SECTION 01019 - GENERAL PROJECT REQUIREMENTS

SPECIFIER'S NOTE: Insert wording, numbers, etc. as appropriate where [italics in parenthesis] are shown throughout this specification section. Italicized words are used for directions to the specifier and should be filled in. Blue colored text are Notes to Specifier and should be completely deleted from the final text. Red colored text is used for items to be modified. *Maintain footer notation in italics with the current version used (e.g. TG01019 v00.04)**.***

SPECIFIER NOTES: Add this section for all projects. Modify for major projects. Be sure to type without errors. Most paragraphs have major contract implications and must be presented verbatim.

PART 1 - GENERAL

1.01 SUMMARY OF WORK

A. Perform operations and furnish equipment, fixtures, appliances, tools, materials, related items and labor necessary to execute, complete and deliver the Work as required by the Contract Documents.

1.02 DIVISION OF WORK

B. The Division and Sections into which these specifications are divided shall not be considered an accurate or complete segregation of work by trades. This also applies to work specified within each section

C. Contractor shall not alter the Drawings and Specification. If an error or discrepancy is found, notify the Engineer. Comply with the GENERAL CONDITIONS Article 5 - CONTROL OF THE WORK. Should the Contractor deliberately fail to notify the Engineer, the Contractor will be held responsible for any cost involved in correction of work placed due to such discrepancy.

D. Where devices, or items, or parts thereof are referred to in the singular, it is intended that such reference shall apply to as many such devices, items or parts as are required to properly complete the Work.

E. Specifications and Drawings are prepared in abbreviated form and include incomplete sentences. Omission of words or phrases such as "the Contractor shall", "as shown on the drawings", "a", "an", and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences

F. Specifying of interface and coordination in the various Specification Sections is provided for information and convenience only. Such requirements in the various Sections shall complement the requirements of this Section.

SPECIFIER'S NOTE: Add other notification requirements to Section 1.03 if required. Confirm with Project Coordinator

1.03 NOTIFICATION

A. As a condition of the bidding requirements, contact and obtain permission from the Project Contact Person listed in Section 00800 SPECIAL CONDITIONS before visiting the site to examine the premises.

B. Contact the Engineer and the Project Contact Person at least three (3) working prior to starting any onsite work.

1.04 SAFETY REQUIREMENTS

A. The Hawaii Occupational Safety and Health Law, Chapter 396, Hawaii Revised Statutes, effective May 16, 1972, as amended, is applicable and made a part of the Contract. Carefully read and strictly comply with its requirements.

B. Protect the facility personnel, students, and the public whenever power driven equipment is used. Ensure adequate safety precautions are used when operating any power driven equipment.

1.05 PERFORMANCE AND COORDINATION

A. Contractor shall be in charge of the Work and the Project Contract Limits, as well as the directing and scheduling of all work. Contractor shall include general supervision, management and control of the Work of this project, and in addition to other areas more specifically noted throughout the Specifications. Final responsibility for performance, interface, and completion of the Work and the Project shall be the Contractor's.

B. Jobsite Administration shall be the responsibility of the Contractor. Provide a competent superintendent on the job and provide an adequate staff to execute the Work. In addition, all workers shall dress neatly and conduct themselves properly at all times. Loud abusive behavior, sexual harassment and misconduct will not be tolerated. Workers found in violation of the above shall be removed from the job site as directed by the Engineer.

C. The State of Hawaii will hold the Contractor liable for all the acts of Subcontractors and shall deal only with the Prime Contractor in matters pertaining to other trades employed on the job.

D. Coordination: Provide project interface and coordination to properly and accurately bring together the several parts, components, systems, and assemblies as required to complete the Work pursuant to the GENERAL CONDITIONS and SPECIAL CONDITIONS.

1. Provide interface and coordination of all trades, crafts and subcontracts. Ensure and make correct and accurate connections of abutting, adjoining, overlapping, and related work. Provide anchors, fasteners, accessories, appurtenances, and incidental items needed to complete the Work, fully, and correctly in accordance with the Contract Documents.

2. Provide additional structural components, bracing, blocking, miscellaneous metal, backing, anchors, fasteners, and installation accessories required to properly anchor, fasten, or attach material, equipment, hardware, systems and assemblies to the structure.

3. Provide excavation, backfilling, trenching and drilling for trades to install their work.

4. Provide concrete foundations, pads, supports, bases, and grouting for trades as needed to install their work.

5. Provide caulking, sealing, and flashing as required to waterproof the building complete and as required to insulate the building thermally and acoustically. Include sealing, flashing, and related work as required to prevent moisture intrusion, air infiltration, and light leakage.

6. Equipment, appliances, fixtures, and systems requiring plumbing and mechanical services, rough-in, and connections, or other utilities and services shall be provided with such services, rough-in, and final connections.

7. Equipment, appliances, fixtures, hardware, and systems requiring electrical services shall be provided with such electrical services, including outlets, switches, overload protection, interlocks, panelboard space, disconnects, circuit breakers, and connections.

8. Materials, equipment, component parts, accessories, incidental items, connections, and services required to complete the Work which are not provided by subcontractors shall be provided by the Contractor.

SPECIFIER'S NOTE: Include Paragraph 1.06.A with all projects. Provide other paragraphs if needed. Confirm requirements with the Project Coordinator.

1.06 COOPERATION WITH OTHER CONTRACTORS

A. The State reserves the right at any time to contract for or otherwise perform other or additional work within the Project Contract Limits. The Contractor of this project shall to the extent ordered by the Engineer, conduct its work so as not to interfere with or hinder the progress or completion of the work performed by the State or other contractors.

SPECIFIER'S NOTE: Paragraph 1.06.B and subparagraphs are examples of wording for multiple contractor's and phased construction. Delete if not required, or if applicable modify to suite project. If appropriate to better define the requirements, provide a new section 01310 PROJECT MANAGEMENT AND COORDINATION or Section 01350 SPECIAL PROJECT PROCEDURES. Confirm requirements with the Project Coordinator.

B. Multiple prime contractors performing work under separate agreements with the State will be present at the project location adjacent to and abutting the Project Contract Limits. This Contractor shall coordinate activities, sequence of work, protective barriers and any and all areas of work interfacing with other Prime Contractor's work. Contractor shall provide a continuity of finishes, walks, landscape, etc. at abutting Contract Limits so no additional work will be required. Any damage to other Prime Contractor's Work committed by this Contractor (or its subcontractors) shall be repaired promptly at no additional cost to the State. Contractor shall adjust and coordinate its work and operations as required by INCREMENT 2 work as part of the Work of this Contract without additional cost or delay to the State.

1. The State intends to construct INCREMENT 2 work during the execution of this Project. Construction of INCREMENT 2 is scheduled from [*January 2000 thru May 20XX*]. INCREMENT 2 consists of a [*description - example new library building, classroom addition that abuts this classroom building and related site work for both the library and classroom building addition*]. Refer to drawings for location of and limits of INCREMENT 2 work. Contractor shall adjust and coordinate its work and operations as required by INCREMENT 2 work as part of the Work of this Contract without additional cost or delay to the State.

2. Contractor shall schedule a meeting with the Engineer no later than thirty (30) days after Notice to Proceed to review the INCREMENT 2 contract documents developed as of that date. It is intended this Contractor becomes familiar with the scope of work in INCREMENT 2 and the areas affected.

3. The INCREMENT 2 Bidder shall study the work to be performed in INCREMENT 1 and bid on a basis of not interfering with or delaying the INCREMENT 1 Contractor. INCREMENT 2 Contractor shall provide the Engineer a weekly updated schedule and description of its work. This weekly update will be used to inform INCREMENT 1 Contractor of the INCREMENT 2 work schedule and also used by the Engineer to coordinate the efforts of both Increment Contractors.

4. This Contractor shall inform and coordinate its subcontractor(s) on the scope and required areas of work in INCREMENT 2. If the Contractor has any questions regarding its coordination, responsibilities or needs clarification as to the impact in schedule of its Work and the Work of INCREMENT 2, this Contractor shall notify Engineer in writing no later than 7 days after the review meeting.

5. Subject to approval by the Engineer, this Contractor shall amend and schedule its work and operations to minimize disruption to the work and operation of INCREMENT 2 Contractor.

6. Relocate and/or remove and replace temporary barriers, fencing, supports or bracing to allow work by others to proceed unimpeded. Do not remove required barriers supporting work until specified time or as approved by Engineer. If directed by Engineer, leave in-place any temporary barriers.

7. Coordinate work that abuts or overlaps work of INCREMENT 2 with the Engineer and other Prime Contractor to mutual agreement so that work is 100% complete with continuity of all materials, systems and finishes.

8. When directed by the Engineer, provide access into the construction zone to allow INCREMENT 2 Contractor to perform their work that must be interfaced with INCREMENT 1 work.

END Paragraph 1.06.B Example

SPECIFIER'S NOTE: For most projects, include Section 01330 SUBMITTALS in these specifications. When providing Section 01330, include last sentence of Paragraph B. Confirm with the Project Coordinator.

1.07 SUBMITTALS

A. Comply with the GENERAL CONDITIONS Section 5.4 SHOP DRAWINGS AND OTHER SUBMITTALS. Furnish required submittals specified in this Section and in the Technical Sections. Submittals include one or more of the following: shop drawings, color samples, material samples, technical data, material safety data information, schedules of materials, schedules of operations, guarantees, certifications, operating and maintenance manuals, and field posted as-built drawings.

B. Required Submittals: Provide a comprehensive list of the required submittals by Specification Section. Furnish this list to the Engineer within fifteen (15) calendar days after award of the contract or upon earlier written instructions from the Engineer. [*A general listing is provided under Specification Section 01330 - Submittals.*]

1. The listing shall indicate and include the following:
   a. The number of copies required for submittal.
   b. Planned submittal date.
   c. Approval date required by the contractor.
   d. A space where the "date of submittal" can be inserted.
   e. A space where the "date of approval" can be inserted.
   f. A space where an "action code" can be inserted.

2. The schedule shall accommodate a minimum of twenty-one (21) or (25) twenty five calendar days for the State's review, as applicable for the Island the project is located.

3. An updated listing shall be prepared and submitted to the Engineer at monthly intervals or as directed by the Engineer. The listing shall reflect all approvals received since the last update.

C. Record Drawings: Field Posted As-Built Drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be prepared and submitted by the Contractor. To accomplish this, the following procedure shall be followed by the Contractor:

1. A full-size set of field posted as-built drawings shall be maintained at the job site. All deviations from alignments, elevations and dimensions which are stipulated on the drawings and authorizations given by the Engineer to deviate from the drawings shall be clearly and accurately recorded by the Contractor on this set of record drawings.

2. Changes shall be recorded immediately after they are constructed in place to assure they are not forgotten. Record the changes in red pencil and where applicable, refer to the authorizing document or Change Order. The field posted as-built drawings shall be made available to the Engineer at any time so that its clarity and accuracy can be monitored.

3. The words "FIELD POSTED AS-BUILT" shall be labeled on the title sheet and certified by the Contractor as to accuracy and completeness as shown below:

   FIELD POSTED AS-BUILT

   Certified By: _____ Date: _____
   Contractor (Include name and company)

4. The words "FIELD POSTED AS-BUILT" shall be labeled on all sheets in the margin space to the right of the sheet number written from the bottom upward.

5. The Index to Drawings shall be revised with the label "FIELD POSTED AS-BUILT" for each sheet. The index shall conclude with the following note: "A COMPLETE SET CONTAINS ____ SHEETS" with the total number of sheets comprising the set to be placed in the blank.

6. Any "FIELD POSTED AS-BUILT" drawing which the Engineer determines does not accurately record the deviation may be corrected by the State and the Contractor shall be charged for the services.

7. Submit the set of "FIELD POSTED AS-BUILT" drawings to the Engineer no later than five (5) calendar days prior to the date of final inspection.

8. "AS-BUILT" drawings will be prepared by the design consultant using the "FIELD POSTED AS-BUILT". Both sets of drawings will be sent to the Contractor for review and approval. The Contractor shall retain the "FIELD POSTED AS-BUILT" drawings for records, sign the "AS-BUILT" set of drawings, indicating approval, and return the drawings in a timely manner to the Engineer.

1.08 CONSTRUCTION SCHEDULE - CRITICAL PATH METHOD (CPM):

A. Contractor shall prepare and submit three sets of its Construction Schedule for review within fifteen (15) calendar days after the Notice to Proceed or upon earlier written instructions from the Engineer.

B. The schedule shall be related to the entire project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the work. If requested by the Engineer, the Contractor shall participate in a preliminary meeting to discuss the proposed schedule and requirements prior to submission of the schedule.

C. The Construction Schedule shall indicate the following:

1. Elements of the Project in detail time scaled by month or by week, and a project summary.

2. The order and interdependence of activities and the sequence in which the work is to be accomplished.

3. How the start of a given activity is dependent upon the completion of preceding activities and how its completion restricts the start of following activities.

4. The submittal and approval of shop drawings, samples, procurement of critical materials and equipment, receipt of materials with estimated costs of major items for which payment will be requested in advance of installation, fabrication of special materials and equipment, and their installation and testing.

5. Activities of the State which have an effect on the progress schedule (e.g. required delivery dates for State furnished materials and equipment).

6. The description of the activity and the duration of time in calendar days.
   a) For each activity indicate the early start, early finish, late start, late finish dates and total float time.

   b) "Float" means the amount of time between the early start date and the late start date, or the early finish date and late finish date for any of the activities noted on the CPM Schedule.

   c) The "Critical Path" is made up of activities which control the total length of the project. It is by definition, the longest path through the schedule. For this project, a critical activity shall be any activity with less than five (5) days of total float.

7. The party responsible for the accomplishment of the activity. As a minimum, indicate responsibility for each subcontractor.

8. Contract-required dates for completion of all or parts of the Work.

9. Non-work days (e.g. Holidays, exclusionary non-work days).

D. Upon completion of the Engineer's review, the Contractor shall amend the schedule as necessary to reflect comments made by the Engineer. If necessary, the Contractor shall participate in a meeting with the Engineer to discuss the proposed schedule and changes required. Submit the revised schedule for review to the Engineer within seven (7) calendar days after receipt of the Engineer's comments.

E. Use the reviewed schedule for planning, organizing and directing the work, for reporting progress, and for requesting payment for the work completed. Do not make changes to the reviewed schedule without written approval of the Engineer.

F. Should changes to the schedule be desired, submit a request in writing to the Engineer and indicate the reasons for the proposed change. Should the Engineer consider the change to be major, the Engineer may require the Contractor to revise and resubmit the schedule at no additional cost to the State. Contractor shall mitigate the impact of all changes by readjusting the sequence of activities, duration of time, or resources utilizing available float.

   1. A change shall be considered major if, in the opinion of the Engineer, the change may affect the substantial completion date or other contractual and milestone dates.

   2. Minor changes are those that only affect activities with adequate float time.

G. Once the schedule has been reviewed by the Engineer, the Contractor shall furnish to the Engineer three (3) copies of the schedule within fifteen (15) calendar days.

H. Throughout the duration of the project, the Engineer reserves the right to request more detailed breakdowns of activities, logic, and schedule submittals from the Contractor at no additional cost to the State.

I. Updated schedules shall be prepared and submitted to the Engineer at monthly intervals or as directed by the Engineer. The schedule shall reflect all changes occurring since the last update including the following:

1. Activities started and completed during the previous period.

2. The estimated duration to complete each activity which was started but not completed.

3. Percentage of cost payable for each activity.

4. Modifications and pending proposed changes.

5. Narrative report describing current and anticipated problem areas and / or delaying factors with their impact together with an explanation of corrective actions taken or proposed.

J. Failure on the part of the Contractor to submit updated schedules may be grounds for the Engineer to withhold progress payments for items noted on the schedule.

K. Contractor shall prosecute the work according to the CPM Schedule. The Engineer shall rely on the reviewed Contractor's CPM Schedule and regular updates for planning and coordination. The Engineer's review of the Contractor's CPM Construction Schedule does not relieve the Contractor of its obligation to complete the work within the allotted contract time. Nor does the review grant, reject or in any other way act on the Contractor's request for adjustment(s)to complete remaining contract work, or for claims of additional compensation. Such requests shall be processed in accordance with other relevant provisions of the contract.

L. If the State issues a Field Order or Change Order or requires Force Account Work that affects the sequence or duration of work activities noted on the construction progress schedule, the Contractor shall promptly update the schedule. This shall be accomplished by adding, deleting or revising the work activities noted or changing the logic in the schedule to show the Contractor's plan for incorporating the change into the flow of work. All Change Orders and Time Extension requests that affect the construction schedule shall be evaluated based on their impact on the approved Construction Schedule.

M. If the current work is behind schedule or projected to be behind schedule, such as negative float on a critical activity and / or inability to meet the Contract Completion Date, the Engineer may require the Contractor, at the Contractor's cost, to take remedial measures to get the project back on schedule. This may require increasing the work force, working overtime and weekends, air freighting materials, or other similar actions.

N. If at any time the Engineer determines that any critical activity has fallen behind the CPM schedule by 15 calendar days or more, Contractor shall submit a remedial plan to recapture the lost scheduled time. Include a revised schedule. Furnish the remedial plan no later that 7 calendar days from Engineer's notification.

O. If an accelerated schedule is proposed, refer to GENERAL CONDITIONS Section 7.22 CONSTRUCTION SCHEDULE.

SPECIFIER'S NOTE: Include Meetings Paragraphs if needed for your project. Confirm requirements with the Project Coordinator. Use one option for Paragraph A, delete other paragraphs not used.

1.09 MEETINGS ***Option 1***

A. Unless noted elsewhere in these Specifications, Scheduled meetings are not anticipated for this project. However, the Contractor and / or the Engineer may request that periodic meetings be held. Time and location shall be mutually agreed to. Refer to Sections 01310 PROJECT MANAGEMENT AND COORDINATION or Section 01350 SPECIAL PROJECT PROCEDURES if provided in these Specifications.

Option 2

A. Scheduled weekly meetings will be held to discuss the progress of the Work. Refer to [*Section 01310 PROJECT MANAGEMENT AND COORDINATION or Section 01350 SPECIAL PROJECT PROCEDURES*].

Option 3

A. Contractor shall meet with the Engineer, weekly or other interval as determined by the Engineer, to discuss the progress of the Work. Contractor and / or the Engineer shall determine whose attendance shall be required. Meetings shall be held in the Contractor's field office on the same time and day weekly. Coordinate any changes to date and time and meeting location with the Engineer.

SPECIFIER'S NOTE: For major project or multi-phased projects, include Paragraph 1.09.B. Modify to suite project or delete if not required. Confirm with the Project Coordinator.

B. For each meeting, Contractor shall take meeting minutes and provide a list stating all items, work or material, which may cause a delay or have an impact on the project's contractual dates. The list shall be inclusive of items requiring action from all responsible parties such as outstanding submittal status, request for information (clarification), force account work, change order, and change proposals. The format of this list shall be at the Contractor's discretion, subject to the Engineer's approval. Submit the list to all parties for discussions as a meeting agenda. Contractor shall provide a plan of corrective action for any item which is delayed or expected to be delayed, where that item impacts the contractual dates.

END MEETING Paragraph

SPECIFIER'S NOTE: Make sure Project Contract limits are shown on the Drawings.

1.10 PROJECT AND SITE CONDITIONS

A. Project Contract Limits (Contract Zone Limits) shown on the drawings indicate only in general the limits of the work involved. Perform necessary and incidental work which may fall outside of these demarcation lines. Confine construction activities within the Project Contract Limits and do not spread equipment and materials indiscriminately about the area.

B. Disruption of Utility Services - Pre arrange work related to the temporary disconnection of electrical and other utility systems with the Project Contact Person listed in Section 00800 SPECIAL CONDITIONS and the Engineer. Notify the Engineer at least fifteen (15) days in advance of any interruption of existing utility service. Time and duration of interruptions is subject to the Engineer's approval. Keep the utility interruptions and duration to a minimum so as not to cause inconvenience or hardship to the facility. If temporary electrical and / or other utility systems hook-up is required, provide the necessary services. Pay for temporary services as part of the contract, unless specifically noted otherwise in the specifications.

C. Contractor's Operations - Provide means and methods to execute the Work and minimize interruption or interference to the facility's operations. Rearrange the construction schedule when construction activities results in interruptions that hamper the operations of the facilities.

D. Maintain safe passageway to and from the facility's occupied buildings, rooms and other occupied spaces for the using agency personnel and the public at all times.

E. Contractor, subcontractor(s) and their employees will not be allowed to park in zones assigned to users and/or facility personnel. Areas to be used by the Contractor shall be designated by the

Engineer. Any lawn when damaged by the Contractor shall be restored as directed by the Engineer. Pay for restoration costs as part of the contract. Refer to Sections 01140 WORK RESTRICTIONS or Section 01350 SPECIAL PROJECT PROCEDURES if provided in these Specifications.

SPECIFIER'S NOTE: For projects within the State Capitol District, delete paragraph 1.10.E above and substitute the following Paragraph E and subparagraphs 1 & 2.

E. Contractors, Subcontractors and equipment service companies doing business within the Hawaii Capitol District will be assessed appropriate parking fees whenever parking for more than five working days.

1. Parking stalls will be assigned only to the company vehicles. Check with the Automotive Management Division (telephone 586-0351) regarding number and cost of stalls required for the duration of this contract. Each stall shall be assessed at the current rate per month as established by TITLE 3, Administrative Rules, Department of Accounting and General Services, Chapter 30, Rules Governing Parking on State Lands. If the Work involved is less than five working days, check with the Automotive Management Division to coordinate parking requirements.

2. Areas to be used by the Contractor other than assigned stalls shall be designated by the Engineer. Any lawn damaged by the Contractor shall be restored, as directed by the Engineer. Pay for restoration costs as part of the contract.

PART 2 - MATERIALS

2.01 QUALITY

Materials, items, equipment and fixtures specified in the various Divisions and Sections shall be new unless otherwise specified.

2.02 STORAGE AND HANDLING

A. Contractor shall supervise jobsite delivery and handling, and assign storage space for materials, items, equipment and fixtures of all trades. Contractor and installer are responsible for delivery, unloading, unpacking, handling, storage, distribution, installation and protection of its materials at the jobsite.

B. Except as otherwise required by these specifications or by the Engineer, determine and comply with manufacturer(s) recommendation(s) on product handling, storage and protection.

C. Deliver products to the jobsite in manufacturer's original containers, with labels intact and legible. Maintain packaged material with seals unbroken and labels intact until time of use. Promptly remove damaged materials and unusable items from the jobsite, and promptly replace with material meeting the specified requirements, at no additional cost to the State.

D. The State may reject as non-complying such material and products that do not bear identification satisfactory to the State as to manufacturer, grade, quality, and other pertinent information.

PART 3 - EXECUTION

3.01 EXAMINING THE SITE

B. Contractor and Subcontractors are expected to visit the site and make due allowances for difficulties and contingencies to be encountered. Compare contract documents with work in place. Become familiar, with existing conditions, the conditions to be encountered in performing the Work, and the requirements of the drawings and specifications.

C. Verify construction lines, grades, dimensions and elevations indicated on the drawings before any clearing, excavation or construction begins. Any discrepancy shall be immediately brought to the attention of the Engineer, and any change shall be made in accordance with the Engineer's instruction. Contractor shall not be entitled to extra payment if it fails to report the discrepancies before proceeding with any work whether within the area affected or not.

D. Obtain all field measurements required for the accurate fabrication and installation of the Work included in this Contract. Exact measurements are the Contractor's responsibility.

E. Furnish or obtain templates, patterns, and setting instructions as required for the installation of all Work. All dimensions shall be verified in the field.

***SPECIFIER'S NOTE: For Major Projects, modify Paragraph 3.01.E and generally describe the existing conditions* [*italic passages to be described /modified*].**

F. The Contractor shall accept the site [*and the existing building(s)*] in the condition which exists at the time access is granted to begin the Work.

1. Verify existing conditions and dimensions shown and other dimensions not indicated but necessary to accomplish the Work.

2. Locate general reference points and take action to prevent their destruction. Lay out work and be responsible for lines, elevations and measurements and the work executed. Exercise precautions to verify figures and conditions shown on drawings before layout of work.

3. Before starting the Work, the Contractor and each Subcontractor, shall verify governing dimensions and shall examine adjoining work on which the Contractor's work is in any way dependent. No additional compensation will be allowed on account of differences between actual measurements and dimensions shown. Submit differences discovered during the verification work to the Engineer for interpretations before proceeding with the associated work.

SPECIFIER'S NOTE: Delete paragraphs 3.02.F thru J where there is no site work and utility connections, such as interior renovations. If in doubt, leave paragraphs 3.02.F thru J in this Section. Confirm with the Project Coordinator.

3.02 SITE UTILITIES AND TONING

A. Cooperate, coordinate and schedule the work to suit the owners of underground or overhead utility lines or other property in removing or altering such lines or providing new services in order for the work to progress according to the contract. Cooperation includes rearranging construction operations and work schedules in order to accommodate the operations and work of the utilities and/or other property in and around the work site.

B. Contractor shall contact all the various utility companies before the start of the work to ascertain any existing utilities and to develop a full understanding of the utility requirements with respect to this project. Furnish the Engineer with evidence that the utility companies were contacted.

C. Should the Contractor discover the existence and location of utilities in the contract drawings are not correct, do not disturb the utilities and immediately notify the Engineer. The Engineer will advise the Contractor regarding actions to take.

D. Any utilities that the Contractor encounters during the progress of the work, such as telephone ducts, communication ducts, electric ducts, water lines, gas lines, sewer lines, electric lines and drainage pipes, whether shown or not on the contract drawings, shall not be disturbed or damaged

unless otherwise instructed in the drawings and specifications or as directed by the Engineer. Contractor shall repair and restore to pre-damaged condition any utilities or any other property the Contractor damaged.

E. Contractor shall transfer to their "Field Posted As-Built" drawings the location(s) of new and existing utilities that differ from the Contract Drawings.

SPECIFIER'S NOTE: Delete paragraphs 3.02.F thru J where there is no site work and utility connections. If in doubt, leave paragraphs 3.02.F thru J in this Specifications.

F. Prior to the start of grading, excavation work or trenching, the Contractor shall verify and confirm the presence, location and depth of existing underground utility lines in the area affected by the project, by "toning" or other appropriate means acceptable to the Engineer. The intent of this advanced toning is to afford the State an opportunity to identify the utility lines that may or may not be shown on the drawings and issue a change order and / or directive which may be necessary to address their presence. If toning is not performed prior to the start of grading, excavation or trenching work, Contractor shall repair or replace damaged utility lines at its cost.

G. Toning shall be performed using instruments specifically developed and designed for the detection of underground pipe and cable utilities. Use of instruments such as "divining" or "dowsing" rods are not considered "toning" and are not acceptable.

H. Contractor shall give the Engineer a minimum of 24 hours advance notice of its proposed toning work and of the method of toning proposed to be used. Upon completion of the toning operation, Contractor shall:

1. Inform the Engineer, in writing, where utility lines are found as indicated on the drawings and no new utility lines are found. Also, where utility lines indicated on the drawings are not shown in their approximate location or where new utility lines are found or pointed out to the Contractor in the field.

2. Submit a sketch to the Engineer indicating the location and approximate depth of the lines. The State will identify the type of utility lines found and provide the Contractor with directions on their disposition. Do not proceed with any excavation or trenching work until so directed by the Engineer.

I. After ascertaining the exact location and depth of utilities within the project area, mark such locations to warn workers or equipment operators of their existence and location. Also, be responsible to acquaint personnel working near utilities with the type, size location, depth of the utilities and the consequences that might result from disturbances. Do not start trenching or start similar operations until reasonable and appropriate precautions to protect the utilities are taken.

J. For new utilities that were not shown on the drawings but discovered during toning or pointed out in the field, the Contractor shall proceed with care in the excavation.

1. Where directed by the Engineer, excavation performed within 2 feet of the line shall be done manually to avoid damage. The excavation shall be considered to be additional work as covered under GENERAL CONDITIONS subsection 4.2 CHANGES.

2. Newly identified utilities which must be relocated or otherwise disturbed due to new construction shall be considered to be additional work as covered under GENERAL CONDITIONS subsection 4.2 CHANGES.

END Paragraphs 3.02 E thru J

SPECIFIER'S NOTE: Confirm if the Contractor will be allowed temporary use of electricity by the facility. If so modify Paragraph 3.03.A.

