-305-220	2	CABLE SPLICING Cable in Manholes and Vaults Splicing and Cable Racking Arrangements -- Central Office -- Cable Entrance Facility System
632-305-222	2	CABLE SPLICING Cable in Manholes and Vaults L4/L5 Carrier Basic Manhole -- Equipping and Splicing Arrangements
632-305-223	2	CABLE SPLICING Cable in Manholes and Vaults L4/L5 Basic Manhole Equipping an Splicing -- 22 Coaxial System
632-305-224	2	CABLE SPLICING Cable in Manholes and Vaults L4/L5 Basic Manhole Equipping an Splicing -- 12 Coaxial System
632-305-225	1	CABLE SPLICING Cable in Manholes and Vaults Wiring Options at L4 Basic Repeater Manhole
632-305-226	1	Manholes
632-305-230	1	CABLE SPLICING Cable in Manholes and Vaults L4/L5 Carrier -- Regulating Manhol -- Equipping and Splicing Arrangements
632-305-231	1	CABLE SPLICING Cable in Manholes and Vaults L4/L5 Regulating Manhole Equipping and Splicing -- 22 Coaxial System
632-305-232	1	CABLE SPLICING Cable in Manholes and Vaults L4/L5 Regulating Manhole Equipping and Splicing -- 12 Coaxial System
632-305-233	1	CABLE SPLICING Cable in Manholes and Vaults Wiring Options at L4 Regulating Manholes
632-305-234	1	CABLE SPLICING Cable in Manholes and Vaults Wiring Options at L5 Regulating Manholes
632-310-011	1	CABLE SPLICING BURIED GENERAL
632-3 LAYER	PHANTOM	
632-400-200	1	CABLE SPLICING GENERAL RANDOM SPLICE EXCHANGE CABLE 19 GAUGE AND SMALLER
632-400-201	1	CABLE SPLICING SPLICING PLANS AND CABLES Plans Random Splice -- Exchange Cable -- 13- and 16-Gauge
632-400-202	2	CABLE SPLICING GENERAL BUNCH SPLICE
632-400-205	1	CABLE SPLICING GENERAL RANDOM SPLICES IN TOLL CABLES

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632-400-215	2	TERMINATING K CARRIER CABLES PLANNED SPLICES FOR SUCCESSIVE REPEATER STATIONS (ON QUADDED CABLE ROUTES) TO MINIMIZE RECURRENCE OF SAME TWO K SYSTEMS IN A QUAD
632-405-205	1	CABLE SPLICING GENERAL 388A CONDENSERS
632-405-211	1	CABLE SPLICING GENERAL BUILDING OUT STUB CABLES
632-410-200	12	PLASTIC INSULATED CONDUCTOR (PIC) CABLE CABLE SPLICING GENERAL
632-410-203	2	Joints
632-420-205	5	CABLE SPLICING SPLICING VIDEO PAIRS
632-425-201	3	CABLE SPLICING SPLICING PLANS AND CABLES Coaxial Cable Joining 0.270-Inch Coaxials
632-425-203	3	CABLE SPLICING SPLICING PLANS AND CABLES Coaxial Cable Splicing 0.270 Inch to 0.375 Inch Serrated Seam Coaxials
632-425-205	3	CABLE SPLICING SPLICING PLANS AND CABLES Coaxial Cable Splicing Multiple Tube Coaxial Cable -- Serrated Seam
632-425-205 ADD	3-Jan	
632-425-207	1	CABLE SPLICING SPLICING PLANS AND CABLES Coaxial Cable Splicing Composite Coaxial Cable
632-435-211	1	CABLE SPLICING SPLICING PLANS AND CABLES Submarine Cable Welded Armor Wire Method
632-490-200	6	CABLE SPLICING - GENERAL WRAPPING COMPLETED SPLICE
632-490-200 ADD	6-Jan	CABLE SPLICING-GENERAL WRAPPING COMPLETED SPLICE
632-4 LAYER	PHANTOM	
632-615-200	1	CABLE SPLICING SPLICING TERMINALS Video Terminals Connecting and Terminating Flexible Shielded Video Cable
632-6 LAYER	PHANTOM	
632-800-324	1	QUADED AND PAIRED CABLE RESTORATION PROCEDURES
632-8 LAYER	PHANTOM	
632 DIV	PHANTOM	
633-000-000	9	SPLICE CLOSURES
633-020-011	1	SPLICE CLOSURES INDEX, GENERAL INFORMATION, AND SHEATH OPENINGS General Solders
633-020-201	4	SPLICE CLOSURES INDEX, GENERAL INFORMATION, AND SHEATH OPENINGS General Supports at Y-Splices -- Description and Use
633-020-208	1	BONDING AND GROUNDING METHODS BURIED AND UNDERGROUND PLANT
633-020-210	1	FR-TYPE JACKET DESCRIPTION AND INSTALLATION
633-040-201	6	SPLICE CLOSURES INDEX, GENERAL INFORMATION, AND SHEATH OPENINGS Sheath Openings, Temporary Protection Temporary Splice Protection Using CR Tape
633-040-202	3	SPLICE CLOSURES INDEX, GENERAL INFORMATION, AND SHEATH OPENINGS Sheath Openings, Temporary Protection C and D Splice Covers