3.03 UTILITY SERVICE

A. Electricity - Make arrangements with utility companies for temporary use of electricity for construction use. Pay for all expenses pertaining thereto.

B. Telephone - Make arrangements with the utility companies for temporary use of telephone for construction use. Pay for all expenses pertaining thereto.

SPECIFIER'S NOTE: Confirm if the Contractor will be allowed temporary use of water by the facility. If so, add the conditions for temporary tapping into the facilities water system, modify Paragraph 3.03.C to include bracketed text and add subparagraphs 1 thru 5.

C. Water - Make arrangements with the utility company for temporary use of water. Pay for all expenses pertaining thereto. [However, at the option of the Contractor, a temporary tap into the facility's existing water system is allowed, subject to the following conditions:]

1. Comply with the Department of Health's requirements when tapping into the existing water system. Pay all expenses to tap into the water system.

2. Provide a proper water meter on the tapped line. All water used shall be registered by this meter.

3. Upon hook up and prior to water use, notify the Engineer to take an initial meter reading.

4. Pay the State, on a monthly basis, for all water used for the project at the current rate per 1,000 gallons. Take all monthly meter readings for such payments.

5. Payments are to be by check, made payable to the "Director of Finance, State of Hawaii" and mailed to:

SPECIFIER'S NOTE: Obtain information from Project Coordinator. If cannot obtain the information insert the following.

[Obtain information from the Engineer]
Office:
Department:
Address:
Attention:

6. Checks shall be accompanied by the following information:

a. Name of facility, Project Title and DAGS Job No.[*00-00-0000*]

b. Contractor's name

c. Initial meter reading for the month and final meter reading for the month

d. Volume of water used and the amount due in payment for that water

7. Upon completion of the project and just prior to removal of the water meter, notify the Engineer to take a final meter reading.

8. Should the Contractor at any time fail to comply with any or all of the above conditions, the State reserves the right to terminate the use of water. The Contractor shall remove the hookup within 48 hours of notification of such termination.

End Paragraph 3.03.C

3.04 ENVIRONMENTAL

A. General Contractor shall oversee that proper environmental conditions are met regarding temperature, humidity, lighting and ventilation.

3.05 PREPARATION AND PROTECTION

G. Protection of Property: Continually maintain adequate protection of the Work from damage and protect all property, including but not limited to buildings, equipment, furniture, grounds, vegetation, material, utility systems located at and adjoining the job site. Repair, replace or pay the expense to repair damages resulting from Contractor's fault or negligence.

H. Before starting work to be applied to previously erected constructions, make a thorough and complete investigation of such recipient surfaces and determine their suitability to receive required additional construction and finishes. Contractor, at its expense, shall make whatever repairs and conditioning required to properly prepare such surfaces. Contractor shall coordinate the work to provide a suitable surfaces to receive following work.

I. Commencement of work by any trade will be construed as acceptance of existing conditions and surfaces as being satisfactory for application of subsequent work, and full responsibility for finished results and assumption of warranty obligations under the Contract.

J. Protect existing work in a manner to prevent damage including interior work from damage by vandals or the elements. Provide temporary protection. Use curtains, barricades, or other appropriate methods. Take positive measures to prevent breakage of glass and damage to plastic, aluminum and other finishes.

K. Repairs and Replacements: In event of damage, promptly make replacements and repairs to the approval of the Engineer and at no additional cost to the State. Additional time required to secure replacements and to make repairs will not be considered by the State to justify an extension in the Contract Time or completion.

SPECIFIER'S NOTE: For minor projects or interior projects, modify or delete the barricade requirements. Check that other specification sections do not specify conflicting requirements for barricades. Should more stringent barricade requirements be needed, revise these paragraphs accordingly or provide new Section 01560 TEMPORARY BARRIERS AND ENCLOSURES.

3.06 BARRICADE

A. Erect temporary construction barricade(s) to prevent unauthorized persons from entering the project area and to the extent required by the Engineer. At a minimum, construct barricades using industry standard 4 feet high plastic fencing with metal (or wood) post supports at 10 feet on center connected with a top and bottom 12 -gauge soft annealed galvanized tie wires securely connected to posts. Posts shall be capable of resisting a lateral load of 100 lbs measured at the top of the post.

B. Maintain temporary construction barricade(s) throughout the duration of the Work. During the course of the project, the Engineer may require additional barricades be provided for the safety of the public. Contractor shall erect the additional barricade(s) at its own expense.

SPECIFIER'S NOTE: Delete if not applicable or modify paragraph 3.06.C.

C. If provided in these Specifications, refer to Sections 01560 TEMPORARY BARRIERS AND ENCLOSURES or 01568 GOOD NEIGHBOR BARRIER. Provide the barriers/barricades required by Sections 01560 or 01568 in lieu of the barricade specified in paragraph 3.06.A.

3.07 INSTALLATION

A. Materials, items, fixtures required by the various Divisions and Sections of the Specifications shall be installed in accordance with Contract Documents, by workers specially trained and skilled in performance of the particular type of work, to meet guarantee and regulatory agency requirements.

Should the drawings or specifications be void of installation requirements, install the materials, items, fixtures in accordance with the manufacturer's current specifications, recommendations, instructions and directions.

3.08 CUTTING AND PATCHING

A. General Contractor shall oversee cutting and patching of concrete, masonry, structural members and other materials where indicated on drawings and as job conditions require. Unless noted elsewhere in the Drawings and Specifications, no cutting or patching of existing or new structural members will be permitted without previously notifying the Engineer.

B. Patch materials and workmanship shall be of equal quality to that indicated on the drawings or specified for new work.

3.09 CLEAN-UP

Rubbish and debris resulting from work of the various Divisions and Sections of the specifications shall be collected and disposed of by the Contractor at legal disposal areas away from the project site. Clean up and remove from premises all debris accumulated from operations from time to time and as directed by the Engineer. Permission to provide on-site trash containers shall be granted by the Department and shall be placed where directed by the Engineer. See also GENERAL CONDITIONS Section 7.30 FINAL CLEANING.

END OF SECTION

Add this section as applicable:
~~(Consultant to type)~~

Section 01030 - SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

Special requirements listed hereinafter shall be complied with.

1.03 LOADING ON EXISTING STRUCTURE

A. Historically, the original concrete building structure was designed in 1924, revised in 1925, and the building cornerstone laid in October of 1925.

B. As a precautionary measure for the safety and protection of the building occupants as well as the entire building, no heavy construction machinery and motorized equipment such as loaders, lift trucks, fork trucks, etc., shall be permitted on any of the building floors.

The Contractor shall employ extreme care not to concentrate or impose loads onto the existing First Floor building structure and floor with construction material or debris. Loads shall not exceed 50 psf.

1.04 HISTORIC BUILDING

The existing building is of historic significance and is listed on the State Historical Building Register.

A. Accordingly, no cutting of openings in the exterior walls will be permitted. The Contractor shall employ extreme care in his construction operations to protect from damage the building's original architectural features and details.

B. Where necessary, debris, materials, and equipment shall be disassembled to fit through the existing openings.

1.05 CONSTRUCTION ACCESS AND STAGING AREA

A. Contractor's access to the building shall be from the Punchbowl Street side.

B. The Contractor's staging area shall be strictly limited to the area on the Kokohead side of the building as shown on the Existing Site Plan.

1.06 CONTRACTOR'S OPERATION DURING NON-NORMAL STATE WORKING HOURS

The following work shall be conducted during non-normal State working hours:

A. All demolition and general construction work involving excessive noise and dust such as concrete saws, jackhammers, chipping gun, etc. The Engineer shall make the final determination on the excessiveness of the noise and dust.

B. Any work posing danger to occupants and public.

C. Soil treatment work.

1.07 EMPLOYEE LOUNGE SPACE

Contractor shall schedule and phase his construction work to provide a temporary employee lounge at the vacated area ewa of the electric room until the renovation work in the present existing Employee Lounge is completed.

END OF SECTION

SECTION 01140 - WORK RESTRICTIONS

SPECIFIER'S NOTE: Insert wording, numbers, etc. as appropriate where [italics in parenthesis] are shown throughout this specification section. Italicized words are used for directions to the specifier and should be filled in. Blue colored text are Notes to Specifier and should be completely deleted from the final text. Red colored text is used for items to be modified. *Maintain footer notation in italics with the current version used (e.g. TG01140 v00.04)**.***

SPECIFIER NOTES: Include in this section; restrictions that affect construction operations, access to site, location of construction, occupancy requirements, coordination with occupants, and use of building premises and site.

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes work restriction on contractor's operations, and construction [as required by the University of Hawaii at Hilo (UH Hilo) to maintain the University's operation] during the construction period.

SPECIFIER'S NOTE: For University Projects confirm the required dates and duration when the contractor must shut down. Modify paragraphs 1.02.A & 1.02.B.

1.02 WORK SCHEDULE

B. No work shall be done during the final exam weeks as shown below, except as authorized by the Engineer. The contract time is inclusive of these no work days. Contractor shall verify the exact dates with the University of Hawaii at Hilo prior to finalizing Contractor's work schedule.

C. [December 4-15, 2000] [(12 calendar days)]
[May 4-15, 2001] [(12 calendar days)]
[December 4-15, 2001] [(12 calendar days)]
[May 4-15, 2002] [(12 calendar days)]

SPECIFIER'S NOTE: For University of Hawaii at Hilo Projects. Insert paragraph 1.03 and subparagraphs. Confirm the University's requirements.

1.03 UNIVERSITY'S OPERATIONS AND REQUIREMENTS

A. Use of Premises

1. Operate machinery and equipment with discretion and with minimum interference to campus driveways, walkways and malls. Do not leave machinery and equipment unattended on roads and driveways.

2. Store materials in the areas shown on the Drawings or as designated by the Engineer. Locate construction equipment, machinery , equipment and supplies within the contract zone limits.

3. Keep access roads and campus roads, to the project site free of dirt and debris. Provide, erect and maintain lights, barriers, signs, etc. when working on campus roads, driveways and walkways to protect. pedestrians and moped / bicycle riders. Obey campus traffic and safety regulations.

B. Noise and Dust Control

1. In adjacent locations surrounding the project site, noise, dust and other disrupting activities, resulting from construction operations, are detrimental to the conduct of the

University's instruction activities. Therefore, Contractor shall monitor its construction activities. Exercise precaution when using equipment and machinery to keep the noise and dust levels to a minimum.

2. To reduce loud disruptive noise levels, ensure mufflers and other devises are provided on equipment, internal combustion engines and compressors.

3. Schedule construction activities that create excessive noise and dust problems, such as concrete drilling and demolition, for the weekends, holidays or semester breaks. Overtime costs are the Contractor's responsibility.

4. The Engineer may require any construction activity that produces excessiveness of noise and dust to be performed during non school hours. The Engineer shall make the final determination. Overtime costs are the Contractor's responsibility.

C. Campus Parking

1. Parking for the Contractor's employees (or subcontractors) will be limited to the available areas within the designated project contract zone or in areas designated by the Engineer. Do not use parking stalls in regularly designated parking zones within the University campus. Unauthorized vehicles parked in marked stalls and in any area outside of the designated project construction site will be fined and Contractor shall be responsible for the payment of all parking citations fines occurred.

2. Parking passes will be required for all Contractor's (or subcontractor's) vehicles entering the campus.
   a. Temporary parking passes will be issued for the inspection of the project site prior to bidding, the preconstruction meeting and other temporary entry to the University. Contact the University in advance to arrange temporary parking passes.
   b. To obtain construction parking passes, send your written request to the University. List the number of parking passes required for your use and your subcontractor(s). The University shall reserve the right to limit the number of parking passes to be issued to the Contractor.
   c. Direct requests for parking pass arrangements to the University of Hawaii at Hilo, Facilities Planning and Construction Office, Phone 947-7595. All parking passes will be issued free of charge.

3. Comply with campus rules and regulations governing parking and traffic circulation.

4. If permitted to park on lawn or grassed areas restore any damaged areas. The Engineer shall make the final determination if the restoration work is acceptable.

D. Disruption of Utility Services

1. Pre-arrange and obtain approval of the Engineer for any anticipated disruptions to utility services, including disconnection and / or connection of the utility system. Unless stated elsewhere, notify the Engineer in writing at least fifteen (15) working days in advance of any proposed utility system work. Coordinate any connections and / or disconnection with the respective utility companies and the County of Hawaii.

2. Schedule work to minimize utility outage time. Schedule utility work requiring a shut-down of four (4) hours or more or affecting several campus buildings, on weekends, holidays, semester breaks and / or non-regular school hours. Overtime costs are the Contractor's responsibility.

3. Provide temporary utility service, if necessary for the University's operation at no additional cost to the State. The Engineer shall make the final determination.

4. The existence of active and abandoned underground utility lines within the construction area is not definitely known other than those indicated in their approximate location on the Drawings. Perform toning operations prior to excavation or trenching. Notify the Engineer if any unknown utility line is discovered. Comply with the requirements of Section 01019 GENERAL PROJECT REQUIREMENTS.

5. The contractor shall tone traverse of new utility lines to locate existing utilities prior to trenching.

6. Shore and protect uncovered underground piping or conduit. If utilities are damaged, Notify the Engineer and commence repairs within two (2)hours after the damage.

7. Record on the As-Built drawings existing utilities. For exposed existing utilities, new utilities, replacement and rerouting of utilities, record the size of pipe or conduit and its depth on the as-built drawings.

E. Burning and Disposal of Trash

1. Burning debris on the University Campus is expressly prohibited.

2. Do not use the University's trash receptacles for disposal of construction materials and waste. Provide separate trash receptacle(s). Remove and dispose of all construction material.

F. Barricades, Signs and Lighting

1. Erect temporary barricades and post directional signs at construction limits. Provide separate building entrances, walkways for pedestrians, driveways for vehicles, and other barricades and construction aids to prevent unauthorized individuals from entering the construction area. To insure the protection and safety of the public, adjust or extend the barricades and directional signs if directed by the Engineer. Refer to Section 01019 GENERAL PROJECT REQUIREMENTS.

2. Locate exterior barricades to maintain existing (and required) fire exits or lanes from adjoining buildings.

3. If construction activities or operations reduce the current illumination in the areas adjacent to construction, provide temporary lighting to achieve existing illumination levels or required for safety and security. Maintain temporary lighting during construction. The Engineer shall make the final determination.

4. On the temporary barricades, provide informational signs every 100 feet and at pedestrian/vehicular traffic junctions. Signs shall be 12 inches square, with minimum one inch high lettering, high contrast, and read: "Any Questions? Call UH Facilities and Planning and Construction Office, Phone 974-7595". Include Contractor's name and office telephone number along the bottom edge of the sign.

SPECIFIER'S NOTE: Although this information is covered in the INTERIM GENERAL CONDITIONS, for University of Hawaii at Hilo Projects. Insert paragraph 1.04 and subparagraphs. Confirm the University's requirements.

1.04 HISTORIC CULTURAL AND ARCHAEOLOGICAL FINDS

A. During construction activities, there is the remote possibility of encountering unknown or unexpected historical, cultural or archaeological features, deposits, or burials. Should such a discovery be made or encountered, immediately suspend work in the area leaving the site undisturbed. Notify the Engineer immediately to determine the appropriate action or disposition. Refer to INTERIM GENERAL CONDITIONS Section 7.18.

B. All materials having any apparent historical, cultural or archaeological significance recovered during the course of the project construction activities shall remain preserved and the property of the State.

SPECIFIER'S NOTE: For University of Hawaii at Hilo Projects. Insert paragraph 1.05 and subparagraphs. Confirm the University's requirements.

1.05 PROTECTION AND MAINTENANCE OF LAND RESOURCES

A. Preserve and maintain existing land resources (lawns, grassed areas and planting areas) within the designated project contract zone.

B. Except in areas marked on the drawings to be cleared and grubbed, do not deface, injure or destroy trees/ shrubs nor remove or cut them without obtaining prior approval from the Engineer. Exercise care while working adjacent to trees or shrubs and protect them from injury or damage. Repair or replace tree(s), shrub(s) or other landscape feature(s) scarred or damaged as the result of construction operations. The Engineer shall make the final determination to repair or replace damages items.

C. For areas exposed and adjacent to the public access, maintain the landscaping, and grassed areas within the project contract zone. Provide periodic watering, weeding and mowing during the construction period. Restore damaged areas.

SPECIFIER'S NOTE: For University of Hawaii at Hilo Projects. Insert paragraph 1.06 and subparagraphs. Confirm the University's requirements.

1.06 PAVEMENT MARKING

A. Should the construction operations diminish the existing pavement marking of surrounding campus roads, parking and walkways, repair any damages and provide new pavement markings. The Engineer shall make the final determination to repair or replace damages items.

SPECIFIER'S NOTE: For University of Hawaii at Hilo Projects. Insert paragraph 1.07 and subparagraphs. Confirm the University's requirements.

1.07 PROJECT REFUSE

A. Provide a solid waste management plan that conforms to the rules and regulations of the County of Hawaii, Solid Waste Division.

SPECIFIER'S NOTE: For University of Hawaii at Hilo Projects. Insert paragraph 1.08 and subparagraphs. Confirm the University's requirements.

1.08 EXPLOSIVE BLASTING

A. No explosive blasting will be allowed.

SPECIFIER'S NOTE: Add this paragraph for facilities where shut-down of the air conditioning system beyond 4 hours cannot be tolerated.

1.09 DISRUPTION OF AIR CONDITIONING SERVICES

A. Coordinate and arrange work related to the temporary disconnection of the air conditioning system with the Engineer. Keep disruptions to a minimum. If temporary power is required, provide services and pay the cost as part of the contract. Schedule any major outage to the air conditioning system that affects the entire building and lasts 4 hours or more, on weekends or during non-regular working hours of the building occupants. Pay for overtime cost as part of the contract.

SPECIFIER'S NOTE: Add this paragraph for work performed in occupied office buildings during non-regular working hours.

1.10 SECURITY

A. BUILDING SECURITY

When work is performed outside the normal operating hours of the Department (or Users operations), only a single entry to the building will be permitted and a State Security Guard shall be stationed at this entrance throughout the period that it is open. Contact and arrange with the Department of Public Safety, Protective Services Division (telephone 586-1352) to provide the security personnel. Make arrangements at least 24 hours before security personnel is required. State Security Guards's changes are $20.00 per hour or fraction thereof, for a minimum of four (4) hours. Pay for State Security Guard's cost as part of the contract.

SPECIFIER'S NOTE: Add this paragraph 'A' and subparagraphs for work performed at Correctional Facilities and other secure facilities. Check with the Project Coordinator for specific project requirements.

A. SECURITY PROVISIONS - AT CORRECTIONAL FACILITY

1. Rules and Regulations: Consult with Facility authorities at the pre-construction conference and become familiar with the rules and regulations of the Correctional Facility.

2. Contractor's Operations: Confine all construction operations to the immediate vicinity of the construction activity. Store building materials, equipment, tools and incidentals in an enclosed area away from the existing correctional facility's perimeter walls. Only materials and/or equipment that are needed at that time shall be taken into the security site. Take precautions and prevent access to power equipment, tools, etc., by the clients (residents). Perform operations to insure the safety of the occupants of the buildings.

3 Perform operations to minimize inconvenience or disturbance upon the personnel and residents.

4. Security Measures: In order to maintain security and to prevent the residents from escaping during construction operations, the following precautionary measures must be strictly enforced.
   a. Exterior doors must be locked at all times.
   b. All exterior openings which have been opened for construction shall be securely closed for the night, unless otherwise directed by the Facility Administrator.
   c. The Contractor shall be restricted to the areas of construction and shall at no time enter other areas unless granted permission by the guards.
   d. All movements of the Contractor's employees into the Facility will be subject to control by the Facility personnel at any time the Correctional Facility Administrator deems such control necessary to insure the safety of the Facility.
   e. The Contractor, his agents, or employees shall be subject to personal search whenever the Correctional Facility Administrator deems such action necessary for the safety of the Facility. This shall also include the inspection of lunch boxes toolboxes, clothing and equipment.
   f. Scaffolding, ladders, etc., must be removed from the building at the end of each day's work or when requested by the Facility Administrator.

g. Introduction or possession of weapons, narcotics, alcoholic beverages or contraband to the project site is prohibited.

h. Control of tools: All hand tools, including power driven hand tools, cables, ropes and other implements shall be transported and retained, except when in use, in approved locked toolboxes. At all times tools will be subject to inventory by the Facility Security Staff. During the progress of the work, care shall be taken that no tool is left unguarded or left where it might be reached by a resident or other unauthorized person. It is an urgent matter that missing tools, equipment, etc., be reported immediately to those in authority. Lock vehicles and equipment unless attended.

i. Materials and equipment shall be brought into the work area through entrance as approved by those in authority and shall be carried to and stored in limited area as approved.

j. Explosives, explosive devices and any equipment associated with a system that could be used as an explosive will not be allowed.

5. Protection of Residents: Special protection must be made by the Contractor at all times to safely protect the residents and facility personnel from any and all injuries that may be caused as a result of the work performed under this contract.

6. Caution: The Contractor shall caution his men on the job that any association with the residents be avoided as much as possible, that when spoken to by residents, normal courtesy shall be maintained at all times.

7. Security Check: After the award of contract and before commencement of any work on the project, the following list containing information on all employees and motor vehicles used on the project shall be submitted to the Engineer for a security check:

a. Employees: Name, date of birth and Social Security Number. Note: Any employee who has a previous record of any felonious conduct or any conviction for such offenses other than minor traffic offenses will not be permitted to work on this project.

b. Motor Vehicles: Make, year, color, license number, insurance company, policy number and expiration date. This information is required to secure passes for permission to operate such vehicles on the Correctional Facility grounds.

c. The list of workmen and motor vehicles shall be kept current at all times. New workmen or vehicles cannot enter the job site until receipt of clearance is obtained from the Engineer. Workmen or vehicles found on site without proper identification shall be removed immediately.

8. Contractor’s Work Time Schedule in existing facilities only: Comply with the daily schedule in subparagraphs a & b below. Only the Correctional Facility Administrator can approve deviations from the daily and weekly work schedules.

a. 7:00 a.m. - Work day commences. Contractor's employees enter via the Administration Building and to the job site, for work inside the existing correctional facilities.

b. 3:00 p.m. - End of work day in existing correctional facilities.

9. None of the foregoing regulations shall be construed as a restriction on the legal prosecution of the work.

End Security Provisions at Correctional Facilities Paragraphs

END OF SECTION

SECTION 01230 - ALTERNATES

SPECIFIER'S NOTE: Insert wording, numbers, etc. as appropriate where [italics in parenthesis] are shown throughout this specification section. Italicized words are used for directions to the specifier and should be filled in. Blue colored text are Notes to Specifier and should be completely deleted from the final text. Red colored text is used for items to be modified. *Maintain footer notation in italics with the current version used (e.g. TG01230 v00.04)**.***

SPECIFIER NOTES: Add this section as applicable. Include in this Section list and description of each alternate. DAGS's normal policy is for all alternatives to be additive. Obtain approval of the Project Coordinator if proposing any deductive alternative.

PART 1 - GENERAL

1.01 SUMMARY

A. The description of alternates is not intended to give a detailed description of all additional work required by the alternate item(s), as only the principal features of such additional work are listed.

B. Should any one or all of the alternates become a part of the contract, the cost of all additional work required by the alternate item(s), even though not specifically mentioned herein, are included in the lump sum bid price.

1.02 ALTERNATE NO. 1 (Additive)

[Describe the scope of each alternate clearly]

END OF SECTION

Add this section as applicable.
(Consultant to type. **Expand matrix as necessary to suit project requirements. Clearly describe the required submittals under PART 1 - GENERAL, in each spec section where applicable.)**

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 SUBMITTALS

The following listing of required submittals is provided for the contractor's convenience. The Contractor shall review the technical sections of this specification, prepare and submit a comprehensive listing of required submittals as described under Section 01019 - General Specifications.

Section No. - Title (List in numerical order of the Spec Section No.)	**Shop Drawings & Diagrams**	**Samples**	**Certificates (Material, Treatment, Applicator, etc.)**	**Mfr. Guaranty / Warranty (> 1 yr.)**	**Product Data, Mfr. Technical Lit., and Brochures**	**MSDS Sheets**	**Calculations**	**Reports (Testing, Maintenance, Inspection, etc.)**	**Test Plan**	**O & M Manual**	**Equipment / Fixture Listing**	**Schedules (Project / Installation)**	**Maint. Service Contract**	**Field Posted As-Built Dwgs.**	**Others**
(Sample only) 13850 - Fire Alarm System	**þ**			**þ**	**þ**		**þ**	**þ**	**þ**	**þ**	**þ**			**þ**	**þ**

1.03 BIDDER'S SPECIAL RESPONSIBILITY FOR COORDINATING CONTRACTUAL WORK

AND SUBMITTALS:

A. The General Contractor is responsible for the coordination of all contractual work and submittals.

B. The General Contractor shall have a rubber stamp made up in the following format:

CONTRACTOR NAME

PROJECT: _____

DAGS JOB NO.: _____

THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR. IT IS CERTIFIED CORRECT, COMPLETE, AND IN COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. ALL AFFECTED CONTRACTORS AND SUPPLIERS ARE AWARE OF, AND WILL INTEGRATE THIS SUBMITTAL INTO THEIR OWN WORK.

DATE RECEIVED _____

SPECIFICATION SECTION # _____

SPECIFICATION PARAGRAPH # _____

DRAWING NUMBER _____

SUBCONTRACTOR NAME_____

SUPPLIER NAME _____

MANUFACTURERNAME_____

NOTE: DEVIATIONS FROM THE CONTRACT DOCUMENTS ARE PROPOSED AS FOLLOWS (Indicate "NONE" if there are no deviations.):_____

CERTIFIED BY: _____

C. This stamp, "filled in" should appear on the title sheet of each shop drawing, on the cover sheet of submittals in an 8-1/2" x 11" format, or on one face of a cardstock tag (min. 3" x 6") tied to each sample. The tag on the samples should state what the sample is, so that if the tag is accidentally separated from the sample, they can be matched up again. The back of this tag will be used by the Engineer for his receipt, review, and log stamp and for any comments that relate to

the sample.

D. All submittals for material, equipment, and shop drawings listed in the contract documents, including dimensioned plumbing shop drawings, shall be required and shall be reviewed by the Engineer prior to any ordering of materials and equipment.

END OF SECTION

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

SPECIFIER'S NOTE: Insert wording, numbers, etc. as appropriate where [italics in parenthesis] are shown throughout this specification section. Italicized words are used for directions to the specifier and should be filled in. Blue colored text are Notes to Specifier and should be completely deleted from the final text. Red colored text is used for items to be modified. *Maintain footer notation in italics with the current version used (e.g. TG01310 v00.04)**.***

SPECIFIER NOTES: Include in this Section; project coordination requirements, including meetings and site administration, coordination with other contractors for phased or separate projects, coordination of several parts of the work under a single contract or multiple contracts

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes coordination requirements including weekly progress meetings.

SPECIFIER'S NOTE: Modify to suit the project.

1.02 WEEKLY MEETINGS AND SCHEDULE

B. Contractor shall meet with the Engineer, weekly or other interval as determined by the Engineer, to discuss the progress of the Work. Contractor and / or the Engineer shall determine whose attendance shall be required. Meetings shall be held in the [Engineer's/Contractor's field office] on the same time and day weekly. Coordinate any changes to date and time and meeting location with the Engineer.

C. For each meeting, Contractor shall take meeting minutes and provide a list stating all items, work or material, which may cause a delay or have an impact on the project's contractual dates. The list shall be inclusive of items requiring action from all responsible parties such as outstanding submittal status, request for information (clarification), force account work, change order, and change proposals. The format of this list shall be at the Contractor's discretion, subject to the Engineer's approval. Submit the list to all parties for discussions as a meeting agenda. Contractor shall provide a plan of corrective action for any item which is delayed or expected to be delayed, where that item impacts the contractual dates.

D. Contractor shall prosecute the work according to the CPM Schedule. The Engineer shall rely on the reviewed Contractor's CPM Schedule and regular updates for planning and coordination. The Engineer's review of the Contractor's CPM Construction Schedule does not relieve the Contractor of its obligation to complete the work within the allotted contract time. Nor does the review grant, reject or in any other way act on the Contractor's request for adjustment(s)to complete remaining contract work, or for claims of additional compensation. Such requests shall be processed in accordance with other relevant provisions of the contract.