633-0 LAYER	PHANTOM	
633-200-201	1	SPLICE CLOSURES LEAD CLOSURES Sleeves Lead-Calcium Sleeves -- Description and Installation
633-200-201 ADD	1-Jan	LEAD-CALCIUM SLEEVES - DE-
633-250-200	3	SPLICE CLOSURES LEAD CLOSURES Steel Sleeves B Steel Sleeve -- Wiped Joints
633-2 LAYER	PHANTOM	LEAD CLOSURES
633-300-200	5	SPLICE CLOSURES WRAPPED, INSULATED, AND SPECIAL CLOSURES Wrapped Joints Auxiliary Sleeves -- Plastic- or Lead- Jacketed Cables
633-330-200	2	SPLICE CLOSURES WRAPPED, INSULATED, AND SPECIAL CLOSURES Plastic Joints Plastic Joint
633-330-210	3	SPLICE CLOSURES WRAPPED, INSULATED, AND SPECIAL CLOSURES Plastic Joints End Plate Kits -- Coaxial Cable Systems
633-3 LAYER	PHANTOM	WRAPPED, INSULATED, AND

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633-400-200	9	20-, 21-, 30-, AND 31-TYPE SPLICE CASES DESCRIPTION AND INSTALLATION
633-460-210	6	9A, 10A, 11A, 12A, 40E2, AND 41E2 SPLICE CASES DESCRIPTION AND INSTALLATION FOR DUAL JACKETED CABLES
633-470-100	4	13A AND 14A SPLICE CASES DESCRIPTION AND INSTALLATION
633-4 LAYER	PHANTOM	SPLICE CASES
633-500-101	4	SPLICE CLOSURES CLOSURES Types 1A1, 1B1, 1C1, 16, 18, 23, 1900, 2200, and 62A1 Types 1A1, 1B1, and 1C1 -- Description and Installation
633-500-102	3	SPLICE CLOSURES CLOSURES Types 1A1, 1B1, 1C1, 16, 18, 23, 1900, 2200, and 62A1 Type 18 -- Description and Installation
633-500-104	3	SPLICE CLOSURES CLOSURES Types 1A1, 1B1, 1C1, 16, 18, 23, 1900, 2200, and 62A1 Type 16 -- Description and Installation
633-500-106	1	SPLICE CLOSURES CLOSURES Types 1A1, 1B1, 1C1, 16, 18, 23, 1900, 2200, and 62A1 62A1 Ages -- Description and Installation
633-500-108	1	SPLICE CLOSURES CLOSURES Types 1A1, 1B1, 1C1, 16, 18, 23, 1900, 2200, and 62A1 1900-Series -- Description and Installation
633-500-110	1	SPLICE CLOSURES CLOSURES Types 1A1, 1B1, 1C1, 16, 18, 23, 1900, 2200, and 62A1 Type 23 -- Description and Installation
633-500-112	1	SPLICE CLOSURES CLOSURES Types 1A1, 1B1, 1C1, 16, 18, 23, 1900, 2200, and 62A1 2200 Series -- Description and Installation
633-500-113-2	1	SPLICE CLOSURES CLOSURES Types 1A1, 1B1, 1C1, 16, 18, 23, 1900, 2200, and 62A1
633-501-101	4	UNIVERSAL LIGHTGUIDE CLOSURE (UCB1) DESCRIPTION AND USE
633-501-101-22	3	SPLICE CLOSURES CLOSURES Lightguide Closure
633-501-101-23	4	SPLICE CLOSURES CLOSURES Lightguide Closure
633-501-101-25	7	SPLICE CLOSURES CLOSURES Lightguide Closure
633-501-101-28	2	SPLICE CLOSURES CLOSURES Lightguide Closure
633-501-101-29	1	SPLICE CLOSURES CLOSURES Lightguide Closure
633-501-101-3	2	INSTRUCTION SHEET 5/PKG
633-501-102	1	UNIVERSAL LIGHTGUIDE CLOSURE (UCB1-STH/P) DESCRIPTION AND USE
633-501-103	1	UNIVERSAL LIGHTGUIDE CLOSURE (UCB2) DESCRIPTION AND USE
633-502-101-0	3	SPLICE CLOSURES CLOSURES
633-502-102-6	2	SPLICE CLOSURES CLOSURES
633-506-201	5	SPLICE CLOSURES CLOSURES 2-Type Plastic Closure, Types 50 and 51 Type 2 -- Description and Installation
633-506-201 ADD	5-Jan	2-TYPE CLOSURE - DESCRIP-
633-506-205	3	SPLICE CLOSURES CLOSURES 2-Type Plastic Closure, Types 50 and 51 Types 50 and 51 -- Description and Installation
633-506-206	1	INSTALLATION
633-506-207	1	SPLICE CLOSURES CLOSURES 2-Type Plastic Closure, Types 50 and 51
633-506-210	3	SPLICE CLOSURES CLOSURES 2-Type Plastic Closure, Types 50 and 51 2000-Series -- Copper Applications -- Description and Installation
633-515-101	5	SPLICE CLOSURES CLOSURES 4-Type Closures Types 4A1 and 4B1
633-560-101	5	SPLICE CLOSURES CLOSURES Central Office and Building Splice Closures Types K and B Splice -- Description and Installation
633-560-205	1	SPLICE CLOSURES CLOSURES Central Office and Building Splice Closures Type 21D4 -- Description and Installation
633-560-205 ADD	1-Jan	TYPE 21D4 - DESCRIPTION