E. If the State issues a Field Order or Change Order or requires Force Account Work that affects the sequence or duration of work activities noted on the construction progress schedule, the Contractor shall promptly update the schedule. This shall be accomplished by adding, deleting or revising the work activities noted or changing the logic in the schedule to show the Contractor's plan for incorporating the change into the flow of work. All Change Orders and Time Extension requests that affect the construction schedule shall be evaluated based on their impact on the approved Construction Schedule.

F. If the current work is behind schedule or projected to be behind schedule, such as negative float on a critical activity and / or inability to meet the Contract Completion Date, the Engineer may require the Contractor, at the Contractor's cost, to take remedial measures to get the project back on schedule. This may require increasing the work force, working overtime and weekends, air freighting materials, or other similar actions.

G. If at any time the Engineer determines that any critical activity has fallen behind the CPM schedule by 15 calendar days or more, Contractor shall submit a remedial plan to recapture the lost scheduled time. Include a revised schedule. Furnish the remedial plan no later that 7 calendar days from Engineer's notification.

H. The Contractor shall submit updated schedules and reports as required in the Contract Documents. Failure of the Contractor to comply may be grounds for the Engineer to withhold progress payments on any item of the schedule until contractor fully complies.

1.03 COORDINATION WITH OTHER PRIME CONTRACTORS

A. Multiple prime contractors performing work under separate agreements with the State will be present near the project location, adjacent to and abutting the Project Contract Limits. This Contractor shall coordinate activities, sequence of work, protective barriers and any and all areas of work interfacing with other Prime Contractor's work. Contractor shall provide a continuity of finishes, walks, landscape, etc. at abutting Contract Limits so no additional work will be required. Any damage to other Prime Contractor's Work committed by this Contractor (or its subcontractors) shall be repaired promptly at no additional cost to the State.

SPECIFIER'S NOTE: Modify to suit the project

B. The Contractor is advised that the following projects may impact the scheduling of the Contractor's work:

1. [University of Hawaii at Hilo Fire Safety Improvements, Phase 2
DAGS Job No. 11-31-4078]

2. [University of Hawaii at Hilo Modifications for the Physically Handicapped
DAGS Job No. 11-31-4072.]

C. The Contractor shall coordinate with its subcontractors and keep them informed of any work from the other Projects that may affect the site or the subcontractor's work. If the Contractor has any questions regarding its coordination responsibilities or needs clarification as to the impact in scheduling of its work and the work of other projects, this Contractor shall notify the Engineer in writing.

D. Subject to approval by the Engineer, this Contractor shall amend and schedule its work and operations to minimize disruptions to the work and operations of other projects.

1. Relocate and / or remove and replace temporary barriers, fencing supports or bracing to allow work by others to proceed unimpeded. Do not remove required barriers supporting work until specified time or as approved by the Engineer. This does not relieve the Contractor of the responsibility of proper coordination of the work. If directed by the Engineer, leave in place any temporary barriers.

2. Coordinate work that abuts or overlaps work of the other projects with the Engineer and other Prime Contractors to mutual agreement so that work is 100% complete with continuity of all materials, systems and finishes.

3. When directed by the Engineer, provide access into the construction zone to allow the other project's Contractor(s) to perform their Work and work that must be interfaced.

4. Contractor shall adjust and coordinate its Work and operations as required by the other projects as part of the Work of this contract without additional cost or delay to the State.

SPECIFIER'S NOTE: For University of Hawaii at Hilo Projects. Insert paragraph 1.04. Confirm the University's requirements or if required in other project.

1.04 PHOTO DOCUMENT EXISTING CONDITIONS

E. Prior to the start of jobsite work, the Contractor shall photo document the existing conditions at the site and file with the Engineer one complete set of documents.

END OF SECTION

SECTION 01568 - GOOD NEIGHBOR BARRIER

PART 1 - GENERAL

1.01 General Conditions

As specified in Section 00700.

1.02 Related Sections

Section 01567 - Pollution Control

1.03 Work Description

The Contractor shall construct a good neighbor barrier.

PART 2 - PRODUCTS

2.01 Construction Materials

A. As indicated on the Standard Detail for Site Barrier.

B. Lumber used shall be appropriately treated for protection against termites and weathering.

PART 3 - EXECUTION

A. The barrier shall be placed as shown on the drawings.

B. A mechanical anchor capable of resisting a lateral load of 950# and an uplift load of 1200# may be substituted for the 4x4 vertical with concrete footing or the 4x4 vertical may be used without concrete if securely imbedded to a depth of at least 6.5 feet;

C. All materials for the barrier, including concrete if used, must be removed in accordance with the General Conditions.

SECTION 01575 - TEMPORARY CONTROLS - AIR QUALITY REQUIREMENTS

SPECIFIER'S NOTE: Insert wording, numbers, etc. as appropriate where [italics in parenthesis] are shown throughout this specification section. Italicized words are used for directions to the specifier and should be filled in. Blue colored text are Notes to Specifier and should be completely deleted from the final text. Red colored text is used for items to be modified. *Maintain footer notation in italics with the current version used (e.g. TG01575 v00.04)**.***

SPECIFIER'S NOTE: Include this section in all projects that have the possibility of creating odors, dusts, or other materials that can be spread in the air and cause complaints during the construction.

SPECIFIER'S NOTE: Equipment refers to odor producing equipment such as tar pots, etc. Materials would refer to paints, sealants, adhesives, etc.

PART 1 - GENERAL

1.01 SUMMARY OF WORK

A. This section describes the steps that the Contractor shall perform to control odors or dusts generated by the equipment, materials, or actions of the construction process that may affect the quality of air to non-contractor personnel.

SPECIFIER'S NOTE: Be sure to reference this section in all applicable technical sections for your project, including but not limited to: DIVISION 6-Wood and Plastics, DIVISION 7-Thermal and Moisture Protection, DIVISION 8-Doors and Windows, DIVISION 9-Finishes, DIVISION 11-Equipment, DIVISION 12-Furnishings, DIVISION 15-Mechanical

1.02 RELATED SECTIONS

A. [*Related requirement specified elsewhere*]

1.03 REFERENCES

A. "Indoor Air Quality" published by the Sheetmetal and Air Conditioning Contractor's National Association (SMACNA).

B. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) standards as follows: 62-1989; 55-1981; 52-76; and 1-1989

C. "Indoor Air Quality in Public Buildings", Volumes I and II, by Sheldon L, Handy RW, Hartwell TD, et al:, 1988 (Public Access Buildings Study)

1.04 DEFINITIONS

A. "A/C" (Air Cond.) means any or all of the equipment used to air condition a building or space.

B. "Air changes per hour" shall mean a number calculated by the maximum work area length in feet times the maximum work area width in feet times the maximum work area height in feet divided by 60 times the cubic feet per minute of air movement (L x W x H)/(60 x CFM).

C. "Odor" means something that can be detected by a person's sense of smell whether objectionable or not to the person.

D. "Perceivable" means able to attain an awareness solely through the use of the human senses such as smell, sight, hearing, etc.

E. “VOC”means volatile organic compound, a compound containing a chemical constituent with a boiling point of less than 100 Deg C (volatile) and that contains carbon (organic).

F. “VOC emission rate""means the total amount of hydrocarbons emitted per area and unit of time as determined from the product and test method data supplied by the manufacturer or from data in the EPA Public Access Buildings Study, 1988.

SPECIFIER’S NOTE: Specify non-volatile materials using other than generic identification. Keep adequate documentation to support the use of volatile materials when specified or left to the discretion of the contractor.

1.05 SUBMITTALS

C. Submit a certification, which may be a copy of the product label or Material Safety Data Sheets (MSDS), of the VOC emission rate for all VOC containing products. (Note: MSDS sheets and labels are acceptable only if the VOC data is available and highlighted.)

PART 2 - MATERIALS

SPECIFIER’S NOTE: Technical Memo #85 has restricted the use of particle board for cabinet doors, countertops, and partitions.

2.01 MATERIAL RESTRICTIONS

A. If used, materials that exceed the standards established by the National Particleboard Association (NPA) Standard for Formaldehyde Emission for Particleboard (NPA 6-84) shall only be used in conformance with the requirements of Section 3.01. All materials that use particleboard for any part of their construction shall be considered to exceed NPA 6-84 standard unless clearly labeled with an NPA certification that the standard is met.

C. Materials that exceed a VOC emission rate of 100
the requirements of Section 3.01.

D. Materials that do not have a submitted VOC emission rate shall be considered to exceed 100

E. If **ALL** of the project’s materials comply with the above restrictions, the requirements of Part 3 - Execution are not required.

2.02 OTHER MATERIALS

A. Provide the temporary equipment such as fans, blowers, etc. and / or products such as tape, ducts, temporary wall materials, etc. necessary to complete the requirements of this section.

PART 3 - EXECUTION

SPECIFIER’S NOTE: These paragraphs define extra work and extra contract time that will be required when products specified or left to the discretion of the contractor in other sections emit VOCs at unknown rates or greater than 100

3.01 GENERAL REQUIREMENTS

A. Keep a copy of the certifications submitted under Sec. 1.06 readily available in an easy to modify format, such as a three ring binder, at the job site.

B. Insure the all work areas are isolated from those areas in which persons not employed by the contractor will be present during construction, including those interconnected by air conditioning systems, adjacent buildings, and public areas.

SPECIFIER'S NOTE: Clearly identify air handling equipment that may be modified on the drawings for jobs involving odors or dusts. Also, identify equipment that shall not be modified.

1. Install isolation barriers so that odor(s) and dust(s) from the work areas are not perceivable in any surrounding occupied area, then remove the barriers before the final acceptance of the project; or

2. Provide local fresh and exhaust air that will be adequate to insure odor(s) and dust(s) from the work areas are not perceivable in any surrounding occupied area. Meet the following minimum criteria:

SPECIFIER'S NOTE: Clearly indicate the extent of the Contractor's work area responsibility on the prints.

a. At least four air changes per hour continued from the start of any emission producing work until four hours after the conclusion of any emission producing work; and

b. Exhaust the ventilating air to the outside of the building, at least 25 feet downwind of **any opening** to the building, surrounding buildings, or similar occupied areas, and at least 100 feet downwind of any building air supply intakes.

C. Immediately stop all odor and dust producing tasks, then execute the requirements of subparagraph 3.01.B.2 within four hours after notification by the Engineer that occupants have complained of any perceivable odor or dust.

1. Compliance with paragraph 3.01.B.1 shall not be considered to have provided sufficient isolation in this instance.

2. If the items in paragraph 3.01.B.2 have been previously implemented without satisfactory results, increase the air changes to eight (8) per hour.

3. The requirements in paragraph 3.01.D may be performed in lieu of the requirements stated in 3.01.C with prior permission from the Engineer or shall be performed if requested by the Engineer.

D. When the conditions described in paragraphs 3.01.B.1, 3.01.B.2, or 3.01.C, are unable to maintain an air quality acceptable to 80% of the surrounding occupants, perform the following at no extra cost to the State:

1. Immediately discontinue the use of the offending product(s) upon notification by the Engineer;

2. Perform the odor or dust generating task(s) during a non-occupied time such as evenings, weekends holidays, etc.;

3. Thoroughly clean any odor or dust affected area and equipment prior to occupancy; and

4. Complete the odor or dust generating task(s) at least 16 hours prior to occupancy.

3.02 VENTILATION AFTER CONSTRUCTION

A. In all **work areas of air conditioned new buildings** the Contractor shall perform a ventilation activity after construction has been completed but prior to occupancy according to the following:

1. Notify the Engineer prior to starting the work involved with these steps or immediately if any step cannot be successfully completed;

2. Perform the normal start up procedures for all ventilation equipment;

3. Inspect areas adjacent to air intakes for the existence of air containing odors and eliminate the cause of any odor(s) before proceeding;

4. Insure that the A/C outside make-up air dampers are operable, then set them to remain in the wide open position to provide for the maximum possible flow of outside air into the building;

5. Set the mechanical cooling equipment such as chill water or A/C compressors as appropriate to off so that the temperature will stay as high as possible;

6. Open windows and doors (interior) for maximum ventilation of the work area using caution regarding security, infiltration of dirt, debris, or dust, and impact on surrounding occupied areas. This requirement shall not relieve the Contractor of his responsibility for security, protection from the elements of weather, or site cleanliness;

7. Turn on all of the available lights and heat producing equipment;

8. Run all of the air handling units and ventilation fans continuously for 72 hours;

9. Be prepared to continue the ventilation procedure beyond the 72 hours and to add additional exhaust fans if the Engineer considers it necessary. Ventilation beyond 72 hours will be compensated as extra work if all of the above steps have been followed; and

10. When the Engineer determines that the ventilation has been sufficient, replace all A/C air filters, readjust the building's equipment to the design settings, and perform the start up steps required to be performed after such adjustments have been made.

B. In all **work areas of non-air conditioned new buildings** the Contractor shall perform a ventilation activity after construction has been completed but prior to occupancy according to the following:

1. Notify the Engineer prior to starting the work involved with these steps or immediately if any step cannot be successfully completed;

2. Inspect area adjacent to portable fans for the existence of air containing odors and eliminate the cause of any odor(s) before proceeding;

3. Open windows and doors (interior and exterior) for maximum ventilation of the work area using caution regarding security, infiltration of dirt, debris, or dust, and impact on surrounding occupied areas. This requirement shall not relieve the Contractor of his responsibility for security, protection from the elements of weather, or site cleanliness;

4. Turn on all of the available lights and heat producing equipment;

5. Ventilate the work area using portable supply and exhaust fans capable of providing one complete work area air change per hour for 72 hours;

6. Be prepared to continue the ventilation procedure beyond the 72 hours and to add additional fans if the Engineer considers it necessary. Ventilation beyond 72 hours will be compensated as extra work if all of the above steps have been followed; and

7. When the Engineer determines that the ventilation has been sufficient, remove the portable equipment.

SPECIFIER'S NOTE: This paragraph may be removed for new facilities that do not have HVAC systems interconnected with existing facilities.

C. In all **work areas in an existing building** the Contractor shall perform a ventilation activity after construction has been completed but prior to occupancy according to the following:

1. Use the steps in paragraph 3.03.A when the work area is air conditioned by air handling equipment that can be completely isolated from all A/C systems supplying occupied areas; otherwise

2. Use the steps in paragraph 3.03.B.

END OF SECTION

SECTION 01577 - POLLUTION CONTROL

SPECIFIER'S NOTE: Insert wording, numbers, etc. as appropriate where [italics in parenthesis] are shown throughout this specification section. Italicized words are used for directions to the specifier and should be filled in. Blue colored text are Notes to Specifier and should be completely deleted from the final text. Red colored text is used for items to be modified. *Maintain footer notation in italics with the current version used (e.g. TG01577 v00.04)**.***

SPECIFIER NOTES: Add this section as applicable.

PART 1 - GENERAL

1.01 SUMMARY

A. Includes site and environmental control requirements.

1.02 TRASH, REFUSE DISPOSAL

A. Burning of debris and / or waste materials on the project site is prohibited.

B. Do not bury debris and / or waste material on the project site, unless specifically allowed elsewhere in these specifications as backfill material.

C. Haul unusable debris and waste material to an appropriate off-site dump area. During loading operations, water down or provide other measures to prevent dust or other airborne contaminants.

D. Vacuum, wet mop, or damp sweep when cleaning rubbish and fines which can become airborne from floors or other paved areas. Do not dry sweep.

E. Use enclosed chutes and / or containers to conveying debris from above the ground floor level.

F. Clean-up shall include the collection of all waste paper and wrapping materials, cans, bottles, construction waste materials and other objectionable materials, and removal as required. Frequency of clean-up shall coincide with rubbish producing events.

1.03 DUST

A. Prevent dust from becoming airborne at all times including non-working hours, weekends and holidays in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 60 - Air Pollution Control.

B. Contractor is responsible for and shall determine the method of dust control. Subject to the Contractor's choice, the use of water or "environmentally friendly chemicals" may be used over surfaces which create airborne dust.

C. Contractor is responsible for all damage claims per the requirements of the INTERIM GENERAL CONDITIONS.

1.04 NOISE

A. Keep noise within acceptable levels at all times in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 43 - Community Noise Control for Oahu. Contractor shall obtain and pay for the Community Noise Permit from the State Department of Health when the construction equipment or other devices emit noise at levels exceeding the allowable limits.

B. To reduce loud disruptive noise levels, ensure mufflers and other devises are provided on equipment, internal combustion engines and compressors. Maintain equipment to reduce noise to acceptable levels.

C. Unless specified elsewhere, pile driving operations shall be confined to the period between 9:00 am and 5:30 pm, Monday through Friday. Pile driving will not be permitted on weekends and legal State and Federal holidays.

D. Starting-up of construction equipment meeting allowable noise limits shall not be done prior to 6:45 a.m. without prior approval of the Engineer. Equipment exceeding allowable noise levels shall not be started-up prior to 7:00 a.m.

1.05 EROSION

A. During interim grading operations, the grade shall be maintained so as to preclude any damage to adjoining property from water and eroding soil.

B. Install temporary berms, cut-off ditches and other provisions as required construction methods and operations. Should there be a question if the temporary measures are insufficient to prevent erosion, the Engineer shall make the final determination.

C. Construct and maintain drainage outlets and silting basins where shown on the Drawings and when required to minimize erosion and pollution of waterways during construction.

1.06 OTHERS

A. Wherever trucks and/or vehicles leave the site and enter surrounding paved streets, Contractor shall prevent any material from being carried onto the pavement. Waste water shall not be discharged into existing streams, waterways, or drainage systems such as gutters and catch basins unless treated to comply with the State Department of Health water pollution regulations.

B. Trucks hauling debris shall be covered as required by PUC Regulation. Trucks hauling fine materials shall be covered.

C. No dumping of waste concrete will be permitted at the job-site unless otherwise permitted in the SPECIAL PROVISIONS.

D. Except for rinsing of the hopper and delivery chute, and for wheel washing where required, concrete trucks shall not be cleaned on the job-site.

E. Except in an emergency, such as a mechanical breakdown, all vehicle fueling and maintenance shall be done in a designated area. A temporary berm shall be constructed around the area when runoff can cause a problem.

F. If allowed in this Contract, spray painting shall be done by the “airless spray” process. Other types of spray painting is not permitted.

1.07 SUSPENSION OF WORK

A. Violations of any of the above requirements or any other pollution control requirements which may be specified in the Specifications shall be cause for suspension of the work creating such violation. Refer to INTERIM GENERAL CONDITIONS Section 7.24 SUSPENSION OF WORK.

B. If no corrective action is taken by the Contractor within 72 hours after ordered by the Engineer, the State reserves the right to take whatever action is necessary to correct the situation and to deduct all costs incurred by the State in taking such action from monies due the Contractor.

C. The Engineer may also suspend any operations which creates a pollution problems even if the problem does not violate the provisions of this Section. In this instance, the work is considered a Change and subject to the provisions of INTERIM GENERAL CONDITIONS Section 4.2

CHANGES and Section 8.3 PAYMENT FOR ADDITIONAL WORK.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION (Not used)

END OF SECTION

Add this section as applicable.
(Consultant to type **this** page where applicable **and insert the appropriate drawings, pages 2 thru 8**)

NOTES TO ARCHITECT

SECTION 01581 - SIGNS AND FRAMES

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

A. Furnish all labor, materials and equipment necessary to construct and install all signs and frames listed hereinbelow and specified hereinafter:

	Pages	
1. Project Sign	2-3-3a	Indicate "NOT REQUIRED" if not applicable for your project.
2. Frame for Certificate of Occupancy	4	
3. Room Capacity Sign	5	
4. Security Gate Sign	6	
5. "No Smoking" Sign	7	Indicate size and location for "No Smoking" sign.
6. "Tobacco Free School" Sign (for school projects only)	7a	
7. "Visitors Welcome" Sign (for school projects only)	8	

Add number of pages used to be included in Table of Contents.

END OF SECTION

SECTION 01582 - WARNING SIGNS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

A. Furnish all labor, materials and equipments necessary to construct and install warning signs as specified herinafter.

PART 2 - PRODUCTS

2.10 MATERIALS

A. Backing: Backing shall be 6061-T6 aluminum 0.032" minimum thickness.

B. Paint: Paint shall be satin finish, exterior grade or factory baked enamel or a combination thereof.

2.02 COLORS

A. Signs shall have white background. Remaining items shall be similar to Rust-Oleum Federal Safety Red.

2.03 REQUIREMENTS FOR WARNING SIGN

A. Message configuration and dimensions shall be in accordance with the attached illustration.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Signs shall be located at 50 foot intervals around roped off work area or at all entrances in the case of interior work.

B. Signs shall be attached to the rope barrier, rope barrier supports, individual sign supports or buildings. Do not use nails to attach signs to building(s).

3.02 CLEAN-UP

A. Remove all signs upon completion of project. Repair any damages caused by sing mounting and removal.

WARNING SIGNS

END OF SECTION

Add this section as necessary.
(Used usually for New Building and Sitework Projects)
(Check with Project Coordinator)
(Consultant to type)

SECTION 01590 - FIELD OFFICE

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

Furnish all labor, materials and equipment necessary to construct and install the inspectors' field office as shown on page 01590-2.

The field office will be required for the exclusive use of the State. No contractor related materials shall be stored in the field office.

Add this section as necessary.
(Used usually for Large RENOVATION Projects)
~~(Consultant to type)~~

SECTION 01590 - FIELD OFFICE

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

The Contractor shall provide a room in the building for the State inspectors' use in lieu of the field offic building shown on page 01590-2. The location shall be approved by the Engineer. Floor areas shall be a minimum of length and width dimensions of 12'-0" x 8'-0" respectively.

The Contractor shall furnish all labor, materials and equipment necessary to construct and furnish the interior of the inspectors' field office as shown on page 01590-2 with the following exceptions:

1. Interior and exterior need not be painted;

2. The door hardware may be the same as one called for in the plans and specifications;

3. All adjustments to construction shall be approved by the Engineer;

4. The field office will be required for the exclusive use of the State. No contractor related materials shall be stored in the field office.

SECTION 01715 - EXISTING CONDITIONS - ASBESTOS / LEAD / HAZZARD MATERIAL SURVEY

SPECIFIER'S NOTE: Insert wording, numbers, etc. as appropriate where [italics in parenthesis] are shown throughout this specification section. Italicized words are used for directions to the specifier and should be filled in. Blue colored text are Notes to Specifier and should be completely deleted from the final text. Red colored text is used for items to be modified. *Maintain footer notation in italics with the current version used (e.g. TG01715 v00.04)**.***

SPECIFIER NOTES: Be sure to type in the footer (i.e. job number, spec section title, spec section number and page number) on the attachments appended to this section. Confirm with the Project Coordinator when to use this section. This section was formally known as SECTION 01015 - CONTRACTOR USE OF PREMISES

PART 1 - GENERAL

1.01 ASBESTOS

A. The structure or structures to be renovated or modified under this contract were surveyed for the presence of asbestos containing building materials (ACBM), using AHERA requirements. A copy of the initial survey report, as well as any subsequent supplemental survey report(s) if performed, are included in this Section.

1. A "User's Guide" for the asbestos survey report(s) is available for review from DAGS Public Works Division Contracts Section and at the DAGS District Office listed in the NOTICE TO CONTRACTOR. The "User's Guide" contains information on how to interpret the asbestos reports.

2. The report(s) are included, even when no ACBM was found, for the Contractor's information. Contractor shall review the attached report(s) for the basis on which the negative ACBM finding was made. Contractor may perform further surveys at its own expense, if ACBM not shown in the report(s) is suspected in the areas of the building(s) in which work will be performed. If ACBM is found, the Engineer shall be immediately notified.

3. If the report(s) show that asbestos containing building materials are present, Contractor is required to fully understand the content of the report(s) in the areas of the building(s) in which work will be performed.

4. If there is ACBM outside of the areas in which work will be performed, this ACBM shall not be disturbed in any way.

A. If applicable, Contractor shall notify its employees, subcontractors and all other persons engaged on the project of the presence of asbestos in the existing buildings in accordance with the requirements of Chapter 110, Article 12-110-2 (f) (1) (B) of the Occupational Safety and Health Standards, State of Hawaii.

B. In the event that work is required in any building or buildings on the site other than the one(s) designated within this project scope, Contractor shall request copies of the asbestos survey report(s) for such building(s) from the Engineer. Based on the information contained in the additional survey(s), Contractor shall notify affected personnel per paragraph 1.01.B.

SPECIFIER NOTES: Add this paragraph if Section 13281 ABATEMENT OF ASBESTOS CONTAINING MATERIALS is used.

C. Perform all work which disturbs ACBM in accordance with Section 13281 ABATEMENT OF ASBESTOS CONTAINING MATERIALS.

SPECIFIER NOTES: When the project includes paint to be disturbed that was applied prior to 1980, it shall be assumed to contain lead and this paragraph shall be included.

1.02 LEAD CONTAINING PAINT

A. Contractor shall inform its employees, subcontractors and all other persons engaged in the project that lead containing paints are present in the existing building(s) and at the job site. Follow the requirements of Title 12 (Department of Labor and Industrial Relations), Subtitle 8 (Division of Occupational Safety and Health), Chapter 148 (Lead Exposure in Construction), Hawaii Administrative Rules.

SPECIFIER NOTES: If testing for lead was done, this paragraph shall be added and any data collected shall be appended at the end of this section.

B. Contractor shall review the attached lead testing data which identify locations where lead containing paints were found. Lead testing was for design purposes only, and the results **do not satisfy** any of the requirements of Chapter 12-148.

SPECIFIER NOTES: Add this paragraph if Section 13282 SUBSTRATES WITH LEAD-CONTAINING PAINTS is used.

C. Perform all work which disturbs ACBM in accordance with Section 13282 SUBSTRATES WITH LEAD CONTAINING PAINTS.

SPECIFIER NOTES: Add other paragraphs where other hazzard material are found in the building. Include the appropriate Survey and reference to the respective removal sections in these specifications.

1.03 POLYCHLORINATED BIPHENYLS (PCB's), TERMITICIDES, CHLORDANE, DIELDRIN

A. Contractor shall inform its employees, subcontractors and all other persons engaged in the project that [PCB, Chlordane, Dieldrin, etc.] are present in the existing building(s) and at the job site [and may have contaminated - describe]. Perform all work which disturbs the contaminated materials in accordance with [Section 00000] or [Follow the requirements of - describe].

PART 2 - MATERIALS not used

PART 3 - EXECUTION

3.01 SURVEY attached[_____] pages, dated [_____], prepared by [_____] .

END OF SECTION

NOTES TO ARCHITECT

This specification is intended for use with new construction, not retreatment of existing facilities.

SECTION 02281 - SOIL TREATMENT FOR TERMITE CONTROL

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

A. Soil shall be treated against subterranean termites by a pest control operator licensed by the Hawaii State Pest Control Board in Branch #3 and certified as a commercial applicator under the Hawaii Pesticide Law by the Hawaii State Department of Agriculture in category 7b.

B. The Contractor shall notify the Engineer at least one day before application of chemicals.

C. A totalizing meter shall be provided to determine application rates and to indicate the total volume of pesticide applied in U.S. gallons. The meter shall be no more than five feet from the applicator at all times.

D. Pumping equipment shall be a type normally used and be capable of pumping the working solution in a manner accepted and practiced by the pest control industry.

1.03 SUBMITTALS

The Contractor shall submit to the Engineer for approval 6 copies of the label for the chemical he proposes to use.

1.04 GUARANTEE

A. The Contractor shall furnish a written warranty in 3 copies to the State of Hawaii stating that:

1. The chemical concentration, rates and method of application complied with these specifications;

2. The effectiveness of the treatment is guaranteed for a period of not less than two (2) years from the date of final application of the treatment;

3. All necessary repairs of damages resulting from subterranean termite infestation within a period of one (1) year from the date of project acceptance will be made at the Contractor's own expense up to a total cost of $5,000.00 as verified through cost breakdown in accordance with Section 8.4(b) "Force Account Work" of the General Conditions and submitted to the Engineer; and

4. If subterranean termite infestation should occur through the treated area within the two (2) year guarantee period, the soil shall be re-treated to exterminate all infestation without cost to the State of Hawaii as stipulated below. The application rates shall be as given by the label of the chemical being used. All corrective treatments shall be performed to at least 10 feet around each visible subterranean termite activity.

   a. Working pressure while applying treating solution shall be held to that which is applicable to and safe under the conditions at the site being treated.

   b. Drill one hole per block along one course above adjacent grade of hollow tile walls which extend below grade, and treat at a rate consistent with the pesticide label.

   c. Remove carpets from areas being treated.

   d. Drill and treat through all interior concrete floors, along both sides of all partitions and walls, and all cracks and expansion joints according to label directions. Drill holes through concrete slab shall be 1/2" or 9/16" dia. and spaced not more than 18 inches apart.

   e. Drill one hole at each plumbing or utility

penetration through ground floor slab and treat according to label instructions.

f. Patch drill holes with cement/concrete to full depth of slab thickness and refinish walls/floors as necessary to prevent any backflow and to restore original appearance.

g. Re-install carpets as applicable / necessary. Installation shall be done by a competent commercial carpet installer.

h. Replace any finish/finish materials which are contaminated by spilled chemicals.

5. The above-ground areas infested with subterranean termites shall be treated as appropriate with a proven, effective insecticide to eliminate those termites.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Chemicals shall be aqueous solutions of Type I repellent termiticides such as Prelude, **Dragnet SFR**, Demon TC, or Prevail FT **or the Type II non-repellant termiticide Premise 75. The chemicals** shall be used in accordance with the labels and provisions related to the use of those pesticides as adopted by the Hawaii Pesticide Law, Chapter 149A, HRS, and the Federal Insecticide, Fungicide and Rodenticide Act.

The Type II non-repellent termiticide Dursban TC shall not be used.

PART 3 - EXECUTION

3.01 APPLICATION AND RATES

A. The solution shall be applied uniformly and at the **maximum** rates **permitted** on the label for the chemical being used.

B. **Treatment shall include the provision of**

vertical barriers as stated on the product label. **Treatment shall extend down to the top of the footing.**

C. Whenever possible, the solution shall be applied not more than 24 hours before the pouring of concrete over the affected area.

Where a treated area that is not scheduled to be covered with a moisture barrier in the finished construction (e.g. lanai area) cannot be covered with a poured concrete slab the same day, the area shall be protected with a waterproofing covering such as polyethelene sheeting.

D. The solution under slabs shall be applied after backfill has been completed and rough plumbing and other utility lines have been installed and just prior to the placement of the **Basaltic Termite Barrier (BTB) material, where specified, and** moisture barrier. The treatment shall be applied to dry material whenever possible, but in any case shall not be applied under conditions during which the soil does not readily absorb the solution.

END OF SECTION

NOTES TO ARCHITECT

SECTION 02285 - BASALTIC TERMITE BARRIER **SYSTEM**

Refer to Technical Memorandum #61 dated Rev. 12/07/98 and sample details for guidance regarding the use of BTB material, Termi-mesh and Termite Resistive Construction.

PART 1 - GENERAL

1.01 **GENERAL CONDITIONS**

As specified in Section 00700.

1.02 **GENERAL REQUIREMENTS**

Note: This Guide Spec Section supercedes the Guide Spec dated Rev. 03.07.88 that was prepared by Ameron.

A. Work Included: The work of this Section includes the furnishing and placing of graded basaltic **termite barrier material** on the excavated building foundation to provide a barrier against subterranean termite intrusion.

As an alternative to the Basaltic Termite Barrier System, the contractor may elect to provide the Termi-mesh System as specified in Section 02287 - Termite Control Barrier System.

Be sure to prepare and add this section to your specs.

B. Related Work:

1. Excavation, utility trenching, backfilling: Section _____

Indicate section no.

2. Cast-in-place oncrete: Section 03300.

1.03 REFERENCE DOCUMENTS

The following documents form a part of these specifications to the extent they are referenced herein:

A. ASTM C 128-**97**: Specific Gravity and Absorption of Fine Aggregates.

B. ASTM C 131-**96**: Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

C. ASTM C 136-**96a**: Sieve Analysis of Fine and Coarse Aggregates.

D. ASTM C 289-**94**: Potential Reactivity of Aggregates (Chemical Method).

1.04 SUBMITTALS

Submit certification from the material producer

that the material supplied complies with the requirements of these specifications.

1.05 STORAGE AND HANDLING

Store and handle the material so as to prevent contamination by dirt, water and organic material.

1.06 WARRANTY

The Contractor shall warrant the system against subterranean termite intrusion for a period of two (2) years from the date of project acceptance. All necessary repairs of damages resulting from subterranean termite infestation within the two year period, including the extermination of all infestation, shall be made at the Contractor's own expense up to a total cost of $50,000.00 as verified through cost breakdown in accordance with the Interim General Conditions.

PART 2 - PRODUCTS

2.01 **MATERIALS**

A. **Basaltic Termite Barrier (BTB) Material**: Clean, dry, **basaltic aggregate** material manufactured from crushed basalt rock and meeting the following requirements:

1. Material Gradation **(per** ASTM C 136**)**:

Sieve Size	Percent Passing
No. 4 (4.75 mm)	100
No. 8 (2.36 mm)	95 - 100
No. 10 (2.00 mm)	75 - 95
No. 12 (1.70 mm)	35 - 50
No. 16 (1.18 mm)	0 - 10

2. Specific Gravity**: 2.80 when tested in accordance with ASTM C 128.**

3. Silica Content**: 45 percent when tested in accordance with ASTM C 289.**

4. Abrasion Loss**: 20 percent after 500**

revolutions when tested in accordance with ASTM C 131.

The materials shall not contain aggregate that has formed into clumps.

B. Vapor Barrier: **As specified in** Section 03300 - Cast-in-Place Concrete.

C. **Bio-Barrier: Permeable geotextile fabric having a tensile strength of approximately 145 lbs., impregnated with time-release nodules of root growth inhibitors such as treflan herbicides.**

D. Termite Barrier Mesh: Type AIAA Marine Grade 316 stainless steel mesh of 0.18 mm diameter wire with a maximum mesh opening size of 0.66 x 0.45 mm, as manufactured by Termi-Mesh or approved equal.

E. **Barrier Mesh Accessories: Cementitious parging adhesive, clamps, ties and other accessories as recommended by the barrier mesh system manufacturer.**

2.02 EQUIPMENT

A. Equipment used to place BTB shall be free of dirt and other deleterious material so as not to contaminate the BTB.

B. Compaction: Use power driven, vibrating-plate type tampers for large areas and rod-and-plate type hand tampers for small areas such as foundation and walk edges.

PART 3 - EXECUTION

3.01 PREPARATION

Prior to placing material, remove visible plant roots and standing water from the excavated area. **Inspect the subgrade, piping and conduits to ensure the minimum 4 inch cover over piping and conduits**

will be achieved. Inspect the foundation perimeter to assure that there is sufficient room between the sides of excavations and edges of foundations and walks to provide the required barrier depth and width. Do not proceed with the work until discrepancies have been corrected.

Refer to DAGS Standard Details included under Tech Memo #61. Be sure to indicate the details on the drawings.

3.02 PLACEMENT

A. General:

1. **The minimum effective depth of the BTB material shall be 4 inches. In no case shall the BTB material be placed in less than the 4 inch thickness.**

2. Place material in one lift for thicknesses of 6 inches or less and in successive lifts of 4 to 6 inches where the thickness indicated on the drawings is greater than 6 inches. Compact each lift prior to placing successive lifts.

B. **BTB material shall not be placed directly onto sand and porous (e.g. loose gravel / rock) substrates. It shall be separated by a membrane such as polyethylene sheeting.**

C. **Placement of BTB material beneath concrete slabs-on-grade: After the subgrade has been properly prepared, the BTB material shall be placed and compacted to a minimum thickness of 4 inches. For interior slabs, a vapor barrier shall be placed atop this layer.**

D. **Placement of BTB material against the exterior face of CMU walls extending below grade: After placement of footings and walls and the removal of forms, remove dirt, loose concrete, and other debris from the excavated area. Install bio-barrier material against the exposed earth face and place BTB material. Provide a minimum 2 inch thick reinforced concrete topping atop the BTB material sloped to drain away from the building. Provide the topping with control and expansion joints to minimize cracking.**

Be sure to indicate the location of control and expansion joints on the drawings.

E. Placement of BTB material beneath thickened

perimeter foundation edges: Place BTB in the minimum thickness as described above. After concrete placement and form removal, remove dirt and debris that may have contaminated the BTB. Bring the vapor barrier up the sides of the foundation and place additional BTB material on the exterior side of the vapor barrier. Tamp the BTB material and provide a minimum 2 inch thick reinforced concrete topping atop the BTB material sloped to drain away from the building. Provide the topping with control and expansion joints to minimize cracking.

F. The General Contractor shall coordinate the following work by other trades:

1. The Contractor shall take the necessary precautions and modify his operations to avoid displacement and contamination of the BTB material during deposition of concrete and removal of forms and stakes.

2. Plumbing, mechanical piping and electrical conduits shall not be placed horizontally within the 4 inch thick BTB layers beneath slabs-on-grade. They shall be placed in trenches beneath the 4 inch layer and shall only penetrate it vertically.

As an option, the Contractor may, at his own expense, provide a BTB layer exceeding the minimum 4 inch thickness to accomodate the placement of horizontal conduits and piping laid directly on a subgrade that has been rolled flat. However, the 4 inch thick effective depth of the BTB material atop the conduit and piping shall be maintained.

3. With the exception of insulated piping, where conduits and piping pass vertically through the BTB material, sleeves and wrappings shall be removed so that the BTB material directly abuts the pipe/conduit surface.

4. Insulated pipes: Provide a barrier mesh collar where insulated piping penetrates the BTB layer and slab-on-grade as detailed on the drawings.

3.03 CLEAN-UP

After placement of the basaltic termite barrier is complete, remove surplus materials from the site.

END OF SECTION

SECTION **02362** - SOIL TREATMENT FOR VEGETATION CONTROL

PART I - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

This work shall consist of spraying weed killer on the prepared roadway subgrade prior to the installation of the base course and where called for on plans and on existing growth prior to application of asphalt in the case of resurfacing jobs.

1.03 SUBMITTALS

Prior to the start of work, the contractor shall submit to the Engineer the material product data and Material Safety Data Sheets for the material proposed for use.

PART 2 - PRODUCTS

2.01 MATERIALS

Weed Killer shall be "Casoron 4G", "Norosac **4G**", or an approved equal for under asphalt application on new or rebuilt pavement, and shall be "Hyvar X", "Roundup" or approved equal for application to existing weeds for resurfacing jobs.

PART 3 - EXECUTION

3.01 APPLICATION

The under asphalt weed killer shall be mixed and uniformly spread using calibrated application equipment at the maximum rates permitted for "under asphalt" use and in strict accordance with the manufacturer's label. Base course material shall be installed as soon as possible after applying the weed killer to preclude loss of germination inhibiting action.

In treatment of existing growth on resurfacing jobs, the weed killer shall be mixed and uniformly sprayed in strict accordance with the manufacturer's label.

Nut grass shall be retreated two (2) days after initial application and again if growth still exists.

NOTES TO ARCHITECT

The Contractor shall notify the Engineer 24 hours before application of weed killer.

END OF SECTION

NOTES TO ARCHITECT

SECTION 02400 - DRAINAGE

PART 1 - GENERAL

Modify this section as applicable to your job.

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 SUBMITTALS

A. Certificates

Before installation, submit to the Engineer affidavits from the manufacturers or suppliers of pipe, pipe coating and fittings proposed to be furnished and installed under this section certifying that such materials delivered to the project conform to the requirements of these specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Materials for drainage system shall be in accordance with the below-listed sections of the Counties' STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION dated May 1975 and STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION dated August 1976 as revised, except as amended in the plans and/or specifications herewith. (Paragraphs concerning Measurements and Payments in the Sections are not applicable to this project.)

1. Subsurface Drains ..... Section 28
2. Drain Pipes (Reinforced Concrete Pipe; Appurtenances) ... Section 24
3. Drain Manholes ..... Section 25

Modify this list to fit your job.

If any details from the "Std. Det." are to be followed, note the exact detail on plans.

4. Portland Cement Concrete ..... Section 39

5. Reinforcing Steel ..... Section 48

6. Filter Material ..... Section 28

PART 3 - EXECUTION

3.01 INSTALLATION

A. Location of Utility Lines

1. The Contractor shall be responsible for precisely laying out the various storm drain lines shown on the drawings.

2. Prior to the actual work of constructing the drain system, the Contractor shall excavate and expose all utility facilities which will be crossed by the new drain and verify their elevations with respect to the new drain grades. Elevations of inverts of new drain lines to be connected to the existing drain shall be verified at their points of connections under this requirement.

3. Should the actual elevation of any existing utility show a possible discrepancy which may affect the alignment and grade of the new drain, the Contractor shall immediately notify the Engineer of his findings and shall not proceed with the drain construction until authorized to do so by the Engineer.

4. In performing all work the Contractor shall exercise due care and caution necessary to avoid any damage to, and impairment in the use of, any existing utility line. Any damage to existing lines resulting from the Contractor's operations shall be immediately repaired and restored as approved by the Engineer at the Contractor's expense.

B. Excavation and Backfill: Trench excavation and backfill for the laying and installation of

NOTES TO ARCHITECT

drain pipes, to the required line and grade, shall be governed by the following provisions of the Counties' STANDARD SPECIFICATIONS FOR PUBLIC WORKS dated May 1975 and STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION dated August 1976 except as amended in the plans and/or specifications herewith. (Paragraphs concerning Measurements and Payments in the Sections are not applicable to this project.)

1. Trench Excavation and Backfill ... Section 11

2. Roadway Excavation ..... Section 12

3. Restoring Pavements and Other Improvements ..... Section 38

If any details from the "Std. Det." are to be followed, note the exact details on plans.

C. Storm Drainage Piping and Drainage Structures: Installation shall be in accordance with the applicable sections noted hereinbefore.

3.02 FINAL INSPECTION

At the time of final inspection of the work performed under the contract, the utilities covered by this section shall be complete in every respect and operating as designed. All surplus materials of every character resulting from the work of this section shall have been removed. Drainage lines and manholes shall be free from sand, silt or other obstructions. Any defects discovered in the utilities subsequent to this inspection shall be corrected prior to final acceptance.

END OF SECTION

NOTES TO ARCHITECT

SECTION 02444 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

The State Div. of P.W. Design Branch's "Chain Link Fence Details" sheet shall be used or copied for use with this section.

1.02 GENERAL REQUIREMENTS

Furnish materials, labor and equipment necessary to install all chain link fences and gates to the limits shown and as detailed on the plan and as specified herein.

These specifications are not intended for use in locales subject to severe salt air exposure (such as the North Shore of Oahu). Modify your specs accordingly for facilities in those type areas.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Chain Link Fence Fabric shall be 2-inch mesh unless otherwise shown or specified, be galvanized and conform to ASTM A392, Class 1. The hot-dipped galvanized fabric shall contain not less than 1.2 ounces per sq. ft. of uncoated wire surface as determined by stripping test ASTM A90 and under the PREECE Test (ASTM A239), shall withstand 6 or more 1-minute dips before reaching the end point. All fabric shall be free from barbs, icicles or other hazardous projections resulting from galvanizing. Aluminum clad fabric shall be an acceptable alternate to the hot-dipped galvanized fabric provided it is of the same gauge as the latter.

Change mesh size to 1-3/4" for tennis courts.

Include all fabrics listed in the Hawaii Products List which meet these specifications in your project specs.

C. Tie Wire shall be 12-gauge (9 gauge for gates) soft annealed galvanized steel wire as called for on plans.

D. Tension Bar shall be **3/16"** thick by 3/4" wide mild steel bar for attachment of a fabric to a terminal post.

Specify 1/4" thick bars for prison projects.

E. Brace Band shall be formed from steel bands at least 1/8" thick by 3/4" wide.

F. Tension Band shall be formed from steel bands at least 12 gauge thick by 3/4" wide.

G. Tension Rod shall be a 3/8" dia. mild steel rod threaded at one end and hooked 180 degrees at the other.

H. Fittings:

1. Post Cap and Eye Top shall be of one-piece cast iron construction and shall attach securely onto their respective posts.

2. Coupling for top rails shall be outside sleeve type, at least 6 inches long and crimped at center.

3. Rail Ends shall be snug, one-piece fittings for top and brace rails with holes to receive 5/16" bolts for securing to rail end bands.

4. Double Rail End shall be similar to rail and except for an additional 1/2" hole to receive the hooked end of a tension rod.

H. Composition and Finish of Metal Parts: All metal parts and fittings, including tracks, gate hardware and frames, shall be of steel, malleable iron or wrought iron and shall be galvanized by the hot-dip process, after fabrication, in conformance with ASTM A153. The coating on all parts shall be continuous and smooth; that is, free from barbs, icicles or other projections. Bolts may be cadmium-plated in conformance with ASTM A165 instead.

I. Gate Hardware:

1. Hinges shall be heavy duty offset type permitting 180-degree swing using double clamping method of attachment and manufactured or forged malleable iron. All

NOTES TO ARCHITECT

hinges shall be of appropriate size and capacity for the particular gate being supported and/or operated.

2. Unless otherwise shown or specified, padlocking provisions for walk gate shall be a fork latch assembly, and that for a drive gate shall be an industrial drop rod guide and latch assembly as detailed in the plans.

Specify requirement for chain if needed.

3. Padlock shall be 5-pin cylinder type with brass case and a 5/16" dia. hardened steel shackle. Padlocks shall be keyed differently but masterkeyed to the fence system. Two (2) masterkeys shall be provided.

J. Posts, Rails and Braces shall be of either standard weight, hot-dipped galvanized, welded and seamless steel pipes conforming to ASTM A120 or hot-dipped galvanized pipes with chromate conversion and polyurethane coatings ("Tuf 40" by American Tube Co., Inc. or approved equal). Posts of the latter type of pipes shall be shall be sized in accordance with and have the minimum properties shown in the table below. Additionally, Tuf 40 type pipes shall not be used where welded pipe frames are called for.

Dimensions and Weights of Tuf 40 Steel Pipe Posts

Post Type/Fence (*/ft.)	Ht. (in.)	Nom.Dim. (in.)	O.D. (in.)	I.D. (lbs/ft)	Weight
Rails only	1-5/8	1.660	1.440	1.82	
L/4	1-7/8	1.900	1.660	2.28	
L/6-8; T/4	2-3/8	2.375	2.115	3.12	
L/10,12; T/6-8	2-7/8	2.875	2.555	4.64	

*L - Line posts; T - Terminal posts

K. Tension Wire shall be of 7-gauge coiled spring or 6-gauge plain galvanized wire.

L. Concrete for post footings shall be Class 2500 as specified in Section 03300.

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

A. General:

1. Metal fencing and gates of the various types called for shall be erected in strict conformance with the plans and these specifications. The gates and hardware shall provide intended freedom of operation. Posts shall be plumb and in line. Welding shall be done in accordance with latest AWS standards. However, no splicing of posts, rails or braces shall be accepted. Where changes in line occur with an angle of deflection of 30 degrees or more, the change point will be considered a corner and a corner post shall be installed thereat. End, corner, and gate posts for fences with 5-foot and wider fabric shall be braced to the nearest line post with horizontal braces and tension rods. The horizontal braces shall be spaced midway between top rail and ground and securely fastened to posts as shown on plans. Where fencing is placed along a curve with radius of 50 feet, or less, horizontal braces (and tension rods) shall be installed between all posts in like manner. Pull posts, at maximum intervals of 300 feet, shall be braced and trusses in both directions as specified above.

2. Field Touch-Ups: Field welds shall be cleaned of flux and spatter and all damaged galvanizing removed, all hazardous projections ground off, properly prepared, and then heavily coated with self-curing inorganic zinc coating. Manufactured coatings shall be applied in strict accordance with manufacturer's printed specifications. Damage to existing painted surfaces shall be touched up.

NOTES TO ARCHITECT

B. Fence Posts, except as otherwise indicated or specified, shall be spaced not more than 10 feet apart. In curved fence sections having a radius of 50 feet or less, the posts shall be spaced as shown on the plans. Line posts shall be set so that top of the eye tops shall be at the same height as the fence fabric.

C. Top Rails shall pass through and bear firmly on base of eye tops, form a continuous brace from end to end of each stretch of fence, and be securely fastened to terminal posts with rail ends and brace bands. Couplings for the top rails shall be installed at intervals of 24 feet maximum.

D. Chain Link Fabric shall be fastened on the side of the posts as designated and shall be mounted on the posts so that the bottom of the fabric will be no more above the finished grade than called for on the plans. High points of the ground shall be excavated as necessary. The fabric shall be stretched taut and securely fastened to the posts. Ends of wire ties shall be bent back so as not to be a hazard. Between posts the top edge of the fabric shall be fastened to the top rail and the lower edge to the tension wire with tie wire of size and at spacing as called for on the plans. Tension wire shall be stretched tight and shall be installed in a straight line between posts. Tension bars extending the full height of the fence and tension bar bands shall be used for fastening fabric to end, corner, pull and gate posts. Bolted tension bar bands shall be placed at top and bottom of tension bars and spaced at 12-inch intervals. Fastenings to line posts shall be made with tie wire of size and at spacing as called for on the plans.

Reduce bottom clearance to 2" for tennis courts.

E. Gates shall be of size specified in plans. The corners of gate frames shall be fastened together and reinforced with malleable iron fittings or by welding as approved. Welds shall all be ground smooth. Where sizes permit, frames shall be galvanized after fabrication, otherwise all welds shall be finished as specified for touching up abrasions and field

welds. All drive gate frames for fences 4 feet and higher and walk gate frames for 6-foot high fences shall be cross- trussed with tension rods welded to frame at hooked end. Fabric specified for the fence shall be attached to the sides of the gate frame with full-height tension bars and tension bar bands at top, bottom and 12 inches ±o.c. along tension bars with 9-gauge tie wires shall be placed along the top and bottom of the gate at corners and 6 inches ±o.c. in between. The gates shall be hung by at least two hinges. For the drive gates, latches of the crop rod type shall be provided and shall be of the full gate height, arranged to engage the gate catch. For walk gates, a forked latch may be provided. Catch for the drop rod shall be galvanized pipe and set in concrete. Gate hold-backs shall be positioned to secure and support the free end of the gate in full open position and/or as shall be accessible from both sides of the gates.

3.02 FINAL CLEAN-UP

All exposed metal surfaces shall be clean and free of cement. All surplus earth resulting from metal fencing work that is not used in the grading work shall be cleaned up and disposed of off-site. All debris resulting from work of this section shall be removed from the site.

END OF SECTION

NOTES TO ARCHITECT

SECTION 02485 - LAWNS AND GRASS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

A. Furnish all labor, materials, equipment and tools for grass planting as specified herein. Grass shall be planted in areas indicated on the plans and as listed below:

1. All existing grassed areas that are damaged by construction operations;

2. Areas that are dug up for utility trenches;

3. Areas from which existing structures are to be removed;

4. Areas with "Contract Zone Limits" that are graded and covered with topsoil except areas designated for other plants; and

5. All other areas within "Contract Zone Limits" that are indicated on the plans to be graded, whether with the addition of screened soil or not, such as slopes of banks, etc.

For clarity, indicate on site plan all areas to be grassed so that there is no doubt as to the extent of new grassing. If necessary, draw a separate grassing plan. Do not use the term "Lawn Area".

Also, if project is adjacent to a road, indicate any unimproved parkway (area between curb and sidewalk) as a separate contract zone for grassing only.

Make sure that screened soil for general finish grading is specified in the EARTHWORK SECTION. The location and extent of screened soil shall be clearly defined. In general, screened soil is required over all graded area.

Fill in name(s) of grass(es) to be used. Specify "Manienie" grass on flat areas and on banks with slopes up to 3:1. Do not specify Wedelia and Lippia grass for school projects. (For other than school projects, check with appropriate Project Coordinators).

For Hawaii District schools, specify only Australian Carpet Grass. Due to heavy rainfall and poor topsoil in most locations, manienie grass does not hold up.

NOTES TO ARCHITECT

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineers.

B. Grass shall be _____ _____.
At the option of the Contractor, grass planting may be by seeds (plain seeding or by hydro-mulching) or by sprigs.

1. Grass seeds shall be fresh, hulled, and meet the following requirements:

   Pure Seed 95.0% minimum
   Crop Seed 1.0% maximum
   Weed 0.5% maximum
   Inert Material 5.0% maximum
   Germination 85.0% minimum

   Grass seeds shall be delivered to the site in unopened, sealed containers, labeled with the brand name and per cent purity. Labeling shall indicate that the seeds passed a certified germination test no more than 12 months prior to use.

2. Grass sprigs shall be healthy living runners and stolons, a minimum of 6 inches long with at least 3 nodes. After they are dug, they shall be covered and kept moist until planted.

For areas which will be in shade most of the time, such as under building overhangs, in building "nooks", or under large spreading trees with dense foliage, use the following:

In low, hot locales - Buffalo grass (Stenotaphrum secundatum). In high, moist locales-Centipede grass.

Zoysia, if used, shall be permitted only in parking lot medial strips. It shall not be specified for large areas because it is slow growing and expensive.

Modify entire specs as necessary when above grass types are used.

C. Fertilizer shall be pelleted and shall consist of the following percentages by weight of active ingredients:

1. For First Application:
   Nitrogen 16%
   Phosphate 16%
   Potash 16%

2. For Second Application:

   Nitrogen 16%
   Phosphate 16%

Potash 16%

D. Mulch Materials

1. Mulch shall be specially-processed fiber containing no growth or germination-inhibiting factors. It shall be such that any addition and agitation in the hydraulic equipment with seed, fertilizer, water and other additives not detrimental to plant growth, the fibers will form a homogeneous slurry. When hydraulically sprayed on the soil, the fibers shall form a blotter-like ground cover which readily absorbs water and allows infiltration to the underlying soil.

2. Stabilizing and water retaining agent for hydro-mulching option only shall be "Verdyol Super", "Ecology Control M-Binder" or approved equal. Rate of application of "Verdyol Super" shall be 50 lbs./acre and that for "Ecology Control M-Binder shall be 60 lbs./acre.

E. Organic Soil Conditioners

1. Burnt bagasse mix shall be a mixture of sugar cane ash, aged sugar cane trash and milled forest waste products.

2. Redwood shavings shall be a nitrogen-stabilized compost of redwood material passing through a 1/2" screen.

3. Peat Moss.

4. Shredded hapuu shall be finely shredded hapuu fern.

F. Screened soil for repair work shall be a fertile, friable soil of loamy character, and shall contain organic matter. It shall be obtained from well-drained arable land; be free

Since it is difficult and/or very expensive to obtain good soil in the Hilo and Kona areas,

NOTES TO ARCHITECT

from weeds, stone and debris; and shall pass a maximum l/2" screen. Screened soil shall be capable of sustaining healthy plant life. See Paragraph 3.01.D.5. for application.

contact the appropriate Project Coordinator for guidance. This also applies to screened soil for finish grading which is specified in the Earthwork Section.

G. Water shall be potable.

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

A. Site Preparation:

1. Placement of screened soil is specified under "Earthwork" Section. The Contractor shall accept the condition of the site prior to starting work.

2. Before soil conditioning and tilling is started, weeds and other obnoxious vegetation shall be removed by manual or chemical methods.

3. Soil Conditioning and Tilling: The Contractor shall notify the Engineer one day before this work is to be done.

A _____ layer of organic soil conditioner shall be placed over all planting areas. The material shall then be roto-tilled a minimum of 2" into the existing soil until the latter is loose and fine textured. All rocks larger than 1" in diameter and all debris such as stumps, roots, wire, grade stakes and other rubbish that are turned up by tilling shall be removed. Tilling shall be omitted on slopes where watering is likely to wash the soil away.

Insert recommended thickness of organic soil conditioner layer. (Max. - 2"; min. - 1".)

4. Leveling: Any undulations or irregularities in the surface resulting from tilling or other operations shall be leveled out before planting operations are begun.

B. Planting: The Contractor shall notify the Engineer one day before planting of grass.

1. Immediately prior to planting operations, all planting areas shall be cleared of weeds, debris, rocks over 1" in diameter and clumps of earth that will not break up.