633-5 LAYER	PHANTOM	CLOSURES
633 DIV	PHANTOM	
634-000-000	73	ELECTRICAL CABLE TESTING AND IDENTIFICATION
634-020-010	2	ELECTRICAL CABLE TESTING AND IDENTIFICATION INDEXES AND GENERAL INFORMATION Cable Testing -- General Identification of Electrical Test Equipment
634-020-012	2	CABLE TESTING GENERAL RESISTANCE OF CABLE CONDUCTORS

Document	Issue	Description
634-020-500	3	CABLES
634-020-501	2	CABLE TESTING GENERAL GENERAL RULES FOR USING IDENTIFICATION TONE AND FOR ESTABLISHING A TALK CIRCUIT
634-020-502	3	CABLE TESTING GENERAL DETECTING TONE WITH AN AMPLIFIER
634-020-504	2	HIGH POTENTIAL DC TESTING OF WIRE COMMUNICATION FACILITIES SERVING POER STATIONS
634-020-505	1	ELECTRICAL CABLE TESTING AND IDENTIFICATION INDEXES AND GENERAL INFORMATION Cable Testing -- General 1097A Filter -- Description and Use
634-0 LAYER	PHANTOM	INDEXES AND GENERAL INFORM
634-200-225	1	ELECTRICAL CABLE TESTING AND IDENTIFICATION IDENTIFYING CONDUCTORS, LOCATING UNDERGROUND PIPES AND CABLES Identifying Conductors, Two Point Operation 145A Test Set -- Description and Use
634-200-450	1	ELECTRICAL CABLE TESTING AND IDENTIFICATION IDENTIFYING CONDUCTORS, LOCATING UNDERGROUND PIPES AND CABLES Identifying Conductors, Two Point Operation 138A Test Set -- Description and Use
634-200-501	4	ELECTRICAL CABLE TESTING AND IDENTIFICATION IDENTIFYING CONDUCTORS, LOCATING UNDERGROUND PIPES AND CABLES Identifying Conductors, Two Point Operation 76C Test Set -- Description and Maintenance and Establishing Talk and/or Calling Circuit
634-200-501 ADD	4-Jan	76C TEST SET - DESCRIP-
634-200-502	2	CABLE TESTING GENERAL IDENTIFYING CONDUCTORS WITH 84A TEST SET (CABLEMAN'S TALKING SET)
634-200-503	2	ELECTRICAL CABLE TESTING AND IDENTIFICATION IDENTIFYING CONDUCTORS, LOCATING UNDERGROUND PIPES AND CABLES Identifying Conductors, Two Point Operation 79D Test Set
634-200-504	1	ELECTRICAL CABLE TESTING AND IDENTIFICATION IDENTIFYING CONDUCTORS, LOCATING UNDERGROUND PIPES AND CABLES Identifying Conductors, Two Point Operation 146A Test Set -- Description and Use

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900-000-000	18	OUTSIDE PLANT ENGINEERING GENERAL INFORMATION
900-000-100	23	PERMUTED INDEX OUTSIDE PLANT ENGINEERING
900-200-318	Jul-87	OUTSIDE PLANT ENGINEERING HANDBOOK
901-000-000	42	Outside Plant Engineering Facility Planning Study Methods and Tools
901-111-301	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS COST STUDIES Comparative Cost Studies -- Manual
901-111-302	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS COST STUDIES Comparative Cost Studies -- Mechanized
901-200-100	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS FEEDER CABLE RELIEF Cable Fill Counting -- General
901-200-110	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS FEEDER CABLE RELIEF Cable Fill Counting -- Manual
901-200-240	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS FEEDER CABLE RELIEF Conversion Guidelines -- Connectivity Data -- Loop Cable Record Inventory System (LCRIS)
901-211-200	2	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS FEEDER CABLE RELIEF Feeder Cable Relief Studies
901-211-201	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS FEEDER CABLE RELIEF Feeder Cable Relief Studies -- Graphic Presentation
901-211-210	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS FEEDER CABLE RELIEF Main Distribution Frame and Cable Route -- Graphic Historical Records
901-350-200	4	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS ROUTE PLANNING AND STUDY Long Range Outside Plant Planning -- Overview
901-350-250	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS ROUTE PLANNING AND STUDY Outside Plant Engineering -- Detailed Distribution Area Planning (DDAP)