2. Option by Grass Seeding: If grass seeds are used, the following procedure shall be used (NOTE: Contractor should exercise caution in seeding slopes where seeds may be washed away):

   a. The grass seeds shall be broadcast uniformly by hand or by sowing equipment at the rate of 100 lbs./acre. Half the seeds shall be sown with the sower moving in one direction and the remainder shall be sown at right angles to the first direction.

   b. The surface shall then be raked to a smooth even plane while the seeds are simultaneously worked into the soil to a depth of about 1/2".

   c. The surface shall then be smoothed and compacted by means of a culti-packer, roller or other similar equipment weighing 60 to 90 pounds per lineal foot of roller.

   d. The planted area shall then be watered sufficiently to provide water penetration to a depth of at least 2" and shall then be kept moist until roots are established.

3. Option by Grass Sprigging

   a. Furrows shall be placed perpendicular to drainage aisles and parallel to contours on slopes and shall be spaced no more than 4" apart.

b. Fresh sprigs shall be planted in each furrow a maximum of 6" apart and covered with soil to a minimum depth of 2".

c. The surface shall then be smoothed and compacted by means of a culti-packer, roller or other similar equipment weighing 60 to 90 pounds per lineal foot of roller.

d. The planted areas shall be watered immediately after rolling in sufficient quantity to provide water penetration to a depth of at least 2" and shall then be kept moist until roots are established.

e. The area shall then be overseeded with annual rye grass seeds at the rate of 25 pounds per acre.

4. Option by Hydro-Mulching of Grass Seed: This work shall consist of furnishing and applying hulled Bermuda seed, fertilizer, mulch and stabilizing and water retaining agent by hydro-mulching.

a. The seeds shall be applied at the rate of 100 lbs./acre minimum. Mulch shall be applied at a rate of 500 lbs./acre minimum (31 lbs. per 900 sq. ft.). In every application, complete and uniform coverage of the soil shall be attained.

b. First application of fertilizer shall be included with mulch and seed.

c. The hydro-mulch equipment shall be capable of mixing all the necessary ingredients to a uniform mixture and to apply the slurry to provide uniform coverage. Seed, fertilizer, mulch mix and stabilizing water retaining agent shall be applied in one operation by hydraulic equipment made

specifically for this use. The equipment shall have a built-in agitation system with an operating capacity sufficient to keep the mix in uniform distribution until pumped from the tank. Distribution and discharge lines shall be large enough to prevent stoppage and shall be equipped with hydraulic discharge spray nozzles which provide a uniform distribution of the slurry.

d. Areas inaccessible to hydro-mulching application shall be seeded or hand sprigged and fertilized by approved hand methods.

e. Water shall be applied immediately following mulching and the planted area shall then be kept moist until roots are established.

C. Application of Fertilizer: The Contractor shall notify the Engineer one day before application of fertilizer.

1. Fertilizer shall be distributed uniformly over the planted area.

2. The first application of fertilizer shall be applied at the rate of 300 pounds per acre about 2 weeks after grassing and shall be followed by watering. (First application of fertilizer if using hydro-mulching option shall be mixed with the seeded mulch.)

3. The second application of fertilizer shall be applied at the rate of 300 pounds per acre about 1 week before the end of the maintenance period and shall be followed by watering.

D. Maintenance:

1. General: The Contractor shall be responsible for the proper care of the grassed areas. Maintenance shall include watering, weeding, moving, repairing, regrassing and protection, and shall be required until the entire project is accepted, but in any event for a period not less than _____ days after planting of grass.

Specify maintenance period: 60 days for 1st increment or large areas; 45 days for 2nd increment or smaller areas.

2. Watering: After planting of seeds or grass sprigs or mulching the ground shall be watered as deemed necessary by the Contractor to establish a healthy growth. Watering shall be done in a manner that will prevent erosion due to the application of excessive quantities of water, and the watering equipment shall be of a type that will prevent damage to the finished surface.

3. Weeding: Weeds shall be uprooted and removed completely and in no case shall they be allowed to grow and propagate more seeds. Large holes caused by weeding shall be filled with screened soil and raked level.

4. Mowing: Grass shall be mowed to a height of 1" whenever the height of grass becomes 1-1/2".

5. Repairing and Regrassing: When any portion of the surface becomes gullied or otherwise damaged and grass has failed to grow, such areas shall be repaired with screened soil and replanted with grass. Any area of one foot square or more in which grass has failed to grow after 30 days of maintenance shall be regrassed.

6. Protection: The grassed areas shall be protected against traffic so that the grass establishes a healthy growth. Grassed areas damaged by traffic shall be replanted.

3.02 ACCEPTANCE OF GRASSING

A. At the time of acceptance, the grass shall have been well-established and shall be given a final weeding and a final mowing to a height of 1 inch. If the maintenance period has expired before acceptance of the entire project, the Contractor shall continue to maintain the grass until acceptance of the entire project. If the

maintenance period should extend beyond acceptance of the entire project, the Contractor shall continue to maintain the grass until the end of the specified period of time required for maintenance.

B. At the end of the maintenance period, should there appear areas where grass has failed to grow, such areas shall be replanted with grass, refertilized and maintained beyond the maintenance period until a healthy growth is established.

END OF SECTION

SECTION 02513 - ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Weed killer as specified in Section 02282.

B. Materials for roads and parking areas shall be in accordance with the below-listed sections of the **State of Hawaii Department of Transportation HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND PUBLIC WORKS CONSTRUCTION dated 1994 and the Counties** STANDARD DETAILS FOR PUBLIC WORKS dated September 1984 as revised, except as amended in the plans and/or specifications herewith. (Paragraphs concerning Measurements and Payments in the sections are not applicable to this project.) **Where recycled glass is available at a cost no greater than that of the equivalent aggregate, the aggregate base course and subbase course shall contain recycled glass as specified in Section 717.**

1. **Excavation & Embankment(Subgrade)** Section **203**

2. Aggregate Base Course ..... Section **304**

3. **Aggregate** Subbase Course..... Section **305**

4. Asphalt Concrete Pavement ..... Section **401**

   Mix shall be No. _____

5. **Tack Coat..... Section 407**

6. **Prime Coat..... Section 408**

7. **Aggregate..... Section 703**

8. **Water..... Section 712**

9. **Cullet and Cullet-Made Materials. Section 717**

NOTES TO ARCHITECT

If your job entails work in a street/highway right-of-way, ensure conformance with the following:

€ City streets - ordinances and standards of the City and County of Honolulu.

€ State and/or Federal - Aid highways - Standards of the State of Hawaii and/or the Federal Government, as applicable.

Delete reference to STANDARD DETAILS FOR PUBLIC WORKS if not applicable and no specific details are referenced.

If **aggregate** subbase course is not required due to soil and grading conditions, omit reference to it.

Design and designate **pavement section** thickness **(i.e. subbbase, base course and AC pavement)** on plans to suit wheel load and traffic conditions.

Tailor the use of these specifications to your job.

€ For asphalt concrete, use Mix No. **IV and** No. **V** for roads and parking areas **respectively**. Use Mix No. **V** for resurfacing of existing roads and parking areas. **Use Mix No. III for heavy**

NOTES TO ARCHITECT

traffic / delivery areas.

€ **Delete reference to Tack Coat and Prime Coat where not applicable to your project. See Note to Architect under paragraph 3.01 B.a. below.**

C. **Materials for p**laycourts, walkways and other foot traffic areas shall be in accordance with the following sections of the **State of Hawaii Department of Transportation HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND PUBLIC WORKS CONSTRUCTION dated 1994** as revised, except as amended in the plans and/or specifications herewith. (Paragraphs concerning Measurements and Payments in the sections are not applicable to this project.) **Where recycled glass is available at a cost no greater than that of the equivalent aggregate, the aggregate base course shall contain recycled glass as specified in Section 717.**

Design and designate **pavement section** thickness **(base course and AC pavement)** on plans to suit wheel load and traffic conditions.

Delete this paragraph if not applicable to your project.

1. **Excavation & Embankment(Subgrade)** Section **203**

2. Aggregate Base Course ..... Section **304**

3. Asphalt Concrete Pavement ..... Section **401**

   Mix shall be No. **V**

4. **Tack Coat..... Section 407**

5. Aggregate..... Section 703

6. Water..... Section 712

7. Cullet and Cullet-Made Materials. Section 717

The Mix. No. V is coarser than the Navy Tennis Court Mix. Therefore, a Finish Wearcoat shall be provided.

D. Finish wearcoat on playcourts shall be in accordance with Section 02535 - Play Surfacing.

Delete this paragraph if not applicable to your project.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The Contractor shall stake out the areas to be paved, using grade stakes on which the final finish elevations, base course and subgrade

Delete Paragraph B and/or C if not applicable to your project.

NOTES TO ARCHITECT

elevations are clearly marked. All such stakes and elevations shall be approved by the Engineer before any work is done.

B. Road and parking areas and playcourts, walkways and other foot traffic areas. Installation shall be in accordance with the applicable sections noted hereinbefore.

a. Application of the prime coat specified above over newly constructed base course will not be required where the longitudinal grade of the pavement is less than 8% or where the asphaltic concrete pavement thickness is greater than 4 inches.

Use of MC-30 Prime Coat: Elimination of the MC-30 under the conditions noted is in response to the impact of its objectionable odor, potential health hazards (especially w/ children) and the potential for the contamination of waterways in the event of runoff (e.g. the UH has prohibited the use of the MC-30 on some projects due to the objectionable odors). (cont. on following page)

Where a prime coat is provided, the contractor shall control runoff and protect adjacent work, property, utilities, waterways, etc. against damage. Damaged work, etc. shall be repaired and restored to their original condition at no additional cost to the State.

Use of MC-30 Prime Coat (cont.): The criteria for slope and pavement thickness noted is in accordance with guidance provided by the City & County of Honolulu. However, modify the paragraph to delete the MC-30 if project conditions warrant it (e.g. Even if the criteria noted requires the use of MC-30, delete its use where adjacent classrooms will be occupied during its application. In such cases, the Tack Coat should be used in its place.)

C. Finish wearcoat on playcourts shall be in accordance with Section 02535 - Play Surfacing.

D. Existing weed growth shall be treated with weed killer prior to paving. Weed killer shall be applied per the manufacturer's directions.

E. The Contractor shall notify the Engineer 24 hours in advance before application of weed killer.

3.02 REPAIR OF EXISTING A.C. PAVEMENTS

Any existing asphaltic concrete pavements including roads, playcourts and walkways that have been damaged by construction activities shall be repaired to the original condition and to the satisfaction of the Engineer. Damage done by heavy equipment, especially on roads and yards not stable for such equipment, shall be repaired to the original condition and to the satisfaction of the Engineer.

NOTES TO ARCHITECT

END OF SECTION

NOTES TO ARCHITECT

SECTION 02535 - PLAY SURFACING

PART 1 - GENERAL

1.01 GENERAL CONDITIONS:

As specified in Section 00700.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall ensure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Leveling Patch Mix: Shall consist of the following

5 parts	30 - 60 mesh silica sand
5 parts	Seal-Master Black Level-Master by Wikel Mfg. Co., Inc., or APOC AC Filler Coat Binder 330 by Asphalt Products Oil Co., or Laykold Resurfacer by Flintkote, or Huntseal Asphalt Emulsion or Park-Top Pavement by Western Colloid Products, or approved equal.
2 parts	Emulsified asphalt, Type SS-1
1 part	Water (Note: No water for Seal Master)

C. Sealer Compound: Shall be one of the following or an approved equal.

Product/Qty.	30-60 Mesh Silica Sand	SS-1h Emulsion Asphalt	Water
APOC AC Filler Coat Binder 300 55 gal.	450-600 lbs.	4-5 gal.	25-35 gal.
Huntseal Asphalt Emulsion			

55 gal.	450-600 lbs.	4-5 gal.	25-35 gal.
Laykold Resurfacer 55 gal.	450-600 lbs.	4-5 gal.	25-35 gal.

Product/Qty.	30-60 Mesh Silica Sand	SS-1h Emulsion Asphalt	Water
Seal-Master Black Level-Master 55 gal.	450-600 lbs.	4-5 gal.	25-35 gal.
Park-Top Pavement Sealer 55 gal.	450-600 lbs.	4-5 gal.	25-35 gal.

D. Wearcoat: Shall be green in color and one of the following, or an approved equal:

Produc/Qty.	60-90 Mesh Silica Sand	Water
Decoralt DecoColor Multi-Purpose Coating 920-27 30 gal.	12 lbs.	12 gal.
Laykold Colorcoat 200 Laykold Colorcoat 100 (mix equal parts) 30 gal.	-------	10-28 gal.
Play-on 30 gal.	100-125 lbs.	20-24 gal.
Plexipave, Plexichrome (mix equal parts) 30 gal.	-------	7-10 gal.
Seal-Master Color-Master Base Coat, Color-Master Top Coat (mix equal parts) 30 gal.	120-180 lbs. (90 mesh)	60 gal.

E. Navy Tennis Court Mix: Shall be specified in Section 02513 - Asphaltic Concrete Pavement.

F. Tack Coat: Tack coat bituminous material shall be one-part slow-setting emulsified asphalt, Type SS-1 which meets the requirements of AASHTO M-140 mixed with 5-parts water. Tack coat shall be applied to a previously bitumized surface or concrete base or other surface prior to the laying of asphaltic concrete for resurfacing or matching a new pavement or existing pavement.

PART 3 - EXECUTION

3.01 CLEANING: New asphalt shall be cured a minimum of 14 days prior to surfacing. New asphalt which becomes dirty shall be well cured before cleaning is attempted. Existing play surfaces shall be cleaned. All dirt and loose paint and aggregate shall be removed from the entire area to be surfaced by scraping, brooming and hosing from 2,500-3,000 psi spray water. Grease and oil shall be removed by brooming with a strong solution of detergent and water before hosing with water. (Color coated surfaces shall be etched in accordance with the manufacturer's directions when Seal Master is to be used.)

3.02 LEVELING: Court surface shall be leveled in accordance with the following procedure:

A. The entire area shall be flooded with water and allowed to drain for 20 minutes.

B. Any areas holding over 1/4" of water shall be marked, dried out, and leveled with U. S. Navy Tennis Court Mix.

C. Any areas holding water deep enough to cover a nickel (1/16") and up to 1/4" in depth shall be marked, dried out and leveled with the leveling patch mix. Level in lifts of 1/8" maximum depth each lift and allow to dry completely before applying succeeding lift.

D. Tack coat shall be applied over newly applied U.S. Navy Tennis Court Mix or Leveling Patch Mix prior to Sealer Compound application.

3.03 TACK COAT: After all areas are leveled, aplicationpply tack coat over entire court.

A. Tack coat shall not be applied when the surface to be treated is appreciably damp or when weather conditions are unsuitable.

B. Tack coat shall be uniformly applied by a pressure distributor or rubber faced squeegee with long handle at the approximate rate of fifteen hundredths (0.15) of a gallon per square yard.

C. Tack coat shall be placed only so far in advance of the surface course placement as is necessary for it to cure to the proper condition for placement of such surface course. Until the surface is placed, the Contractor shall protect the tack coat from damage.

3.04 SEALER COMPOUND APPLICATION:

A. Mixing shall be in conformance with manufacturer's recommendations.

B. Method of Application: Prior to the first application of patching compound, fog the surface with water from a hose to cool and dampen the surface. Do not allow any free water to remain. Additional water fog must be applied when the surface becomes dry as the squeegee work progresses, but only for the first application. Subsequent applications shall be made without fog.

Sealer compound shall be applied to the entire court by pouring from a can or a wheeled container in continuous parallel lines and spreading immediately with rubber-faced squeegees or with long-handled hair brooms. The squeegee or broom shall be pulled on an angle from the line of spread so as to continually

roll the materials toward the operator and not overflow or "spill" on its forward edge away from the operator. After each coat has dried, any ridges shall be removed with scrapers.

No application shall be covered by a succeeding application until thoroughly cured, dry to the touch and not scuffing under normal walking. Subsequent application shall be applied 90 degrees to the prior application.

C. Quantity of Application: Sealer compound shall be applied to the clean underlying surfaces in multiple applications, to obtain a minimum total quantity as specified by the manufacturer, but not to be less than 3 applications.

D. Rolling: After thorough drying, the final application of sealer compound shall be uniformly rolled. Rollers shall be power-driven machines weighing from 2 to 4 tons. Rollers shall not be left standing on the area at any time.

E. Finish: The controlling factor shall not be the number of applications, nor the quantity of sealer compound used (except that minimum application shall conform to manufacturer's recommendations but not less than 3) but it shall be the following specified result to be obtained:

After the final coat of sealer compound has been applied, rolled and allowed to dry thoroughly, its surface shall be smooth and uniform, showing no evidence of coarse or uneven texture, free of ridges, valleys and tool marks.

The completed and rolled surface shall not pond water anywhere to a depth greater than the thickness of a nickel (1/16") when flooded.

F. Protection: The finished surface shall be protected from traffic during all operations and until final acceptance of project.

3.05 WEARCOAT APPLICATION:

A. Mixing and Method of Application: Shall be as

specified under sealer compound except that wearcoat shall be applied on the clean, dry sealer compound surface.

B. Quantity of Application: Wearcoat shall be applied on the clean, dry underlying surface to obtain a minimum total quantity as recommended by the manufacturer, except that a minimum of two applications shall be made. No application shall be covered by a succeeding application until it is thoroughly cured, dry to the touch and will not scuff under normal pedestrian traffic.

C. Finish and Protection: Shall be as specified under Sealer Compound Application.

END OF SECTION

NOTES TO ARCHITECT

SECTION **02920** - LAWNS AND GRASS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

A. Furnish all labor, materials, equipment and tools for grass planting as specified herein. Grass shall be planted in areas indicated on the plans and as listed below:

1. All existing grassed areas that are damaged by construction operations;

2. Areas that are dug up for utility trenches;

3. Areas from which existing structures are to be removed;

4. Areas with "Contract Zone Limits" that are graded and covered with topsoil except areas designated for other plants; and

5. All other areas within "Contract Zone Limits" that are indicated on the plans to be graded, whether with the addition of screened soil or not, such as slopes of banks, etc.

For clarity, indicate on site plan all areas to be grassed so that there is no doubt as to the extent of new grassing. If necessary, draw a separate grassing plan. Do not use the term "Lawn Area".

Also, if project is adjacent to a road, indicate any unimproved parkway (area between curb and sidewalk) as a separate contract zone for grassing only.

Make sure that screened soil for general finish grading is specified in the EARTHWORK SECTION. The location and extent of screened soil shall be clearly defined. In general, screened soil is required over all graded area.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Grass shall be _____ _____. At the option of the Contractor, grass planting may be by seeds (plain seeding or by hydro-mulching) or by sprigs.

1. Grass seeds shall be fresh, hulled, and meet the following requirements:

Pure Seed 95.0% minimum
Crop Seed 1.0% maximum
Weed 0.5% maximum
Inert Material 5.0% maximum
Germination 85.0% minimum

Fill in name(s) of grass(es) to be used. Specify "Manienie" grass on flat areas and on banks with slopes up to 3:1. Do not specify Wedelia and Lippia grass for school projects. (For other than school projects, check with appropriate Project Coordinators).

For Hawaii District schools, specify only Australian Carpet Grass. Due to heavy rainfall and poor topsoil in most locations, manienie grass does not hold up.

NOTES TO ARCHITECT

Grass seeds shall be delivered to the site in unopened, sealed containers, labeled with the brand name and per cent purity. Labeling shall indicate that the seeds passed a certified germination test no more than 12 months prior to use.

2. Grass sprigs shall be healthy living runners and stolons, a minimum of 6 inches long with at least 3 nodes. After they are dug, they shall be covered and kept moist until planted.

For areas which will be in shade most of the time, such as under building overhangs, in building "nooks", or under large spreading trees with dense foliage, use the following:

In low, hot locales - Buffalo grass (Stenotaphrum secundatum). In high, moist locales-Centipede grass.

Zoysia, if used, shall be permitted only in parking lot medial strips. It shall not be specified for large areas because it is slow growing and expensive.

Modify entire specs as necessary when above grass types are used.

B. Fertilizer shall be pelleted and shall consist of the following percentages by weight of active ingredients:

1. For First Application:
   Nitrogen 16%
   Phosphate 16%
   Potash 16%

2. For Second Application:

   Nitrogen 16%
   Phosphate 16%
   Potash 16%

C. Mulch Materials

1. Mulch shall be specially-processed fiber containing no growth or germination-inhibiting factors. It shall be such that any addition and agitation in the hydraulic equipment with seed, fertilizer, water and other additives not detrimental to plant growth, the fibers will form a homogeneous slurry. When hydraulically sprayed on the soil, the fibers shall form a blotter-like ground cover which readily absorbs water and allows infiltration to the underlying soil.

2. Stabilizing and water retaining agent for hydro-mulching option only shall be "Verdyol Super", "Ecology Control M-Binder" or approved equal. Rate of application of "Verdyol Super" shall be 50 lbs./acre and that for "Ecology Control M-Binder shall be 60 lbs./acre.

NOTES TO ARCHITECT

D. Organic Soil Conditioners: **Organic amendments shall be brown, gray, or black in color. It shall be free of live seeds, cuttings, fungus, spores and foul odor. It shall also not contain resins, tannin or other materials in quantities that would be detrimental to plant life.**

Soil conditioner shall be one, or a combination of the following:

1. Burnt bagasse mix shall be a mixture of sugar cane ash, aged sugar cane trash and milled forest waste products.

2. Redwood shavings shall be a nitrogen-stabilized compost of redwood material passing through a 1/2" screen.

3. Peat Moss.

4. Shredded hapuu shall be finely shredded hapuu fern.

5. **Macadamia nut husks shall be air-classified fine husk, sifted through a 1/4" screen and free of shells.**

6. **Composted green waste shall be stabilized compost of recycled green waste material passing through a 1/2" screen. The material shall not contain any treated or painted woods.**

E. Screened soil for repair work shall be a fertile, friable soil of loamy character, and shall contain organic matter. It shall be obtained from well-drained arable land; be free from weeds, stone and debris; and shall pass a maximum l/2" screen. Screened soil shall be capable of sustaining healthy plant life. See Paragraph 3.01.D.5. for application.

Since it is difficult and/or very expensive to obtain good soil in the Hilo and Kona areas, contact the appropriate Project Coordinator for guidance. This also applies to screened soil for finish grading which is specified in the Earthwork Section.

F. Water shall be potable.

PART 3 - EXECUTION

NOTES TO ARCHITECT

3.01 INSTALLATION AND WORKMANSHIP

A. Site Preparation:

1. Placement of screened soil is specified under "Earthwork" Section. The Contractor shall accept the condition of the site prior to starting work.

2. Before soil conditioning and tilling is started, weeds and other obnoxious vegetation shall be removed by manual or chemical methods.

3. Soil Conditioning and Tilling: The Contractor shall notify the Engineer one day before this work is to be done.

A _____ layer of organic soil conditioner shall be placed over all planting areas. The material shall then be roto-tilled a minimum of 2" into the existing soil until the latter is loose and fine textured. All rocks larger than 1" in diameter and all debris such as stumps, roots, wire, grade stakes and other rubbish that are turned up by tilling shall be removed. Tilling shall be omitted on slopes where watering is likely to wash the soil away.

Insert recommended thickness of organic soil conditioner layer. (Max. - 2"; min. - 1".)

4. Leveling: Any undulations or irregularities in the surface resulting from tilling or other operations shall be leveled out before planting operations are begun.

B. Planting: The Contractor shall notify the

NOTES TO ARCHITECT

Engineer one day before planting of grass.

1. Immediately prior to planting operations, all planting areas shall be cleared of weeds, debris, rocks over 1" in diameter and clumps of earth that will not break up.

2. Option by Grass Seeding: If grass seeds are used, the following procedure shall be used (NOTE: Contractor should exercise caution in seeding slopes where seeds may be washed away):

   a. The grass seeds shall be broadcast uniformly by hand or by sowing equipment at the rate of 100 lbs./acre. Half the seeds shall be sown with the sower moving in one direction and the remainder shall be sown at right angles to the first direction.

   b. The surface shall then be raked to a smooth even plane while the seeds are simultaneously worked into the soil to a depth of about 1/2".

   c. The surface shall then be smoothed and compacted by means of a culti-packer, roller or other similar equipment weighing 60 to 90 pounds per lineal foot of roller.

   d. The planted area shall then be watered sufficiently to provide water penetration to a depth of at least 2" and shall then be kept moist until roots are established.

3. Option by Grass Sprigging

   a. Furrows shall be placed perpendicular to drainage aisles and parallel to contours on slopes and shall be spaced no more than 4" apart.

   b. Fresh sprigs shall be planted in each furrow a maximum of 6" apart and covered with soil to a minimum depth of 2".

c. The surface shall then be smoothed and compacted by means of a culti-packer, roller or other similar equipment weighing 60 to 90 pounds per lineal foot of roller.

d. The planted areas shall be watered immediately after rolling in sufficient quantity to provide water penetration to a depth of at least 2" and shall then be kept moist until roots are established.

e. The area shall then be overseeded with annual rye grass seeds at the rate of 25 pounds per acre.

4. Option by Hydro-Mulching of Grass Seed: This work shall consist of furnishing and applying hulled Bermuda seed, fertilizer, mulch and stabilizing and water retaining agent by hydro-mulching.

a. The seeds shall be applied at the rate of 100 lbs./acre minimum. Mulch shall be applied at a rate of 500 lbs./acre minimum (31 lbs. per 900 sq. ft.). In every application, complete and uniform coverage of the soil shall be attained.

b. First application of fertilizer shall be included with mulch and seed.

c. The hydro-mulch equipment shall be capable of mixing all the necessary ingredients to a uniform mixture and to apply the slurry to provide uniform coverage. Seed, fertilizer, mulch mix and stabilizing water retaining agent shall be applied in one operation by hydraulic equipment made specifically for this use. The equipment shall have a built-in agitation system with an operating capacity sufficient to keep the mix in uniform distribution until pumped from the tank. Distribution and discharge lines shall be large enough to prevent stoppage and shall be equipped with hydraulic discharge spray nozzles which provide a uniform distribution of the slurry.

NOTES TO ARCHITECT

d. Areas inaccessible to hydro-mulching application shall be seeded or hand sprigged and fertilized by approved hand methods.

e. Water shall be applied immediately following mulching and the planted area shall then be kept moist until roots are established.

C. Application of Fertilizer: The Contractor shall notify the Engineer one day before application of fertilizer.

1. Fertilizer shall be distributed uniformly over the planted area.

2. The first application of fertilizer shall be applied at the rate of 300 pounds per acre about 2 weeks after grassing and shall be followed by watering. (First application of fertilizer if using hydro-mulching option shall be mixed with the seeded mulch.)

3. The second application of fertilizer shall be applied at the rate of 300 pounds per acre about 1 week before the end of the maintenance period and shall be followed by watering.

D. Maintenance:

1. General: The Contractor shall be responsible for the proper care of the grassed areas. Maintenance shall include watering, weeding, moving, repairing, regrassing and protection, and shall be required until the entire project is accepted, but in any event for a period not less than _____ days after planting of grass.

Specify maintenance period: 60 days for 1st increment or large areas; 45 days for 2nd increment or smaller areas.

2. Watering: After planting of seeds or grass sprigs or mulching the ground shall be watered as deemed necessary by the Contractor to establish a healthy growth. Watering shall be done in a manner that will prevent erosion due to the application of excessive quantities of water, and the watering equipment shall be of a type that will prevent damage to the finished surface.

3. Weeding: Weeds shall be uprooted and removed completely and in no case shall they be

allowed to grow and propagate more seeds. Large holes caused by weeding shall be filled with screened soil and raked level.

4. Mowing: Grass shall be mowed to a height of 1" whenever the height of grass becomes 1-1/2".

5. Repairing and Regrassing: When any portion of the surface becomes gullied or otherwise damaged and grass has failed to grow, such areas shall be repaired with screened soil and replanted with grass. Any area of one foot square or more in which grass has failed to grow after 30 days of maintenance shall be regrassed.

6. Protection: The grassed areas shall be protected against traffic so that the grass establishes a healthy growth. Grassed areas damaged by traffic shall be replanted.

3.02 ACCEPTANCE OF GRASSING

A. At the time of acceptance, the grass shall have been well-established and shall be given a final weeding and a final mowing to a height of 1 inch. If the maintenance period has expired before acceptance of the entire project, the Contractor shall continue to maintain the grass until acceptance of the entire project. If the maintenance period should extend beyond acceptance of the entire project, the Contractor shall continue to maintain the grass until the end of the specified period of time required for maintenance.