901-350-300	5	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS ROUTE PLANNING AND STUDY Feeder Cable -- Size
901-350-400	2	TOOLS ROUTE PLANNING AND STUDY Administrative Route Layouts and Pair Group Displays
901-357-200	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS ROUTE PLANNING AND STUDY Planning
901-370-100	2	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS ROUTE PLANNING AND STUDY Economic Feeder Administration and Relief (EFAR) -- Overview
901-370-110	1	(EFAR)
901-370-120	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS ROUTE PLANNING AND STUDY Economic Feeder Administration and Relief (EFAR) -- Use and Application
901-473-051	2	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS CABLE PRESSURIZATION Air Pressure Analysis Program -- Preparation of Study Data
901-473-052	2	TOOLS CABLE PRESSURIZATION Air Pressurization Analysis Program -- Preparation of Forms
901-473-053	2	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS CABLE PRESSURIZATION Air Pressurization Analysis Program -- Time-Share Data Check Routine
901-555-300	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS TRUNK STUDIES Cable Studies
901-555-400	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS TRUNK STUDIES Mechanized Trunk Study

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901-601-100	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS SYSTEM ENGINEERING PROGRAM Operational Procedures -- Remote Data Entry System Administration
901-625-100	2	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS SYSTEM ENGINEERING PROGRAM Outside Plant Engineering -- Computerized Administrative Route Layouts (CARL) -- Responsibilities of the CARL Engineer
901-625-110	2	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS SYSTEM ENGINEERING PROGRAM Outside Plant Engineering -- Computerized Administrative Route Layouts (CARL) -- Responsibilities of CARL Engineering Clerks and Drafters
901-660-100	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS SYSTEM ENGINEERING PROGRAM Overview
901-660-101	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS SYSTEM ENGINEERING PROGRAM Headquarters Administration User Guide
901-660-102	1	OUTSIDE PLANT ENGINEERING -- FACILITY PLANNING~~~STUDY METHODS AND TOOLS SYSTEM ENGINEERING PROGRAM District Administration User Guide
902-000-000	37	NUMERICAL INDEX DIVISION 902 OUTSIDE PLANT ENGINEERING FACILITY PLANNING APPLIED TRANSMISSION
915-000-000	35	OUTSIDE PLANT ENGINEERING FACILITY DESIGN SYSTEMS
915-251-100	2	OUTSIDE PLANT ENGINEERING SERVING AREA CONCEPT (SAC) DESIGN
915-251-200	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS SERVING AREA CONCEPT Outside Plant Design -- Feeder Cable Design
915-251-300	2	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS SERVING AREA CONCEPT Outside Plant Design -- Distribution Cable Design
915-700-100	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS Loop Products Remote Terminal Site -- Functional and Aesthetic Considerations
915-710-110	3	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS SLC* 96 Carrier System -- Application Engineering
915-710-111	2	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS Fiber SLC 96 Carrier System -- Application Engineering
915-710-113	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS SLC 24 Carrier System -- Engineering and Implementation -- Digital Transmission Systems
915-720-110	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS SLC 40 Subscriber Loop Carrier System -- Engineering and Implementation
915-774-110	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS Loop Switching System (LSS) -- Engineering and Implementation