B. At the end of the maintenance period, should there appear areas where grass has failed to grow, such areas shall be replanted with grass, refertilized and maintained beyond the maintenance period until a healthy growth is established.

END OF SECTION

NOTES TO ARCHITECT

NOTES TO ARCHITECT

Add to specifications as necessary if other finishes are to beused.

SECTION 03100 - CONCRETE FORMWORK

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00800.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

B. Plywood shall be commercial-standard Douglas Fir, moisture resistant concrete form plywood not less than 5-ply and at least 5/8" thick.

C. Metal forms may be used if they will produce surfaces equal to those specified for wood forms.

D. Forms of other materials shall not be used unless approved by the Engineer.

E. Metal clamps and ties shall be used. Form ties for exposed concrete shall be removable either completely or to a minimum depth of 1" from the face of the concrete.

PART 3 - EXECUTION

3.01 TOLERANCES

A. Forms shall be constructed so that the concrete surfaces do not deviate from established lines, grades and dimensions in excess of the tolerances listed below:

1. Variations from plumb:

a. In the lines and surfaces of columns, piers, walls, and in arrises:

In any 10 ft. of ht.:	1/4"
Max. for the entire ht. of structure:	1"

b. For exposed corner columns, control-joint grooves, and other conspicuous lines:

In any 20 ft. of length	1/4"
Max. for the entire length	1/2"

2. Variation from the level or from the grades specified in the contract documents:

a. In slab soffits, ceilings, beam soffits and in arrises, measured before removal of supporting shores:

In any 10 ft. of length	1/4"
In any bay or in any 20 ft. length	3/8"
Max. for the entire length	3/4"

b. In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:

In any bay or in 20 ft. length	1/4"
Max. for the entire length	1/2"

3. Variation of the linear building lines from established position in plan and related position of columns, walls and partitions:

In any bay	1/2"
In any 20 ft. of length	1/2"
Max. for the entire length	1"

4. Variation in the sizes and location of sleeves, floor openings, and wall openings:

Plus or Minus	1/4"

5. Variation in cross-sectional dimensions of columns and beams and in thickness of slabs and walls:

Minus	1/4"
Plus	1/2"

6. Footings: Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items:

   a. Variations in dimensions in plan:

Minus	1/2"
Plus	2"

   b. Misplacement or eccentricity:

2% of the footing width in the direction of misplacement but not more than	2"

   c. Thickness:

Decrease in specified thickness	5%
Increase in specified thickness	No Limit

7. Variation in steps:

   a. The largest tread run within any flight of stairs shall not exceed the smallest by more than 3/8". The greatest riser height shall not exceed the smallest by more than 3/8".

3.02 INSERTS, FASTENING DEVICES AND CONDUITS

NOTES TO ARCHITECT

A. Install inserts, reglet strips, hangers, metal ties, anchors, bolts, nailing strips, blocking, grounds and other fastening devices as required for attachment of other work. Properly locate all embedded items in cooperation with other trades and secure in position before concrete is placed.

Be sure to show all embedded items on plan details, including nailing strips for roofing as required for roof decks having high slopes (2' per foot and up).

B. All electrical and mechanical conduits and fittings shall be located such that they do not impair the strength of the concrete member and shall be subject to acceptance by the Engineer. Conduits referred to in the items below include pipes, ducts, and electrical conduits. Conduits and fittings shall conform to the following, unless shown on structural drawings:

1. Concrete Columns:

   a. Electrical conduits and other pipes and fittings may not be embedded in a column if they will displace more than 4% of the cross-sectional area of the column.

   b. Conduits in columns shall not be larger in outside diameter than 1/3 the least dimension of the column.

2. Concrete Walls:

   a. Conduits larger than 1-inch outside diameter shall not be embedded vertically in any wall. Conduits shall be spaced a minimum of 10 times outside diameter and shall be placed in the middle of the wall thickness.

   b. No conduits shall be embedded horizontally in any wall, lengthwise.

   c. Conduits passing through walls shall not impair the strength of the wall and shall be provided with Schedule 40 galvanized steel pipe (ASTM A 53) sleeve.

Coordinate all electrical and mechanical conduits, ducts, fittings and fixtures embedded in or penetrating structural members. Show and properly reinforce all major embedded items and penetrations on the structural drawings. Check structural integrity when allowing horizontal runs in beams and walls. For thin toppings, check clearances with rebar and also for possible cracking. Modify guidelines to meet specific job requirements.

3. Concrete Beams:

   a. Conduits larger than 1-1/2 inches outside diameter shall not be embedded vertically in any beam. Conduits embedded vertically shall be spaced a minimum of 10 times outside diameter and shall be placed in the middle third of the beam thickness.

   b. No conduits shall be embedded horizontally in any beam lengthwise.

   c. Conduits passing through beams shall not impair the strength of the beam and shall be provided with Schedule 40 galvanized steel pipe (ASTM A 53) sleeve.

4. Suspended Concrete Slabs and Toppings:

   a. Conduits larger than 1 inch outside diameter shall not be embedded in any concrete slab or topping. Conduits shall be spaced a minimum of 10 times outside diameter. Conduit crossings shall be avoided.

   b. Conduits passing through slabs shall be provided with Schedule 40 galvanized steel pipe (ASTM A 53) sleeve.

5. Concrete Slabs on Grade:

   a. Conduits shall not be embedded within the thickness of any concrete slab on grade.

   b. Conduits may be placed in the subgrade

below the bottom surface of slabs on grade, but not within the thickness of the basaltic termite barrier.

C. Where a number of pipes are intended to penetrate a structural member at a location which may unduly impair the strength of the member, such as near the face of a column, the Engineer shall be informed and his approval must be obtained before concrete is placed.

D. The Contractor shall coordinate the installation of all embedded items and penetrations. Cost of any added reinforcement required at pipe and conduit penetration and embedment shall be borne by the Contractor.

3.03 CONSTRUCTION OF FORMS

A. All concrete forms shall be placed with metal clamps and ties. Locate ties level and plumb in horizontal rows and vertical tiers.

B. Where soil conditions will permit excavation to accurate sizes without bracing, side forms for footings may be omitted only if approved by the Engineer.

C. Temporary access openings to forms for cleaning prior to depositing of concrete shall be provided.

D. Unless otherwise called for on the plans, all exposed concrete surfaces and/or all surfaces designated as "Architectural Concrete" on the plans shall be formed with plywood. The arrangement of the plywood sheets shall be orderly and symmetrical and shall be of 4' x 8' size wherever practicable.

Add to specifications as necessary if other finishes are to be used.

Only new or unmarred plywood shall be used. A 3/4" by 3/4" chamfer shall be provided at external corners of exposed concrete beams, girders, columns and pilasters unless otherwise indicated on the plans. Metal forms may be used if they will produce surfaces equal to those specified for wood forms.

E. Rough concrete finish may be used for all

unexposed concrete surfaces as indicated in Section 03300 or on the plans. Rough concrete finish shall be obtained by using clean, straight lumber or metal forms.

F. Forms for architectural concrete surfaces or on exposed surfaces which are to receive a finishing material shall be either wetted thoroughly immediately before placing concrete or coated with a bond-breaking material compatible with the finishing material and/or its adhesive prior to the placement of reinforcing steel. Forms for unexposed surfaces may be coated with form oil. However, any surplus oil on the form surfaces and any oil on the reinforcing steel shall be removed by wiping with dry rags.

G. Forms which cannot be removed shall be of material other than wood and must be approved by the Engineer.

H. All forms other than for the non-removable form described under the preceeding subparagraph shall be constructed so that they can be removed without hammering or prying against the concrete.

I. Forms shall not be removed before the expiration of the minimum lapsed time from concrete pour shown below unless information and/or data justifying a request for a shorter period is submitted to and approved by the Engineer. Even with such approval, however, the Contractor shall be fully responsible to repair any damages which may result from the early removal.

Bottom forms of beams and girders	14 days
Walls, columns and side forms of beams	3 days
Footing side forms	24 hours
Bottom forms of slabs	14 days

No construction loads exceeding the structural design live loads shall be supported upon any unshored portion of the structure under construction. No construction load shall be supported upon, nor any shoring removed from any part of the structure under construction until the portion of the structure has attained sufficient strength to support safely its weight and the loads placed thereon. This strength may be demonstrated by job-cured test specimens and by a structural analysis considering the proposed loads in relation to this test strength. Such analysis and test data shall be furnished by the Contractor to the Engineer.

J. To maintain the tolerances specified in Paragraph 3.01, the formwork shall be cambered to compensate for anticipated deflections in the formwork prior to hardening of the concrete.

K. Screeds for slabs:

1. Edge forms and intermediate screed strips shall be set accurately to produce the designated elevations and contours of the finished surface, and shall be sufficiently strong to support vibrating screeds or roller pipe screeds if the nature of the finish specified requires the use of such equipment.

   The concrete surface shall be aligned to the contours of screed strips by the use of strike-off templates or approved compacting type screeds. Screeds shall be set adjacent to all walls and in parallel rows not to exceed 8 feet o.c. Penetrations of the moisture barrier shall be held to a minimum.

2. At walks, screeds shall be set at the sides to serve as forms and additional screeds, if required, shall be spaced not exceeding 8 feet o.c.

END OF SECTION

NOTES TO ARCHITECT

SECTION 03200 - CONCRETE REINFORCEMENT

Design your project using the "soft" metric system for reinforcing steel (as described under ASTM A 615 / A 615M) and indicate "soft" metric sizes on the drawings.

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 SUBMITTALS

Submit certified mill test results or laboratory test results for all reinforcing steel indicating the following: bar size; yield strength; ultimate tensile strength; elongation and; bend test. Rebar chemical composition shall be provided for rebars which are to be welded.

Delete for other than Seismic Zone 3 and 4 facilities. **(Req'mt source: UBC(1994) 1921.2.5.1)**

PART 2 - PRODUCTS

2.01 MATERIALS

A. Reinforcing steel shall be deformed bars conforming to ASTM A 615 **/ A 615M**, grade as shown on plans.

B. Welded wire fabric for concrete reinforcement shall conform to ASTM A185 and shall be galvanized.

C. Accessories such as spacers, chairs, ties, and other devices necessary for properly placing, supporting and fastening reinforcement in place shall be provided. Annealed steel wire of not less than 16-gauge shall be used to secure reinforcement.

Indicate grades of steel to be used in plan general notes (**e.g. Grade** 40 for stirrups and tie**s**, **Grade** 60 or 75 for main reinf.). In addition, when rebars are to be welded, specify reinforcing steel conforming to ASTM A706 or ASTM A 615 **/ A 615M** with preheat**, and other applicable criteria. Note: The ASTM A 615 / A 615 M std. does not include specific provisions to enhance the weldability of the steel. Therefore, when welding of steel conforming to this std. is permitted, refer to the ASTM std. for recommendations and requirements.**

PART 3 - EXECUTION

3.01 TOLERANCES

A. Bars used for concrete reinforcement shall meet the following requirements for fabricating tolerances:

Sheared length: ±1 inch

Depth of truss bars: +0, -1/2"

Delete reference to welded wire fabric when

NOTES TO ARCHITECT

concrete toppings not used.

Overall dimensions of stirrups, ties, and spirals: ±1/2"

All other bends: ±1 inch

B. Bars shall be accurately placed and adequately supported before the concrete is placed and shall be secured against displacement within the following tolerances:

Minimum distance between bars: -1/4"

d	**Tolerance on d:**	**Tolerance on the minimum concrete cover:**
d € 8"	**± 3/8"**	**-3/8"**
d > 8"	**± 1/2"**	**-1/2"**

Where d = Distance from the extreme compression fiber to the centroid of tension reinforcement.

<u>Exception</u>:

1. **The tolerance for the clear distance to formed soffits (exposed underside of beams and slabs)shall be -1/4".**

2. **The tolerance for cover shall not exceed minus one-third the minimum concrete cover required under Section 3.02 H.**

Longitudinal location of bends and ends of reinforcement: ± 2" except at discontinuous ends of members where tolerance shall be ± 1/2".

Spacing of repetitious bars in walls and slabs: ± 2" except where openings, inserts and embedded items might require some additional shifting of bars. The total number of bars specified shall be maintained.

Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved

NOTES TO ARCHITECT

more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangement of bars shall be subject to approval by the Engineer.

3.02 REINFORCEMENT

A. Reinforcing steel bars, wire and wire fabric shall be provided in the sizes, lengths and configurations as indicated on plans and shall be thoroughly cleaned, before placing, of loose mill scale, loose flaky rust, oil, and all coatings that will destroy or reduce bond. If necessary, they shall be cleaned again before placing of concrete. All items shall be fabricated, positioned and secured in place as indicated in the plans and as herein specified. Annealed steel wire shall be used to secure reinforcement.

Delete reference to welded wire fabric when concrete topping is not used.

Reinforcement shall be placed in specified positions not exceeding the tolerances listed in Sub-section 3.01. Unless otherwise noted, cleaning, bending and placing of reinforcement shall be done in accordance with the standard practice of the Concrete Reinforcing Steel Institute.

B. Concrete or metal support and spacers shall be used to secure the proper spacing of reinforcement over formwork. Stirrups shall be accurately and securely wired to the bars at both top and bottom. At slabs, footings and beams in contact with earth, pre-cast concrete blocks (not bricks or hollow tile) or chairs shall be used to hold reinforcement at a proper distance above earth.

C. Bars shall be tied at all intersections, and distances from forms shall be maintained by means of pre-cast concrete blocks, ties, hangers, chairs or other approved supports.

D. Bars shall be bent cold to the shapes shown on the plans. Bends shall be made around a pin having a diameter not less than 6 times the bar diameter except that for bars of larger than 1 inch diameter the pin diameter shall be 8 times the bar diameter. If required, bars may be bent in the field using a "hickey" bar.

NOTES TO ARCHITECT

E. All reinforcing steel bars shall be furnished in the lengths indicated on the plans. Splicing of bars, except where shown **or indicated**, will not be permitted without the approval of the Engineer. Splices where permitted shall be staggered as far as possible, wired together in such a manner as to maintain the clear depth of the member and the minimum clear distance to the surface of concrete. Unless otherwise shown on the plans, splices shall be lapped in lengths as follows:

Specify submittal of shop drawing only if absolutely required by structural engineer.

Modify lap requirement to suit your job conditions. If all lap requirements are to be shown on drawings, delete given lengths and modify paragraph to read, "...and shall be lapped (in lengths as follows) as shown on the structural plans." (Delete bracketed phrase and add underlined phrase.)

#**36** bars and smaller	48d or 24 inches, whichever is larger.

Welded splices only shall be used **where shown on the structural drawings and where permitted by the Engineer**.

Welding shall conform to **ANSI/**AWS D1.4, Structural Welding Code - Reinforcing Steel. The Contractor shall notify the Engineer 48 hours prior to making any welded splices.

Change length of splice to suit the grade of steel used.

F. Vertical bars in columns shall be offset at least one bar diameter at splices.

Indicate where welded splices will be allowed on the drawings.

G. Unless permitted by the Engineer, reinforcement shall not be bent after being partially embedded in hardened concrete. Improperly and/or excessively bent bars shall be replaced.

H. Minimum concrete protective covering for reinforcement, except for extremely corrosive atmosphere, other severe exposures, or fire protective covering shall be as follows:

In corrosive environments or severe exposure conditions, the amount of concrete protection shall be increased to provide the necessary protection.

Concrete cast against and permanently exposed to earth..... 3"

Concrete cast against earth and deposited below the water table..... 6"

Formed concrete in contact with the earth or exposed to the weather: (except not less than 1-1/2 times the maximum size of aggregate for column

NOTES TO ARCHITECT

spirals or ties)
#16 or smaller..... 1-1/2"
#19 - #57..... 2"

Formed concrete not exposed to the weather or in contact with the ground:
Slabs, walls and joists:
#36 or smaller..... 3/4"
#43 and #57..... 1-1/2"
Beams, girders and columns
Primary reinforcement, ties, stirrups, spirals..... 1-1/2"

I. Dowels (minimum #**10** @ 24 inches o.c. unless otherwise shown in the plans) shall be installed in all concrete to which masonry walls abut.

Provide typical detail on plans. Dovetail anchors shall not be used.

J. All reinforcement shall be inspected and approved by the Engineer prior to the closing of forms. This approval, however, shall not be construed to relieve the Contractor of his responsibility to place all reinforcement in accordance with the plans.

END OF SECTION

NOTES TO ARCHITECT

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Resilient flooring and accessories, including floor leveling and patching compounds and testing for moisture and alkalinity is provided under SECTION 09650 - RESILIENT TILE FLOOR.

1.03 STORAGE OF MATERIALS

A. Cement and aggregates shall be stored in such a manner as to prevent their deterioration or the intrusion of foreign matter. Any material which has deteriorated or which has been damaged shall not be used for concrete and shall be promptly removed from the site.

1.04 TESTS

A. Slump: Standard slump tests as described in ASTM C143 (Modification: Sampling of concrete for slump test shall be taken after at least 1/4 cubic yard of concrete has been discharged) will be made periodically during the placement of concrete by the Engineer to ensure that the slump for which the concrete has been designed is met. Any concrete batch tested and showing slumps exceeding the specified tolerance shall be rejected. Any concrete placed prior to slump testing shall be the sole responsibility of the Contractor and shall be rejected should the subsequent slump test of the batch in question indicate that the slump tolerance is being exceeded. All rejected concrete shall be promptly removed and properly replaced. All costs resulting therefrom shall be borne by the Contractor.

B. Compressive Strength: During the progress of the work, compressive strength tests of concrete shall be made **by the Engineer. The number of strength tests of each class of concrete placed each day shall be no less than:**

a. One per day, nor less than,

The use of this specification must be tailored to your job. This specification covers normal weight concrete, not lightweight structural concrete nor prestressed concrete members.

The intent of the specified requirements regarding concrete strength, water-cement ratio and entrained air is to provide concrete slabs-on-grade with a max. vapor transmission level of 5#/1000 s.f. which is acceptable for resilient tile flooring installation. If other flooring materials having a lower vapor transmission level requirement is to be used (e.g. sheet vinyl flooring), the consultant shall amend the specifications as necessary to attain the necessary vapor transmission resistance level.

However, since moisture related flooring problems are not experienced on all projects, the consultant shall verify if the project is located in an area which has experienced such problems in the past. If not, the specification should be amended to reduce the concrete

NOTES TO ARCHITECT

b. One for each 150 cubic yards of concrete placed, nor less than,
c. One for each 5,000 square feet of surface area of slabs or walls placed.

strength to 3,000 psi w/o the addition of entrained air.

If the total volume of concrete is such that the frequency of testing as required above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.

If the total quantity of concrete placed on a project is less than 50 cubic yards, the Engineer may waive the strength tests.

1. **A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete tested at 28 days or at the test age designated for determination of compressive strength. The strength of an individual class of concrete shall be considered satisfactory if both of the following criteria are met:**

   a. No single strength test (i.e. the average of the strengths of two cylinders) shall be more than 500 psi below the specified compressive strength; and

   b. The average of any three <u>consecutive</u> strength tests shall be equal or greater than the specified compressive strength.

2. The Engineer will make and identify all test cylinders. The Contractor shall provide the equipment, such as a shovel and a wheelbarrow for the Engineer to make and move the cylinders, and shall also provide the labor and equipment to deliver the cylinders to the testing laboratory as directed by the Inspector.

3. Cost of testing will be borne by the State.

4. The standard age for testing the cylinders shall be 28 days. However, 7-day tests may be made for indication of final 28-day strengths.

5. All cylinders shall be made and cured in accordance with ASTM C31.

6. In all cases where the strength **level** of any **class** of **concrete** falls below the minimum compressive strength specified, the Engineer shall have the right to require that test specimens be cut from the structure. Specimens shall be selected by the Engineer from the location in the structure represented by the test specimen or specimens which failed.

   Specimens shall be secured, prepared, and tested in accordance with ASTM C42 within a period of 60 days after placing the concrete. The testing shall be done by a laboratory approved by the Engineer. Concrete in the area represented by the core tests will be considered structurally adequate if the average strength of 3 cores is no less than 85% and the strength of a single core is no less than 75% of the 28-days strength specified. Should laboratory analysis indicate, however, that the proper concrete mix has not been used by the Contractor, all such concrete placed using the improper mix shall be subject to rejection. The cost of cutting specimens from the structure, patching the resulting holes, and making the analysis, including laboratory and consultation costs, shall be borne by the Contractor.

   The holes from which the cored samples are taken shall be packed solid with no-slump concrete proportioned in accordance with the ACI 211.3 "Standard Practice for Selecting Proportions of No-Slump Concrete". The patching concrete shall have an "extremely dry" consistency and the same design strength as the specified concrete.

NOTES TO ARCHITECT

7. If the strength of the specimens cut from the structure falls below the requirements stipulated above, the Engineer shall have the right to require any and all defective concrete to be replaced, and all costs resulting therefrom shall be borne by the Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

Change designation of cement type to fit design.

A. Portland Cement shall conform to the requirements of ASTM C150, Type I, for all concrete work.

B. Concrete Aggregates:

1. Fine Aggregates shall be calcareous or basalt sands, or a combination thereof. They shall meet the grading requirements of ASTM C33 unless the concrete producer can provide past data that shows that a proposed non-conforming gradation will produce concrete with the required strength and suitable workability.

If manufactured sands are used in the concrete mix, the Contractor may select and use a water-reducing and/or an air-entraining admixture as specified hereinafter to provide satisfactory workability in the concrete. The cement content of a mix shall be as specified hereinafter, and the use of an admixture shall in no way result in the reduction of the cement factor.

2. Coarse Aggregates shall be crushed close-grained, blue lava rock meeting the grading requirements of sizes 57 or 67 (ASTM D448) or both. The maximum size of aggregate shall not be larger than 1/5 of the narrowest dimensions between sides of the forms of the member for which the concrete is to be used nor larger than 3/4 of the minimum clear spacing between individual reinforcing bars

or bundles of bars.

C. Water used in mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials or other substances that may be deleterious to concrete or reinforcement. Non-potable water shall not be used.

D. Concrete Splash Blocks shall be standard units, 12" x 16" x 4" thick.

Specify appropriate ASTM designation for expansion joint filler and sealing compound where material other than that shown is used.

E. Expansion Joint Filler: A pre-molded material of 1/2" thickness, unless otherwise noted, composed of fiberboard impregnated with asphalt conforming to ASTM D 1751.

F. Joint Sealing Compound shall be a polysulfide or urethane compound conforming to ASTM C 920 or other approved equal, compatible with the floor finish to be applied. Color to be selected by the Engineer.

G. Bond-Break Filler: Mineral-surfaced roofing cap sheet or coated asphalt felt.

Delete paragraph where colored concrete finish is not being provided.

H. Colored Concrete shall be obtained by the application of a dry powder or approved equal pigment into fresh concrete slabs.

I. Non-Slip Grit shall be an abrasive aggregate of silicon carbide or aluminum oxide.

J. Admixture, if used, shall conform to ASTM C494 or ASTM C260 and shall be mixed in proper amount in accordance with directions of manufacturer.

K. Curing Compound shall be compatible with the floor finish to be applied. Unless otherwise required by the floor finish, the compound shall conform to the requirements of ASTM C 309.

L. Pervious Sheeting shall be burlap or other acceptable absorbent material, free from substances that will harm the concrete or cause discoloration.

M. Moisture Barrier shall be of Polyethylene film, minimum 0.010" thick.

NOTES TO ARCHITECT

N. "Keyed Kold Joint" shall be galvanized.

O. Cementitious Coatings shall be cement based polymer modified cement finishing materials ("Pro-Finish" by Bonded Materials Company, "Polycoat" by Tremcrete Systems Incorporated, "Durus" by Durus High Tech Cement, or approved equal).

P. Engineered Synthetic Fiber Reinforcement shall be 100% virgin polypropylene fibrillated fibers containing no reprocessed olefin materials. Fibers shall have a specific gravity of 0.91, and specifically manufactured to an optimum gradation and length for use as concrete secondary reinforcement. Fiber reinforced concrete shall meet the requirements of ASTM C-1116, Type III, Synthetic Fiber-Reinforced Concrete or Shotcrete.

PART 3 - EXECUTION

3.01 DESIGN OF CONCRETE MIXES

A. Ingredients for concrete shall be Portland cement, fine and coarse aggregates and water.

B. Normal weight concrete shall meet the requirements outlined in Subsection C, D and E below.

C. Concrete shall be designed so that the concrete materials will not segregate nor cause excessive bleeding. Slump shall be 4 inches. A tolerance of 1" above the indicated slump will be allowed for individual batches.

For concrete used in ramps or other sloping construction, the slump tolerance shall be waived.

D. Slabs-on-grade shall have a maximum water-cement-ratio of 0.50 and shall contain 4% ± 1-1/2% entrained air.

Modify this paragraph and specify appropriate slumps to suit job requirements. Consider workability, especially on slabs, narrow members and flatwork. For mix designs with high range water reducers, specify maximum slump with added restriction that no segregation occurs.

For severe exposure conditions, provide appropriate water/cement ratio controls.

NOTES TO ARCHITECT

E. For concrete designed for specified strengths in excess of 4,500 psi and/or containing admixtures other than those used exclusively for the purpose of entraining air, mixture proportions to provide the desired characteristics shall be developed in accordance with Sections 5.2, 5.3 and 5.4 of ACI 318-89.

F. The Contractor shall submit for approval by the Engineer the mixes he intends to use at least 14 days before the actual concrete placing operations.

Note classes of concrete to be used on plans.

G. The Contractor shall use only approved mixes.

H. Unless otherwise noted, Class 4,500 concrete shall be used for slabs built on-grade, Class 3,000 concrete for all non-prestressed structural slabs, beams, piers, columns, stairs, walls, footings and equipment pads above ground; Class 2,500 concrete for sidewalks, equipment pads on grade, and other uses not included under the Classes noted above.

For slabs-on-grade, the contractor may use a mix design other than that described above provided the vapor emission rate is equal or less than 5 lbs. per 1000 s.f. at the time of the finished flooring installation. If the vapor emission rate exceeds this limit, the Contractor shall be responsible to take the measures necessary to reduce the emission to an acceptable level without delaying the project.

I. Engineered Synthetic Fiber Reinforcement shall be added to all concrete sidewalks on grade.

3.02 JOINTS

A. Construction joints shall be provided as detailed at locations indicated on the plans. Construction joints not shown on the plans shall be so made as to least impair the strength of the structure and shall be approved by the Engineer. In general, they shall be located near the middle of the spans of slabs, beams and girders unless a beam intersects a girder at this point, in which case the construction joints in the girders shall be offset a distance equal to twice the width of the beam. Joints in

columns and walls shall be at the underside of floors, slabs, beams or girders and at the top of footings or floor slabs. Beams, girders, brackets, column capitals, haunches and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

B. All reinforcing steel shall be continuous across construction joints. Keys and/or inclined dowels shall be provided as required. Longitudinal keys at least 1-1/2" deep shall be provided in all joints in walls and between walls and slabs or footings. Unless otherwise indicated, joints shall be sealed with joint sealing compound.

Locate and detail expansion joints on plans.

C. Expansion joints shall be provided as detailed at locations indicated on the plans. Reinforcement or other embedded metal items bonded to the concrete (except dowels in floors or walls bonded on only one side of joint) shall not be permitted to extend continuously through any expansion joint. Joints shall be sealed with expansion joint filler and sealing compound at least 3/8" deep.

Location of control/contraction joints shall be in accordance with ACI 302.1. Indicate location on plans.

D. Contraction/control joints shall be provided where shown on the plans and shall be 1/4 the depth of the slab or a minimum of 1" deep. Unless otherwise indicated on the plans, joints may either be tooled, formed-in-place or sawcut. When saw-cut joints are provided, cutting shall be timed properly with the set of the concrete so that it is firm enough not to be torn or damaged by the cutting blade and before random shrinkage cracking can form in the slab. In any case, cutting shall be completed not later than 12 hours after the concrete is placed and finished. Unless otherwise indicated on the plans, joints shall be sealed with joint sealing compound.

Modify paragraph to provide type of control joint applicable to your project. Detail joint as necessary on the plans.

3.03 MIXING CONCRETE

A. All concrete throughout shall be either job or plant mixture in an approved type of power operated mixer that will ensure uniformity and

homogeneity of the concrete produced. The Contractor shall provide a sufficient number of mixers to continuously carry on the work.