915-774-200	2	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS The Gfeller Automatic Subscriber Line Concentrator -- General Description and Application
915-774-210	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS Line Concentrator No. 1A 50- and 100- Line Remote Units -- General Description and Application
915-775-110	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS No. 10A Remote Switching System (RSS) -- Pair Gain Application -- Engineering and Implementation
915-776-110	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS SLC 8 Subscriber Loop Carrier System -- Engineering and Implementation
915-776-300	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS PAIR GAIN SYSTEMS U-1 Carrier Systems -- Application and Engineering Considerations
915-800-100	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS SPECIAL OUTSIDE PLANT SYSTEMS Telephone Service to Marinas -- Engineering and Design Guidelines
915-890-100	3	RURAL AREA NETWORK DESIGN (RAND) GENERAL PRINCIPLES OUTSIDE PLANT ENGINEERING

Document	Issue	Description
915-890-101	2	RURAL AREA NETWORK DESIGN (RAND) DESIGN AND IMPLEMENTATION OUTSIDE PLANT ENGINEERING
915-890-110	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS SPECIAL OUTSIDE PLANT SYSTEMS Emergency Telephone Reporting Systems
915-890-200	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS SPECIAL OUTSIDE PLANT SYSTEMS Closed Circuit Television Systems
915-890-210	1	COAXIAL CABLE VIDEO TRANSMISSION SYSTEMS RF TYPE GENERAL DESIGN CONSIDERATIONS
915-890-215	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS SPECIAL OUTSIDE PLANT SYSTEMS Coaxial Cable Television Systems -- RF- Type -- 54- to 216-Megacycle Band Design
915-890-310	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~SYSTEMS SPECIAL OUTSIDE PLANT SYSTEMS Engineering and Implementation Methods System (EIMs) for PICTUREPHONE* Pair Suitability Testing
916-000-000	17	NUMERICAL INDEX DIVISION 916 OUTSIDE PLANT ENGINEERING FACILITY DESIGN FEEDER FACILITIES
916-100-010	1	OUTSIDE PLANT ENGINEERING FEEDER ADMINISTRATION
917-000-000	24	NUMERICAL INDEX DIVISION 917 OUTSIDE PLANT ENGINEERING FACILITY DESIGN DISTRIBUTION FACILITIES
917-100-001	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES GENERAL INFORMATION Engineering and Implementation Methods System for Distribution Facilities
917-152-100	2	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES GENERAL INFORMATION General
917-152-200	2	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES GENERAL INFORMATION Distribution Cable Design -- Cable Sizing and Transmission
917-152-250	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES GENERAL INFORMATION Administration of Distribution Cable Facilities
917-252-300	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES AERIAL CABLE Distribution Cable Design -- Self-Supporting Aerial Cable Facilities
917-272-800	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES AERIAL CABLE Use of Increased Span Lengths in Cable Line Construction
917-300-100	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES Preterminated Buried Cable (Service Wires) -- Engineering and Design Guidelines
917-352-310	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES Distribution Cable Design -- Serving Mobile Homes
917-356-001	2	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES Engineering and Implementation Methods System for New Buried Distribution Facilities
917-356-100	2	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES Buried Urban Distribution Systems
917-356-105	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES Soil Erosion Control
917-454-200	4	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES BUILDING CABLE Housing Facilities