B. Mixing at jobsite shall be done in accordance with ACI 304 and as follows:

1. Concrete shall be thoroughly mixed in a batch mixer of an approved type and size which will insure a uniform distribution of materials throughout the mass. The machine shall have a control device to prevent materials from being discharged until they have been mixed for the specified minimum time.

2. The entire contents of the drum shall be discharged before materials of the succeeding batch are placed therein. No mixer shall be used which has a rated capacity of less than a 1-sack batch and no mixer shall be charged in excess of its rated capacity.

3. The first batch of materials placed in the mixer after the machine has been cleaned shall contain a sufficient excess of cement, sand and water to coat the inside of the drum without reducing the required mortar content of the mix. Upon cessation of mixing, the mixer shall be throughly cleaned.

C. Ready Mixed and Mixed-In-Transit Concrete shall be mixed to conform to the provisions of ASTM C94 and as follows:

1. The plant shall have sufficient capacity and transportation equipment to deliver concrete at the rate desired. The interval between batches for a pour shall not exceed 30 minutes.

2. The time elapsed between the introduction of the mixing water to the cement and aggregates or the cement to the aggregates, and the placing of concrete in its final position shall not exceed 90 minutes.

3. In hot weather (more than 90 degrees fahrenheit ambient temperature) or under conditions contributing to quick stiffening of the concrete, the elapsed time in 2. shall

not exceed 60 minutes, if no retarding admixture is used. If an ASTM C494 Type B or D admixture is added to the concrete, the elapsed time in 2. shall remain at 90 minutes.

4. Synthetic fibers for fiber reinforced concrete shall be added at the batch plant at a rate of 1.5 lbs. per cubic yard.

D. Concrete shall be mixed only in such quantity as is required for immediate use. No retempering will be permitted and concrete that has started to harden shall be discarded and promptly removed from the job.

E. Admixtures conforming to Paragraph 2.01 may be used in the concrete as recommended by the supplier and approved by the Engineer.

F. Hand mixing of concrete will not be permitted except to make up shortages for fence post footings, sidewalks, thresholds, flag pole foundations, curbs and gutters, and thrust blocks.

3.04 PLACING CONCRETE

A. No concrete shall be placed in the absence of the Engineer or his representative who shall be given one day advance notice of starting time of concrete pour.

Place no concrete until foundation, forms, reinforcing steel, pipes, conduits, sleeves, hangers, anchors, inserts, waterproofing, termite treatment and/or basaltic termite barrier and other work required to be built into or placed ahead of concrete placing have been inspected and approved by the Engineer. Concrete placed without such notice and approval shall be rejected.

B. Preparation

1. All sawdust, chips and other construction debris and extraneous matter shall be removed from interior of forms. Struts, stays, bracing, or blocking serving temporarily to hold forms in correct shape or alignment

shall be removed when the concrete placing has reached an elevation rendering their services unnecessary.

2. Concrete shall be placed upon clean, damp surfaces with no free water, or upon properly compacted fills but never upon soft mud or dry, porous earth. Before pouring footings or foundations, bottoms of excavations shall be properly leveled off and tamped.

Modify specification as required when epoxy bonding of new to old concrete is required, such as in rainy areas like Hilo.

3. Before depositing new concrete on or against concrete which has set, all accumulations of mortar splashed upon reinforcing steel and the surfaces of forms shall be removed and the forms shall be retightened. The surfaces of previously set concrete shall be thoroughly roughened and cleaned of all foreign matter and laitance, saturated with water and slushed with a coat of cement grout. New concrete shall be placed before the grout has attained its initial set.

C. Conveying

1. Concrete shall be conveyed from mixer to forms as rapidly as practicable by methods that will prevent segregation.

2. Concrete shall be deposited as nearly as practicable in its final position. Extensive spading as a means of transportation shall be avoided and in no case shall vibrators be used to transport concrete inside the forms.

3. Open troughs and chutes shall have a slope not to exceed 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 ft. long and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.

4. The concrete shall not be allowed to drop freely more than 6 feet except where specifically authorized by the Engineer. When placing operations would involve the dropping of concrete from a height of more than 6 feet, it shall be conveyed through pipes or

flexible drop chutes.

5. If any appreciable segregation occurs through the conveying methods employed, their use shall be ordered discontinued by the Engineer and some other satisfactory method of placing concrete shall be used.

6. All chutes, troughs, pipes and other means of conveyances shall be kept clean and free from coatings of hardened cement or concrete by thoroughly cleaning with water and chipping after each pour. Water used for flushing shall be discharged away from the vicinity of the concrete or forms already in place.

Incorporate supplementary specification when concrete is to be placed below water table.

D. Depositing

If placing underwater, specify concrete to be placed by pumping or tremie techniques. Reference: Chapter 8, ACI 304 "Guide to Measuring, Mixing, Transporting, and Placing Concrete".

1. Unless adequate protection is provided, concrete shall not be placed during rain. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish. Fresh concrete that has been deposited but has not attained its initial set shall be protected in the event of rain.

2. Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcing. As nearly as practicable, the concrete shall be dropped vertically without hitting reinforcement, sleeves or forms into its final position in order to avoid separation of coarse aggregates from concrete. After the initial set of concrete, the forms shall not be jarred and no strain shall be placed on the projecting reinforcing.

3. Formed concrete shall be deposited in horizontal layers not deeper than 2 feet avoiding inclined layers and inclined construction joints. The depth of layers shall be shallow enough so that the succeeding layer will be placed before the previous layer has attained its initial set.

Concrete shall not be allowed nor shall it be caused to flow horizontally or on slopes in the form. Concrete placing on a slope shall begin at the lower end of the slope and progress upward.

4. Construction joints shall be made only where located on the plans unless approved otherwise by the Engineer. Pours shall be planned to provide for the continuous placing of concrete from one construction joint to another. The face edges of all joints that are exposed to view shall be carefully finished true to line and elevation.

5. In slab construction, placing of the concrete shall be started at the far end of the work so that each batch will be dumped against previously placed concrete, not away from it. The concrete shall not be dumped in separate piles and the piles then leveled and worked together. For floor slabs on earth, additional requirements in Paragraph 3.05 shall apply.

When concrete of higher strength is to be used for compression members together with lower strength concrete for flexural members, add supplementary specifications to clarify connection points.

6. Beams and girders shall not be placed at the same time as the supporting columns or walls. At least 2 hours must elapse after columns or walls are placed before placing beams and girders supported thereon.

7. Columns shall be placed in approximately 4-foot sections, with each section being vibrated and compacted as placed.

8. In placing a deck of slabs and beams, the beams shall be placed first up to the height of the bottom of the floor slab. This placement shall extend in bay modules and end at the midspan, midpoint between columns. The length of this placement shall be determined by the time it takes to return to the slab and the top layer of the beams before the top of the first pour has started to harden and form a cold joint.

9. If depositing of concrete must be stopped short of a full placement, it shall be

leveled to a horizontal plane or stopped against a vertical bulkhead. Such bulkhead or horizontal plane shall be located only as approved by the Engineer.

E. Compaction

1. All concrete shall be consolidated by vibration so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. All compaction shall be done by use of high frequency internal vibrators. Where the vibrator cannot be inserted into the concrete, compaction shall be done by spading, rodding or forking.

2. Frequency of vibrator shall be not less than 7,000 inpulses per minute. The Contractor shall provide a sufficient number of vibrators to properly consolidate all concrete immediately after placing. At least one standby vibrator shall be on hand at all times during placement of the concrete.

3. Vibration shall not be applied through contact with reinforcement of forms. Vibration shall penetrate previously deposited concrete sufficiently to prevent pockets or voids or construction joints from occurring between pours, but must not be applied to concrete which has set up sufficiently to cease to be plastic under vibration.

Leave out the phrase "...except where finish is to be a floor covering" where the slab will be in many and/or large areas, such as Industrial Arts Classrooms and Dining Rooms.

3.05 FLOOR SLABS ON EARTH

A. Concrete floor slabs on grade, with the exception of sidewalks, shall be placed directly over a moisture barrier overlain atop basaltic

Show dowel detail on plans.

NOTES TO ARCHITECT

termite barrier specified in another section. The edges of the moisture barrier shall be lapped a minimum of 12 inches and sealed with tape or by other acceptable means. Floor slabs shall not be placed before the roof is in place except where finish is to be a floor covering or when otherwise noted on the plans.

Design reinforcement for special conditions, such as poor foundation, thicker slabs, or slabs other than shown.

B. All earth-supported slabs, with the exception of sidewalks, shall be reinforced with Grade 60 #3 steel reinforcing bars at 15" o.c. each way unless otherwise shown or called for on the plans. Plain bar dowels shall be provided as detailed for construction and expansion joints. Such dowels shall be wrapped or greased on one side of the joints to prevent bonding.

Indicate location on plan detail or call out in specs.

Location of control/contraction joints shall be in accordance with ACI 302.1. Indicate location on plans (especially aournd columns and at corners).

C. Care shall be taken in handling and placing the reinforcement. Reinforcement shall be positively set to the level required within the slab(s) as indicated on the plans.

D. Floor slabs shall be placed in alternate panels, long strip pattern, following construction or expansion joints. Narrow contraction/control joints shall be provided transverse to the length of the cast strips. There shall be an interval of at least 2 days between the placing of the initial panels and that of the adjacent ones. "Keyed Kold Joint" may be used in lieu of placement in alternate panels in areas where floor covering is specified provided all shrinkage cracks are sealed prior to installation of floor covering. As an option, slabs may be placed in alternate panel checkerboard pattern. Where slabs are placed in a checkerboard pattern, no panel shall be placed in excess of 500 square feet in area nor exceed 32 feet in its longest dimension.

Show detail on plans.

E. A bond-break filler shall be provided where edge of slab abuts any vertical surface and where indicated on plans. Width of filler strips shall

equal depth of floor slab.

F. Prior to concrete placement, the basaltic termite barrier material shall be wet down, tamped and screeded to minimize its disturbance. Small mounds of concrete shall be placed at random rebar intersections during the pour to provide support in addition to the chairs or blocks. Reinforcing bars shall be lifted as necessary to ensure proper placement within the slab.

Fiber reinforcement is intended to provide secondary reinforcement only. Provide and indicate steel reinforcement on the drawings where pavement will be subject to vehicular traffic loads or where poor soil conditions exist. Where dowels are required to prevent vertical displacement, provide details on the drawings.

3.06 CONCRETE SIDEWALKS ON GROUND

A. Concrete walks shall be of one lift construction, 4 inches in thickness with thickened edge, and reinforced with synthetic fiber reinforcement. Keys and /or plain bar dowels shall be provided as detailed for construction and expansion joints. Such dowels shall be wrapped or greased on one side of the joint to prevent bonding.

Show other locations for expansion joints if necessary.

B. Expansion joints shall be provided as detailed, not more than 32 feet apart; at junctions with curbs; where walks abut buildings, platforms and other fixed structures; and elsewhere as shown in the plans. Reinforcement or other embedded metal items bonded to the concrete (except dowels in floors or walls bonded on only one side of joint) shall not be permitted to extend continuously through any expansion joint. Joints shall be sealed with expansion joint filler and sealing compound at least 3/8" deep.

Location of control/contraction joints shall be in accordance with ACI 302.1. Indicate location on plans.

Modify paragraph to provide type of control joint applicable to your project. Detail joint as necessary on the plans.

C. Contraction/control joints shall be provided where shown on the plans and shall be 1/4 the depth of the slab or a minimum of 1" deep. Unless otherwise indicated on the plans, joints may either be tooled, formed-in-place or sawcut. When saw-cut joints are provided, cutting shall be timed properly with the set of the concrete so that it is firm enough not to be torn or damaged by the cutting blade and before random shrinkage cracking can form in the slab. In any case, cutting shall be completed not later than 12 hours after the concrete is placed and finished. Unless otherwise indicated on the plans, joints shall be sealed with joint sealing compound.

Show detail section as necessary on plans.

NOTES TO ARCHITECT

D. Concrete shall be tamped and screeded true to grade and section, sufficient mortar brought to the surface for finishing, and the required finish given as specified hereinafter before the concrete sets. Steps in connection with walks shall have same finish as walks. All edges except for those at saw-cut control joints shall be rounded to 1/8" radius. Cross slope for sloped or crowned walks shall be 5/32" per foot. No pedestrian traffic shall be permitted on concrete walks for a period of 3 days after placing.

Show or call for scoring on plans.

E. Walks shall be finished as indicated hereinafter and scored where shown or called for on the plans.

3.07 FINISHING OF SLABS

A. Finish A - Scratched Finish. After the concrete has been placed, struck off, consolidated and leveled, the surfaces shall be roughened with stiff brushes or rakes (cross-scratched) before final set.

B. Finish B - Light Trowelled Finish. After the concrete has been placed, struck off, consolidated and leveled, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared and/or when the mix has stiffened sufficiently to permit the proper operation of a power-driven float. The surface shall then be consolidated with power-drive floats of the impact type except in thin sections. Hand floating with wood or cork-faced floats shall be used in locations inaccessible to the power-driven machine. The slab shall then be steel trowelled to a uniform, smooth texture.

Modify specification as required when concrete hardener is to be used.

C. Finish C - Trowelled Finish. The surface shall be finished first with impact power floats, as specified above for Finish B, then with power trowels and finally with steel hand trowels. The first trowelling after power floating shall

be done by a power trowel and shall produce a smooth surface which is relatively free of defects but which may still contain some trowel marks.

Additional trowelling shall be done by hand after the surface has hardened sufficiently. The final trowelling shall be done to a point when a ringing sound is produced as the trowel is moved over the surface. The finished surface shall be free of any trowel marks and shall be uniform in texture and appearance. On surfaces intended to support floor coverings, any defects of sufficient magnitude to show through the floor covering shall be removed by grinding.

Due to potential non-uniformity of colors and higher construction and maintenance costs, colored slabs shall not be specified unless absolutely required.

D. Finish D - Broom Finish. The concrete slab shall be given a coarse transverse scored texture by drawing a broom across the surface. The operation shall follow immediately after steel-trowelling performed under Finish B above.

E. Finish E - Color Finish. Prior to application of the colored finish, the color finish manufacturer's representative shall instruct the finish applicator in the proper application and curing of the color material. The manufacturer's representative shall also be present during application of the color material to ensure compliance with the manufacturer's instructions.

Unless otherwise required by the color finish manufacturer, the coloring material shall be applied immediately after preliminary wood floating and after any free water has evaporated or been removed. The material shall not be cast into standing water. Approximately 2/3 of the blended material required for total coverage shall be dusted onto the surface by a method that ensures even coverage without segregation.

Power floating (or wood floating) shall begin immediately after this first application. The surface shall not be trowelled. After the material has been embedded by floating, the remainder of the blended material shall be distributed at right angles to the previous application. A small portion of material shall be witheld from this second application for final touch-up of non-uniform or weak-toned areas.

The second application shall be heavier in any areas not sufficiently covered by the first application. A second power floating (or wood floating) and then trowelling shall immediately follow application. Care shall be taken not to over-trowel the surface as this will produce dark burnt areas. For exterior surfaces, a fine soft-bristled dust broom shall be drawn over the surface to produce a roughened texture. The application and rate of application of the coloring material shall be in strict accordance with the manufacturer's recommendations for a heavy-duty application. The surface shall be cured and sealed in strict accordance with the manufacturer's recommendations

Water shall not be added to the surface during application of the color hardener.

F. Finish F - Non-Slip Finish. The surface shall be given a dust-on application of abrasive aggregates. Finish with steel trowel but avoid over-trowelling. The rate of application of abrasive aggregates shall be not less than 25 pounds per 100 square feet or application shall be in strict accordance with the manufacturer's recommendations.

Revise tolerance shown to suit specific project conditions.

G. Finish G - Swirled Finish. After the concrete surface has been struck off, darbied, power floated and steel troweled, the surface shall be given a swirl float finish. The float should be worked flat on the surface in semi-circular or fan-like motion.

H. Finishing Tolerances for slabs shall be in accordance with the following:

Modify and/or add other items to list as required for your project.

1. Finish shall be true planes within + or - 1/4" in 10 ft., as determined by a 10-ft. straightedge placed anywhere on the slab in any direction.

   Unless otherwise shown on the plans, all slabs shall meet this tolerance. The tolerances will be checked prior to removing of forms or shores.

3.08 SELECTION OF FLOOR FINISHES

A. Unless otherwise indicated on the plans, the following floor finishes shall be used:

1. Finish A - Scratched Finish. For surfaces intended to receive bonded applied cementitious applications (such as setting beds for ceramic tile or quarry tile on the first floor, where no membrane is called for).

2. Finish B - Light Trowelled Finish. For surfaces intended to receive roofing, waterproofing and membrane (such as setting beds on membranes, second floor and above).

3. Finish C - Trowelled Finish. For interior floors (including refrigerator floor) and floors intended to receive floor coverings.

4. Finish D - Broom Finish. For first floor lanais or walks.

5. Finish E - Colored Finish. See Finish Schedule.

6. Finish F - Non-Slip Finish. For platforms, interior and exterior steps, landings and ramps.

7. Finish G - Swirled Finish. For upper floor lanais or balconies.

3.09 REPAIR OF DEFECTS

A. After forms have been removed, any concrete which is not constructed as shown on the plans or is out of alignment or level beyond required tolerances or which shows a defective surface which in the opinion of the Engineer cannot be properly repaired or patched shall be removed.

B. Where cast-in-place concrete which is exposed to view or designated architectural requires repairing or patching, the texture of the surface of such repair or patch shall closely match that of the surrounding surface. If the concrete is to remain unpainted, the surface color shall also be closely matched to that of the surrounding surface.

C. All tie holes and all repairable defective areas shall be patched immediately after form removal as follows:

1. All honeycombed concrete shall be chipped out to sound concrete but in no case to a depth of less than 1 inch. If possible, edges of the chipped-out areas shall be undercut.

2. Rock pockets, form tie holes, deep holes not too large in area, other holes with relatively high ratio of depth to area, and similarly confined areas shall be dry packed.

   After the area to be patched has been thoroughly cleaned and dampened, mortar, which shall consist of 1 part cement, 2-1/2 parts sand passing a #16 screen, and only enough water to produce a mortar that will stick together upon being molded into a ball by slight pressure of the hands, shall be placed in the holes in layers having a compacted thickness of about 3/8". Each such layer shall be solidly rammed over its entire surface using a hardwood stick and a hammer.

3. Shallow depressions where lateral restraint cannot be obtained, voids behind reinforcement, and holes extending through concrete sections shall be patched using a commercially prepared bonding agent, a stiff

mortar mix of 1 part cement and not more than 2-1/2 parts sand.

For filling holes in exterior surfaces, an epoxy bonding agent shall be used. Application of the bonding agent shall be in strict conformance with the manufacturer's instructions.

4. An epoxy-and-sand mixture may be used in lieu of the mortar-and-bonding agent mixture for any of the patching above. The preparation of the surface to receive the patch, as well as the mixture proportions of the epoxy-and-sand, shall be in strict conformance with the manufacturer's instructions.

D. Except for concrete required to be removed under Paragraph 3.09A, any concrete which is not constructed as shown on the plans or is out of alignment and/or level beyond allowable tolerances may be patched using an epoxy-and-sand mixture.

The proportions of the mix and the preparation of the surface to receive the patch shall be in strict conformance with the manufacturer's instructions except as or unless otherwise specified herein. The minimum thickness of the patch shall be 1/4". No "feathering" to a lesser thickness will be permitted.

Misalignment which requires correction more than 1 inch thickness shall be repaired in the following manner:

1. The surface of the affected area shall be chipped, etched, or otherwise cleaned and roughened to provide a sound surface for bonding;

NOTES TO ARCHITECT

2. Concrete nails or other fasteners which can provide positive mechanical bonding of the patch shall be set into the surface at about 18 inches o.c. in all directions with a minimum of 2 rows;

3. Wire mesh reinforcement as approved by the Engineer shall be installed in those portions of the patch which exceed 2-inch thickness;

4. A bonding agent suitable for use in the repair location (epoxy required for exterior use) shall be applied over the entire surface to be patched;

5. Formwork to the true lines called for shall be installed over the area requiring the patch; and

6. Concrete or grout with aggregate sized appropriately for the cavity and which will provide strength equivalent to that of the base surface shall be placed in the form, properly compacted and suitably cured.

3.10 SURFACE FINISHES

A. Rough Concrete Finish. Rough concrete finish surfaces shall be reasonably true to line and plane with no specific requirements for selected facing materials. Tie holes, honeycombing and defects shall be patched in accordance with Paragraph 3.09C herein except that the patches for concealed surfaces need not be matched in color and texture with adjacent surfaces. Fins exceeding 1/4" in height shall be removed. Otherwise, surfaces shall be left with the texture imparted by the forms.

Be sure to specify cement rubbed finish on surfaces of exposed prestressed and/or precast members in appropriate section(s).

B. Plywood Finish. Finish of all exposed surfaces cast against forms constructed of plywood or lined with "Plyform" shall be true to line and plane within the tolerances in Section 03100, Paragraph 3.01.

NOTES TO ARCHITECT

1. Joint marks and fins shall be removed and surfaces left smooth, dense and free from prominent grain markings.

2. The surface shall be scrubbed to remove any laitance or loose particles and to expose any defects.

3. Tie holes, honeycombing and defects shall be repaired in accordance with Paragraph 3.09C herein.

4. The surface shall be thoroughly wetted. Then, as the concrete approaches surface dryness, a mortar consisting of 1 part Portland cement, 2 parts well-graded sand passing a No. 30 sieve, and enough water to provide the consistency of thick paint shall be vigorously and thoroughly rubbed over the area with clean burlap pads so as to fill all voids.

5. While the mortar is still plastic but partially set so that it cannot be easily pulled from the voids, the surface shall be rubbed again with a dry (no water) mortar mix of the same proportions as above. Burlap pads, stretched tightly around a board to prevent dishing the mortar in the voids, shall be used for this operation. There shall be no discernible thickness of mortar on the surface, except in the voids, when this operation is concluded.

6. Immediately following the rubbing treatment, the surface shall be continuously moist-cured for 72 hours.

7. In lieu of the rubbing treatment noted above, a cementitious coating in accordance with Subsection 2.01 O. may be used. Surface preparation, mixing, application and curing of the coating material shall be in strict accordance with the manufacturer's instructions and recommendations.

Modify list and/or add other items as required.

8. Exterior wall surfaces above the third floor and not adjacent to walking areas need not be treated as specified in Subparagraphs 4. to 7. above.

3.11 LOCATION OF SURFACE FINISHES

A. Unless otherwise indicated on the plans, the location of formed surface finishes shall be as follows:

1. Rough Concrete Finish - All concealed concrete surfaces such as behind ceramic tile, furring, acoustical tile, etc.

2. Plywood Finish - All exposed concrete surfaces.

3.12 CURING AND PROTECTION

Delete this paragraph for short time frame projects which cannot accomodate the 90 day period noted.

A. All concrete shall be cured for a period of not less than 7 days by one of the methods listed below. During this curing period, the concrete shall be maintained with minimal moisture loss at a relatively constant temperature. Fresh concrete shall be protected from heavy rains, flowing water, mechanical injury, and injurious action of the sun. Curing method selected must be compatible with the finish to be applied to the concrete.

Curing shall immediately follow the finishing operation.

To promote drying of slabs on grade to receive floor finish and avoid moisture related flooring problems, once drying of the slab has started, it shall be protected from getting wet for a minimum of 90 days immediately prior to the placement of the floor finish. If the slab cannot be adequately protected, mechanical drying or other means shall be employed to reduce the vapor emission level to 5 lbs. per 1000 s.f. or less prior to placement of the floor finish.

B. Water Curing - If cured with water, concrete shall be kept wet by mechanical sprinklers, by

ponding, or by any other method which will keep the surfaces continuously wet.

C. Saturated Sand Curing - Surfaces cured with sand shall be covered with a minimum of 1-inch thickness of sand which shall be kept uniformly distributed and continuously saturated during the entire curing period.

D. Pervious Sheeting - Overlap sheeting edges approximately 6 inches and keep sheets continuously wet throughout the curing period.

E. Curing Compounds - Curing compounds used on concrete surfaces that are to receive floor covering, paint or colored finish or acid stain shall be as recommended by the manufacturer to be compatible with the applied finish.

The Contractor shall submit to the Engineer a letter certifying that the curing compound is compatible with the applied finish. Application shall be in accordance with the manufacturer's recommendations. If curing, sealing or other compounds are used which are incompatible with applied finish, such compound shall be thoroughly removed by grinding with a terrazzo grinder or other means approved by the Engineer.

F. Waterproof Paper - Waterproof paper or opaque polyethylene film conforming to ASTM C171 may be used. The paper or film shall be anchored securely and all edges sealed or applied in such a manner as to prevent moisture escaping from the concrete. Waterproof paper shall not be used on floors that will be exposed when finished.

3.13 CONCRETE FOR ELECTRICAL WORK

A. Unless otherwise noted on plans, concrete for handholes and manholes shall be 3,000 psi strength at 28 days. Concrete for encased ducts shall be Class 2,500. Maximum size of aggregates for concrete encased duct shall be 3/4".

B. All ducts shall have a minimum cover of 3 inches of concrete. Spacers shall be used for placing ducts and for rigidly holding the ducts during

the concrete pour. Provide minimum earth cover of 18 inches over top of concrete encasement unless otherwise shown on plans.

C. The encased section of ducts to which a future connection is to be made shall end with a coupling. An unencased 1-foot section of duct and end cap shall constitute the terminus of such ducts.

3.14 CONCRETE FOR DRAINAGE, SEWER AND PLUMBING SYSTEMS

A. Unless otherwise noted on plans, all concrete required for construction of manholes, catch basins, foot baths, valve boxes, etc., which are required for plumbing and drainage installations shall be Class 3,000.

B. Normal weight concrete containing calcareous coarse aggregates shall not be used in sewerage structures and/or components.

C. Sewer manholes shall be constructed in accordance with Section 23 SEWER MANHOLES of the "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" dated September 1986, as amended. (Paragraphs concerning Measurements and Payments in the Section are not applicable to this project.)

3.15 CLEAN UP

Contractor shall clean up all concrete and cement materials, equipment and debris upon completion of any portion of the concrete work and upon completion of the entire concrete and related work.

END OF SECTION

NOTES TO ARCHITECT

SECTION 04220 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section **00700**.

Exercise care in the preparation of plans and specifications to indicate which walls and partitions are to be baffle walls, partitions, end walls, sound walls, fire walls, decorative screen block walls, and other types. Consider preparing a wall schedule for large or complex jobs. Call out and/or detail special conditions affecting specific walls. Also coordinate between the structural requirements and appearance of masonry walls, since the size of reinforcement or location may affect the size of joints, their location, and the use of full or cut blocks, and other such variations.

1.02 SUBMITTALS

The masonry manufacturer's certification that the masonry units comply with **UBC Standard 21-4 (1994 Ed.)** and the curing requirements specified herein shall be submitted to the Engineer upon request.

1.03 SAMPLE BLOCKS

A sample of each of the masonry units required shall be submitted for approval to the Engineer upon request.

At the end of Sub-Section 1.03, delete the phrase "upon request" when masonry components are designed as load bearing.

Insert "for strength testing by the State" in lieu of "for approval ... upon request" when walls are designed as load bearing and strength is important.

1.04 DELIVERY, STORAGE AND HANDLING

A. Masonry Units: Masonry units delivered to the jobsite shall conform to the moisture content requirements as specified under **UBC Standard 21-4 (1994 Ed.)**. Masonry units shall be stored off the ground and protected from inclement weather and physical damage. All units shall be handled with reasonable care to prevent marring or damaging of faces, edges and corners of units. In no case shall dumping of units from hand trucks or wheelbarrows be permitted.

Where used in exposed wall construction, any unit with exposed face or faces having chips, cracks, or other imperfections more than 1 inch in dimension shall be rejected.

B. Mortar and Grout Materials: Portland cement, masonry cement, mortar cement, lime and admixtures shall be stored in such a manner as to prevent deterioration or contamination with foreign matter. Cement which has become caked, partially set or otherwise deteriorated, or any material which becomes damaged or contaminated, shall be rejected.