917-454-300	4	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES BUILDING CABLE Design Illustrations
917-454-400	4	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES BUILDING CABLE Design Data
917-454-410	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES BUILDING CABLE Housing Design Data -- Garden Apartments
917-601-001	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES Engineering and Implementation Methods System for Rehabilitation of Distribution Facilities

Document	Issue	Description
917-601-110	3	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~DISTRIBUTION FACILITIES Guidelines for the Distribution Plant -- Facility Analysis Plan -- Development of Solution Alternatives
918-000-000	11	OUTSIDE PLANT ENGINEERING FACILITY DESIGN APPLIED PROTECTION
919-000-000	27	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~STRUCTURE INDEXES AND GENERAL INFORMATION Outside Plant Engineering -- Facility Design -- Structure
919-117-096	1	OUTSIDE PLANT PROTECTION CONSIDERATIONS NEAR EXTRA-HIGH-VOLTAGE POWER LINES
919-120-100	2	Planning
919-240-001	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~STRUCTURE UNDERGROUND CONDUIT Engineering and Implementation Methods System
919-240-300	2	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~STRUCTURE UNDERGROUND CONDUIT Manholes
919-240-305	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~STRUCTURE UNDERGROUND CONDUIT Below Ground Electronics Remote Terminal (BERT) -- Engineering Considerations
919-240-310	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~STRUCTURE UNDERGROUND CONDUIT Manholes and Service Boxes for T-1 Carrier Apparatus Cases
919-240-550	1	OUTSIDE PLANT ENGINEERING -- FACILITY DESIGN~~~STRUCTURE UNDERGROUND CONDUIT Tunnels -- General Engineering Considerations
920-000-000	12	OUTSIDE PLANT ENGINEERING FACILITY DESIGN TRUNK FACILITIES
928-000-000	17	FUNCTIONS
928-100-070	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS OUTSIDE PLANT LOCATION RECORDS Geographic Record Development
928-100-110	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS OUTSIDE PLANT LOCATION RECORDS Feeder Cable Record System
928-100-130	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS OUTSIDE PLANT LOCATION RECORDS Cable Pressure System
928-100-200	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS OUTSIDE PLANT LOCATION RECORDS Distribution Cable Records
928-100-450	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS OUTSIDE PLANT LOCATION RECORDS Geographic Pole Map
928-113-300	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS OUTSIDE PLANT LOCATION RECORDS Underground Cable
928-113-301	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS OUTSIDE PLANT LOCATION RECORDS Dedicated Outside Plant -- Underground Cable
928-113-401	1	DEDICATED OUTSIDE PLANT AERIAL, BLOCK, BUILDING AND BURIED CABLES
928-113-601	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS OUTSIDE PLANT LOCATION RECORDS Toll Cables -- Long Haul
928-113-602	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS OUTSIDE PLANT LOCATION RECORDS Toll Cables -- Short Haul
928-113-603	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS OUTSIDE PLANT LOCATION RECORDS Toll Aerial Wire
928-200-100	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS ENGINEERING WORK ORDER Work Order Flow
928-313-700	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS MISCELLANEOUS RECORDS Miscellaneous
928-411-505	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS WORK PRINTS Preparation of Work Prints -- Job Management Operations System (JMOS)

Document	Issue	Description
928-411-510	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS WORK PRINTS Preparation of Work Prints -- General
928-411-514	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS WORK PRINTS Preparation of Work Prints -- Aerial Cable
928-411-515	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS WORK PRINTS Preparation of Work Prints -- Buried Wire
928-411-516	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS WORK PRINTS Preparation of Work Prints -- Aerial Wire
928-411-517	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS WORK PRINTS Preparation of Work Prints -- Poles
928-411-518	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS WORK PRINTS Preparation of Work Prints -- Building Cable
928-411-519	2	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS WORK PRINTS Preparation of Work Prints -- Cable Pressurization
928-411-520	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS WORK PRINTS Preparation of Work Prints -- Trunk and Carrier
928-411-523	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS WORK PRINTS Revision to Work Prints
928-515-212	1	OUTSIDE PLANT ENGINEERING -- FACILITY SUPPORT~~~ENGINEERING SUPPORT FUNCTIONS MAPS AND OTHER DOCUMENTS Preparation of Loop Checker Distance Zone Map
930-200-001	2	OUTSIDE PLANT FACILITY SUPPORT~~~MAINTENANCE AND UPKEEP CABLE Engineering and Implementation Methods System -- Cable Upkeep Systems
935-000-000	15	NUMERICAL INDEX-DIVISION 935 OUTSIDE PLANT ENGINEERING MANAGEMENT ORGANIZING
935-100-102	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Distribution Service Design Center (DSDC) -- Center Description
935-100-106	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Distribution Service Design Center (DSDC) -- Center Training Description
935-100-108	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Distribution Service Design Center (DSDC) -- Information Resources Index
935-111-401	2	ADMINISTRATIVE PROCEDURES AND METHODS RESPONSIBILITIES OF OUTSIDE PLANT ENGINEERING
935-111-412	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Production Procedures
935-111-413	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Clerical Support Procedures
935-111-430	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Preparation of Specific Estimate Authorizations
935-111-440	2	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Manual Job Scheduling -- Procedures and Guidelines -- Distribution Service Design Center and Construction Management Center
935-111-450	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Mechanized Scheduling -- General Description
935-111-451	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Mechanized Scheduling -- Implementation Procedures
935-111-452	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Mechanized Scheduling -- Input Procedures
935-111-453	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Mechanized Scheduling -- Operating Procedures

Document	Issue	Description
935-111-455	1	OUTSIDE PLANT ENGINEERING~~~MANAGEMENT ORGANIZING ADMINISTRATIVE PROCEDURES AND METHODS Mechanized Scheduling -- Output Reports
935-111-460	1	OUTSIDE PLANT ENGINEERING JOB MANAGEMENT OPERATIONS SYSTEM (JMOS) ADMINISTRATIVE GUIDE
935-111-461	1	OUTSIDE PLANT ENGINEERING JOB MANAGEMENT OPERATIONS SYSTEM (JMOS) ADMINISTRATIVE GUIDE
935-111-463	1	OUTSIDE PLANT ENGINEERING JOB MANAGEMENT OPERATIONS SYSTEM (JMOS) ADMINISTRATIVE GUIDE
935-111-464	1	OUTSIDE PLANT ENGINEERING (JMOS) SUBJECT JOB MANAGEMENT OPERATIONS SYSTEM (JMOS) ADMINISTRATIVE GUIDE
936-000-000	14	NUMERICAL INDEX DIVISION 936 OUTSIDE PLANT ENGINEERING MANAGEMENT CONTROLLING
936-111-100	2	OPERATIONAL REVIEW PLAN FOR OUTSIDE PLANT ENGINEERING
936-312-110	2	OUTSIDE PLANT ENGINEERING
936-400-004	1	Outside Plant Engineering Defective Pair Control Plan
937-000-000	9	NUMERICAL INDEX DIVISION 937 OUTSIDE PLANT ENGINEERING MANAGEMENT COORDINATING