NOTES TO ARCHITECT

PART 2 - PRODUCTS

2.01 MATERIALS

A. Hollow Concrete Masonry Units shall be load-bearing units and shall conform to the requirements of **UBC Standard No. 21-4 (1994 Ed.)**, Grade N-II. Units shall be 2-core type, 8-inch nominal height, 16-inch nominal length and width as indicated on the plans. Units for jamb, corner sill, lintel and other special shapes shall be provided as required.

All units shall be sound, free of cracks, straight and true. They shall be either steam-cured or cured under atmospheric conditions for a minimum of 30 days. Color shall be standard with manufacturer.

If light weight units, bricks or special texture units are used, these must also be specified herein. Use of bricks or special texture units must be approved by the State Public Works **Administrator**.

B. Screen Blocks shall be standard units manufactured to same specifications as non-load-bearing concrete block masonry units, pattern as indicated.

C. Portland Cement shall conform to ASTM C-150, Type I or Type II.

D. Mortar Cement (Type M) shall conform to the requirements of UBC Standard No. **21-14 (1994 Ed.)** "Mortar Cement". Conformance to this standard shall be noted on the material package. ("Supermortar" by Hawaiian Cement, or approved equal.)

E. Hydrated Lime shall conform to the ASTM C-207, Type S.

F. Aggregate for use in mortar shall conform to ASTM C-144.

G. Aggregate for use in grout shall conform to ASTM C-404, with grading in accordance with ASTM D-448, No. 10.

NOTES TO ARCHITECT

H. Water used in mixing mortar or grout shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials or other substances that may be deleterious to either the mortar or reinforcement. Non-potable water shall not be used.

I. Horizontal Reinforcement shall be trussed or ladder design with #9 gauge, deformed side rods and welded #12 gauge or larger cross rods ("Dur-O-Wal", "Blok-Mesh", or approved equal), or as otherwise indicated on the plans.

J. Reinforcing Steel shall be deformed bars conforming to ASTM A-615, grade as shown on plans.

Delete if deformed billet bars are used instead.

K. Rebar Wire Positioners shall be galvanized, No. 9 gauge wire, manufactured positioners per ASTM A82 or other suitable devices.

L. Additives/Admixtures for mortar shall be "Easy Spred" by American Colloid Co. or approved equal.

PART 3 - EXECUTION

3.01 MORTAR AND GROUT

A. The proportioning of materials for mortar and grout shall be by volume and done in such manner that the specified proportions can be controlled and accurately maintained. Fine aggregate shall be measured in a damp loose condition. Mixing shall be by a mechanical batch mixer for at least 3 minutes for mortar and 5 minutes for grout, but for not more than 10 minutes. Hand mixing shall be permitted only for small batches of 3 cubic feet or less.

B. Mortar shall be freshly prepared and uniformly mixed in one of the following proportions:

1. Type M - Cement-lime Mortar:
   1 part portland cement

1/4 part hydrated lime
3 to 3-3/4 parts mortar aggregate

2. Type S - Cement-lime Mortar:
   1 part portland cement
   1/4 to 1/2 part hydrated lime
   Mortar aggregate: Not less than 2-1/4 and not more than 3 times the sums of the separate volumes of cementitious materials.

3. Type M - Mortar Cement Mortar:
   1 part mortar cement
   2-1/2 to 3 parts mortar aggregate

Sufficient water shall be used to provide a workable consistency. Mortar shall be used and placed in final position within 1-1/2 hours after mixing.

4. Type M Mortar
   2 sacks portland cement
   1/2 to 1 - 7 lb. bag Easy Spred
   6 cu. ft. mortar aggregate

5. Type M Mortar:
   1 sacks portland cement
   3 ounces MRF
   2-1/4 to 2-3/4 cu. ft. mortar aggregate

6. Type S Mortar:
   2 sacks portland cement
   1 - 7 lb. bag Easy Spred
   9 cu. ft. mortar aggregate

7. Type S Mortar
   1 sack portland cement
   3 ounces MRF
   2-1/2 to 3 cu. ft. mortar aggregate

The above mixes **4 through 7** shall be prepared

NOTES TO ARCHITECT

strictly in accordance with the **admixture** manufacturer's instructions. Placement of the mortar shall be completed within 2-1/2 hours after mixing. No materials which start to set shall be retempered.

C. Grout (coarse) mixed on-site shall conform to ASTM C 476 and shall be freshly prepared and uniformly mixed in the following proportion:

The mix specified is for "Coarse Grout". If your design will have conditions where the proper flow of the grout will be affected by the amount and placement of steel reinforcement, amend the specs to include "Fine Grout" as noted in the UBC.

1 part portland cement
0 to 1/10 part hydrated lime
Fine Aggregate: 2-1/4 to 3 times the sum of the volumes of the cementitious materials.
Course Aggregate: 1 to 2 times the sum of the volumes of the cementitious materials.

Grout designed by Ready-mix suppliers may be used upon approval of the Engineer.

Sufficient water shall be used to produce a consistency just fluid enough for pouring or pumping without segregation. Grout shall be used and placed in final position within 90 minutes after mixing, but shall in no case be used after initial set has occurred.

In any event, the grout shall attain not less than 2,500 psi 28-day compressive strength per ASTM C 1019 unless noted otherwise on drawings.

3.02 REINFORCEMENT

A. Reinforcement shall be free from scale, loose flaky rust or other coatings that will destroy bond. It shall be straight except for bends around corners or where bends or hooks are detailed. Size and spacing shall be as indicated on the drawings.

Show location and details on plans.

B. Vertical reinforcement shall be accurately

placed and secured against displacement by rebar wire positioners at top and bottom and at intervals not to exceed 200 diameters of the reinforcement (8 feet for #4 bars; 10 feet for #5 bars). Dowels and splices shall be lapped as indicated but not less than 30 diameters or 15 inches, whichever is longer. At jambs of doors, windows and other openings, and corners and ends of walls, including those abutting concrete, one #5 bar shall be installed in the end cell unless heavier reinforcement is otherwise called for on the plans and that cell shall be filled with grout. Bars ajacent to all openings and at corners and ends of walls shall extend the full height of walls.

C. At intersections, corners and splices, horizontal reinforcing shall be placed, bent and lapped as shown on the plans. End laps shall be at least 30 diameters.

3.03 ANCHORS

Work with other trades shall be coordinated as necessary to set into tile walls all anchors, bolts, nailing blocks, etc. Anchors shall be grouted around with sufficient mortar to make them secure.

3.04 LAYING

A. General: All masonry units shall be clean and dry and shall be handled so that edges and faces will not be chipped, spalled, or cracked. All beds on which masonry is to be laid shall be cleaned. All work shall be built plumb, level, and true, within the tolerances specified below, and shall be laid up with whole units except at closures.

If metal frames are used such as for doors, etc. requiring embedded anchors, include instructions for frames to be in place as walls are laid up.

NOTES TO ARCHITECT

Masonry units in walls shall be laid so that one face of the wall is a true flat plane. Unless otherwise indicated on the plans, this shall be on the inside face. Where one face of a wall is to be plastered or covered, the exposed face shall be the true flat plane. All cutting and fitting as may be required for and necessary to accommodate other trades shall be done neatly using a power driven carborundum saw. It shall be the responsibility of the Contractor to control any dust pollution caused by the cutting operations. All drilling and cutting of small holes shall be neatly done. Bolts, anchors, ties, conduits, and similar items required for the installation of work under other sections of these specifications shall, as far as practicable, be placed as the work progresses. All walls and partitions shall be carried to the underside of beams, slabs, or joists, as the case may be, and shall be connected at the top as shown on the plans.

Detail on plans.

B. Allowable Tolerances:

1. Variation from the Plumb

   a. In the lines and surfaces of columns, walls and arrises:

      in 10 ft. 1/4"
      in any story or 20 ft. max. 3/8"
      in 40 ft. or more 1/2"

   b. For external corners, control joints and other conspicuous lines:

      in any story or 20 ft. max. 1/4"
      in 40 ft. or more 1/2"

2. Variation from the level or grades indicated on the plans:

   For exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:

      in any bay or 20 ft. max. l/4"
      in 40 ft. or more 1/2"

3. Variation of the linear building lines from established position in plan and related portion of columns, walls and partitions:

in any bay or 20 ft. max. l/2"
in 40 ft. or more 3/4"

4. Variation in cross-sectional dimensions of columns and in the thickness of walls:

   minus l/4"; plus l/2"

5. For window and door openings:

   a. Maximum variations as specified in Paragraphs B.1. and B.2. for plumb and level of masonry work.

   b. Maximum variation of 3/8" in each dimension from that specified or dimensioned.

   c. Tolerance requirements for both dimensions and plumb-and-level must be met.

6. Checking and setting:

   The following tools and methods shall be the minimum or acceptable type:

   a. Plumb and level shall be determined by level and/or pull string method.

   b. An instrument at least 4 feet long shall be used for leveling or runs. A shorter level may be used for cross-leveling of units.

C. Masonry units shall not be wet before being used and units which have gotten wet shall be thoroughly dried before being used. Where no bond pattern is shown, the wall shall be laid up in straight uniform course with regular running bond.

D. Masonry units in first course shall be laid with shell mortar beds not exceeding 3/4" in thickness. Webs of adjoining cells containing reinforcement shall also be bedded in mortar to

NOTES TO ARCHITECT

prevent escape of grout.

Vertical head joints shall be mortared well for a thickness equal to the face shell of the block and these joints shall be shoved tightly so that the mortar bonds well to both blocks. Joints shall be solidly filled from the face of the block to the depth of the face shell.

E. If it is necessary to move a block so as to open a joint, the block shall be removed from the wall, cleaned and reset in fresh mortar.

F. Mortar joints shall be straight, clean and in a thickness of 3/8" + 1/8". All exposed horizontal and vertical joints shall be tooled with a l/2" to 5/8" round bar at least 14 inches long to produce a dense, slightly concave surface well bonded to the block at the edges. Tooling shall compact the mortar, pressing the excess mortar out of the joint rather than gouging it out. Use a 3/8" diameter half-round molding to simulate a concave horizontal joint between a concrete bond beam and the hollow tile wall below. Where walls are to receive plaster or where they are not exposed, such as below finish grade and where special glazed finish is indicated, the joints shall be struck flush.

If flush mortar joints are used for exposed work, they shall be carpet-floated in order to present a surface that will not have a sheen when painted.

Raked joints, struck joints, & squeeze joints are not permitted on exterior of buildings because of leakage at joints.

G. All hollow masonry units shall be built to preserve the unobstructed vertical continuity of the cells to be filled. Walls and cross webs forming such cells shall be full-bedded in mortar to prevent the leakage of grout.

H. All cells containing reinforcement shall be filled solidly with grout in lifts not exceeding 8 feet unless otherwise shown on the plans. Other cells, where indicated to be solid for anchors or such items, shall also be filled. When grouting is stopped for one hour or longer, horizontal construction joints shall be formed by stopping the pour of grout 1-1/2" below the top of the uppermost unit.

Indicate locations of filled cells on plans. Do not use toggle bolts where heavy usage or impact loads are anticipated. Also, if cells are to be filled

NOTES TO ARCHITECT

I. Care shall be taken to prevent mortar splotches. All forms shall be made tight and concrete or grout spilled on the wall shall be washed off immediately before it can set up. Walls shall be protected against stains and excess mortar shall be wiped off the surface as the work progresses. After the wall is constructed, it shall not be saturated with water for curing, cleaning, etc.

solid for some special purpose, such as for acoustical req'mt., include instructions describing this work.

3.05 PROTECTION AND CLEANING

A. While masonry walls are being built, they shall be protected when not being worked on to prevent rain from saturating the wall. Covering of suitable materials such as canvas or plastic sheeting shall be placed atop the wall and shall extend at least two feet on either side of the wall. Covering shall be weighted down to prevent it from being lifted by the wind.

Delete this paragraph for projects having interior work only.

B. At the completion of the work, all holes or defective mortar joints in exposed masonry shall be pointed and where necessary defective joints shall be cut out and repointed. All exposed masonry shall be thoroughly cleaned of mortar drippings, sand and splotches during the course of the work. No smoothing of a wall surface which produces a "bright spot" when painted will be accepted. All adjoining work subject to damage shall be carefully protected.

C. Upon completion of work, all surplus, waste materials, rubbish and debris shall be removed from the premises, leaving same in clean and satisfactory condition.

END OF SECTION

NOTES TO ARCHITECT

NOTES TO ARCHITECT

SECTION 06311 - PRESERVATIVE TREATED LUMBER

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. As specified in Section 00700.

Manufactured casework specified in other sections must also be treated in accordance with these specifications. Be sure to specify this.

1.02 SUBMITTALS

A. A Certificate of Treatment shall be issued to the Engineer showing compliance with these specifications, both as to kiln drying and type of treatment performed, including dip treatment.

B. The Contractor shall submit a written certification to the Engineer that all wood used and left in place on this job was treated in accordance with these specifications and that all cuts and penetrations made subsequent to the treatment were coated with preservatives in compliance with Sub-section 3.04.

1.03 GUARANTY

Delete this paragraph for renovation projects in which new wood construction is butted up against existing wood construction.

A. The Contractor shall submit to the Engineer a written guaranty that he will replace all treated wood which is attacked by subterranean termites within a period of two years from the date of project acceptance up to a total cost of $5,000.00 as verified through a cost breakdown in accordance with Section 8.4(b) "Force Account Work" of the General Conditions or is attacked by dry wood termites or deteriorates due to dry rot within the first five years of the project acceptance date. The Surety shall not be held liable beyond two years of the project acceptance date.

PART 2 - PRODUCTS

2.01 GENERAL

A. All wood treated with oil-borne preservatives shall be kiln-dried before treatment to an average moisture content of 12% to 15% per AWPA standards.

B. All wood treated with water-borne preservatives (with the exception of Hi-Bor (SBX) treated wood) shall be air dried or kiln-dried before treatment to an average moisture content of 28%

or less per AWPA standards. Wood having a moisture ccontent higher than 28% is acceptable when treating with Hi-Bor (SBX).

C. All wood shall be treated as noted below except all-heart redwood.

D. Lumber shall be milled to finish size and shape prior to treating, and it shall be treated before assembly. Plywood may be treated in regular panel sizes.

2.02 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

B. Water-Borne Preservatives shall be Wolman CCA, Osmose CCA, Supatimber CCA or Chemonite ACZA or Hi-Bor (SBX) in accordance with American Wood Preservers Association (AWPA) Standard P5. Preservatives shall be EPA registered.

C. Water-Borne Preservatives used to coat end cuts and penetrations within CCA or ACZA treated wood shall be Wolman (R) Treat 00, Wolman (R) Clear or Osmose Special K-33 Preservative. Preservatives shall be EPA registered.

D. Water-Borne Preservatives used to coat end cuts and penetrations in HI-BOR (SBX) treated wood shall be Clear-Bor F.T. or an equivalent solution of 10% inorganic boron. The end coating solution must be approved and labeled by the Environmental Protection Agency and must be accepted by the State of Hawaii, Department of Agricultural Pesticide Division for this purpose. The treatment solution shall have a colorant added which will tint the wood surface to indicate treatment.

E. Oil-Borne Preservatives shall be TRIB II (0.50% by weight chlorpyrifos, 0.75% by weight 3-iodo-2-propynyl butyl carbamate [IPBC]), Perma-Clear 65 (Zinc Naphthenate and Permethrin) or DAP Inc. "Premium Woodlife" (for dip treatment only), manufactured to the manufacturer's quality control and EPA registered. The solvent used in formulating the preservative solution shall meet the requirements of AWPA hydrocarbon solvent Type C, Standard P9, Paragraph 3.1.

PART 3 - EXECUTION

3.01 WOOD PRESERVATION WITH WATER-BORNE PRESERVATIVES

A. Unless otherwise stipulated, all lumber and plywood shall be pressure treated.

B. Lumber and plywood, except as stipulated in Paragraphs 3.02 and 3.03 below, shall be treated with Wolman CCA, Osmose CCA or Supatimber CCA in accordance with American Wood Preservers Bureau Standards AWPB APPROVED (Hawaii Use only) or with Chemonite ACZA in accordance with American Wood Preservers Bureau Standards AWPB LP-2 or Hi-Bor (SBX), using the full cell pressure method in conformance with APWA Standard C1-93. Lumber and plywood treated with Hi-Bor (SBX) shall attain the following penetration **and retention** requirements:

1. Lumber:

   a. Penetration requirement for lumber under 5 inch nominal thickness: 0.40 inch in heartwood and **90%** in sapwood.

   b. Penetration requirement for lumber 5 inch nominal thickness and over: 0.50 inch in heartwood and **90%** in sapwood.

c. Retention requirement for lumber shall be a minimum of **1.50% weight/weight** or **0.42** pounds per cu. ft. in an assay zone of 0.0 - 0.6 inches **for lumber under 5 inches nominal thickness and 0.0 - 0.75 inches for lumber over 5 inches in nominal thickness**.

2. Plywood:

a. Penetration requirement for plywood shall be identical to that noted in AWPA C9-90.

b. Retention requirement for plywood shall be a minimum of **1.27% weight/weight** or **0.40** pounds per cu. ft. through the full thickness.

C. All 1" and 2" lumber and all plywood shall be dried to a moisture content of 19% or less after treatment.

D. Bleacher seat planks shall be cut and drilled prior to treatment, and both seat planks and roof decking shall be kiln-dried to a moisture content of 15% or less after treatment.

Call for and show over-sizing and/or elonga-tion of bolt holes in seat-board support frames to permit adjustments during installation.

3.02 WOOD PRESERVATION BY PRESSURE TREATMENT WITH OIL-BORNE PRESERVATIVES

A. Hardwood flooring and exposed lumber 1-1/2" (net thickness) and over that will be unpainted or receive a clear finish shall be unincised and pressure treated in accordance with the process specifications noted in the latest edition of AWPA Standard C-1, C-2 and C-9.

B. Treated wood shall attain the following net retention requirements:

NOTES TO ARCHITECT

1. TRIB II: 0.0175 lbs. of Chlorpyrifos per cu. ft. of wood, 0.035 lbs. of 3-Iodo-2 propynyl butyl carbamate per cu. ft. of wood.

2. Perma-Clear 65: 0.06 lbs. of zinc as metal per cu. ft. of wood and 0.006 lbs. of Permethrin per cu. ft. of wood.

Be sure to specify wood core and Type I glue for **solid-core** flush **wood** door**s**. Also call for laminated plastic with molding edge band where applicable.

Note: Since door mfrs. do not preservative treat the doors, their warranty will not cover such treatment performed by others. The treatment and doors shall be warranted by the Contractor. Be sure to address this under the Wood Door specifications.

3.03 WOOD PRESERVATION BY DIP TREATMENT

A. All finish lumber under 1-1/2" net thickness (except hardwood flooring); doors **(solid wood and solid-core flush wood doors)**; finish plywood; and mill work items, such as for cabinet work, shelving and similar wood work that will be exposed to view in the finished work shall be immersion treated for a minimum period of 15 minutes in any of the preservatives listed in Section 2.02 D. Oil-Borne Preservatives above or in a solution of 1 quart chlopyrifos in 55 gallons of a 0.50% IPBC solution. **Hollow-core flush wood doors shall be immersion treated for a period of 5-minutes.**

B. Doors shall be treated after manufacture but, where applicable, before application of plastic laminate.

3.04 INSTALLATION

A. **Wood shall be thoroughly dried and virtually odor-free prior to installation.**

B. Wherever it is necessary to end cut or penetrate into (such as by drilling or notching) treated

NOTES TO ARCHITECT

wood on the job, all such cuts and penetrations shall be treated in accordance with AWPA Standard M4-84 using two heavy brush coats of a treating solution noted in the following schedule. Exception: Cuts and penetrations made in Hi-Bor (SBX) treated wood 2 inches or less in nominal thickness need not be field treated.

Be sure to include reference to this requirement for field treatment in your Carpentry Section.

INITIAL WOOD TREATMENT	FIELD TREATMENT
Wolman CCA	Wolman (R) Treat 00
Osmose CCA	Osmose Special K-33 Preservative
Supatimber CCA	Wolman (R) Treat 00 or Osmose Special K-33 Preservative
Chemonite ACZA	Wolman (R) Treat 00
TRIB II	Wolman (R) Clear
Perma-Clear 65	Perma-Clear 65
Hi-Bor SBX	Clear-Bor F.T. (with colorant added)

B. Perma-Clear 65 and Hi-Bor (SBX) treated wood shall not be used in areas exposed to direct precipitation (e.g. exposed decking, trellises, fencing, etc.) unless painted or covered with a finish material.

END OF SECTION

NOTES TO ARCHITECT

SECTION 07110 -MEMBRANE WATERPROOFING (Below Grade and Between Slab)

PART 1 - GENERAL

Be advised that the membranes noted in this section are intended for use in below-grade and between slab applications. They are not intended for use under thin-set ceramic or quarry tile floor installations.

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

The Contractor shall be an approved applicator of the manufacturer whose membrane waterproofing system he proposes to apply. He shall be familiar with the products, equipment and the specified requirements and methods needed for the proper installation of the membrane waterproofing system.

1.03 SUBMITTALS

A. The Contractor shall submit the following to the Engineer for approval:

1. Prior to the start of work, a signed certificate from the membrane waterproofing manufacturer stating that the Contractor is an approved applicator of his assemblies.

2. Six (6) copies of the manufacturer's material specifications, application instructions and Material Safety Data Sheets for the membrane waterproofing system and materials which he proposes to use.

3. Guaranty as noted under Section 1.04.

1.04 GUARANTY

The Contractor shall execute to the State of Hawaii a 2-year written guaranty that the installation will be watertight and that any leaks which develop during that period which are not due to improper use or willful damage will be repaired at no cost to the State.

1.05 PRODUCT HANDLING

A. Delivery of Materials: All materials shall be delivered to the site in the original unbroken manufacturer's wrapping material and containers with the original labels thereon intact.

B. Storage of Materials at Job Site

1. Materials shall be stored in accordance with the manufacturer's recommendations.

2. Materials which absorb moisture shall be kept under waterproof cover. Wet materials shall not be permitted to be used on the job and shall be removed promptly from the site.

C. Cautions and Warnings

1. Materials containing solvents shall be stored in a dry cool area with proper fire and safety precautions.

2. Vapors from bonding adhesives, lap cements, membrane material products, etc., may be harmful if breathed in. They may also be flammable. The Contractor shall consult container labels and Material Safety Data Sheets for specific information and shall employ the necessary safety precautions needed for the products being used.

1.06 TESTING

A. Horizontal membranes placed between slabs located above usable space shall be water tested for at least 24 hours under a head equal to the thickness of the floor finish to be placed atop the depressed floor slab. Any leaks shall be sealed and the membrane similarly re-tested until it is watertight.

B. The Contractor shall notify the Engineer 24 hours in advance before membrane is tested.

C. Fluid-applied membranes shall be subject to compliance testing by the Engineer to ensure proper thickness of application.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The

NOTES TO ARCHITECT

Contractor shall ensure that all materials incorporated in the project are asbestos-free.

Add to or delete from the listing shown to suit your project.

B. Sheet Applied Membrane Systems:

Material:	Rubberized Asphalt or Butyl Rubber
Thickness:	60 mil min.
Facing Sheet:	Polyethylene or Polypropylene

Products of the following manufacturers are acceptable provided they meet the materials and construction specified:

Nord Bitumi:	Nordtene 60
Protecto Wrap Co.:	Jiffy Seal 140/60
Polygard Products, Inc.:	Polygard 650
Polyken Technologies:	Polyken 660
QSC Products, Ltd.:	QSC-701
Royston Laboratories:	104-AHT
WR Grace & Co.:	Bituthene 3000

C. Sheet Applied Membrane Systems:

Material:	E.P.D.M. (Ethylene Propylene Diene Monomer) or Chlorinated Polyethylene (CPE)
Thickness:	60 mil min.

Products of the following manufacturers are acceptable provided they meet the materials and construction specified:

Carlisle Syntec Systems:	Sure-Seal EPDM
The Noble Company:	NobleSeal CP

D. Sheet Applied Membrane Systems:

Material:	High density polyethylene (20 mils thick) with bentonite facing of 1# per sq. ft.

Products of the following manufacturers are acceptable provided they meet the materials and construction specified:

Paramount Technical Products Inc.	Paraseal (Below-grade application only.)

E. Fluid Applied Membrane Systems (Cold-Applied):

Material:	1 or 2 component Polyurethane
Thickness:	60 mil min.

Products of the following manufacturers are acceptable provided they meet the materials and construction specified:

Mameco International Inc.:	Vulkem 201 (moisture cure) Vulkem 222 (chemical cure)
Multi-Chemical Products, Inc.:	Mult-I-Thane 3000 Mult-I-Flex 3200 (between slab use only)
The Neogard Corporation:	Permagard
Pacific Polymers, Inc.:	Elasto-Deck BT (Type I or II)
Sonneborn:	HLM 5000
Tremco:	Tremco TP-60

F. Fluid Applied Membrane Systems (Hot-Applied)

Material:	Rubberized Asphalt
Thickness:	Per Manufacturer's Printed Instructions but no less than

1/8" min.

Products of the following manufacturers are acceptable provided they meet the materials and construction specified:

Hydrotech:	Monolithic Membrane 6125
Tremco:	Tremproof 150

G. Surface Primers, Sealants, Flashings, Reinforcing Sheets, Adhesives, Asphalts, Welding Agents, etc. shall be as recommended by the membrane manufacturer for the specific project installation and shall be compatible with the substrate and membrane waterproofing with which it is in contact.

H. Protective Layer for membrane waterproofing applied on vertical surfaces below grade shall be of inert material, compatible with the waterproofing membrane over which it is overlayed and acceptable to the membrane manufacturer. The following materials are acceptable provided the above stipulations are also met:

1. 7/16" thick glass fiberboard.
2. 1/4" thick mineral hardboard.
3. 1/4" thick fiberglass-and-asphalt protection panels.
4. Heavy-duty reinforced rubberized asphalt sheets.

Inert, non-biodegradable Protective Boards which are compatible with the membrane waterproofing and are of sufficient thickness and density to protect the membrane waterproofing as recommended by the protective board manufactuer may be used in lieu of the protective layer described above. The indicated products of the following manufacturers are acceptable provided they also meet the above stipulations:

Amocor:	Amocor-PB4 (Extruded Polystyrene)
Pacific Allied Products, Ltd.:	Expanded Polystyrene
Dow Chemical Company:	Styrofoam (Extruded Polystyrene)

NOTES TO ARCHITECT

Paramount Technical Products Inc.:	Paradrain (Polyethylene geotextile)

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

A. Before the work is started, the Membrane Waterproofing Installer, together with the Contractor and Engineer, shall examine the

surfaces onto which membrane waterproofing is to be applied. Should any condition be found unsuitable, no work shall be done until the unsatisfactory condition has been corrected and is acceptable to the Membrane Waterproofing Installer. Proceeding with the work will imply acceptance of the conditions by the Membrane Waterproofing Installer.

B. Materials used to patch substrate defects shall be compatible with the substrate and the membrane waterproofing.

3.02 INSTALLATION

A. The procedures and details for the application of waterproofing membranes, especially such items as the patching of substrate defects; surface cleaning and preparation; surface priming; installation of bond breakers at joints; installation of inorganic cant strips at vertical and horizontal corners; mixing of components; number of membrane layers or coats; embedment of reinforcing sheets; details at edges, corners, laps, penetrations and discontinuities; sealing and/or fastening of the top edge of the membrane placed on vertical surfaces; protection of the membrane; repair of damage; etc., shall be in strict accordance with the manufacturer's printed instructions and recommendations.

B. For toilets, showers and other similar areas, the membrane shall be extended 4" up adjacent verical surfaces or 1" above the finished floor level, whichever is higher.

C. Sheet applied membranes shall be rolled or squeegeed onto the surface to ensure total adhesion to the substrate. Wrinkles and buckles in the membrane shall be avoided.

D. Edges and ends of sheet applied membranes shall be lapped and sealed in accordance with the manufacturer's recommendations.

E. Adjoining surfaces which are not to receive waterproofing shall be protected to prevent spillage of liquid materials outside of the membrane area.

F. A protective layer as specified in Sub-paragraph 2.01 G. above shall be provided over membranes on vertical surfaces below grade.

G. The Contractor shall provide protection for horizontal between-slab membranes to prevent puncturing or damage as follows:

   1. Protective layer/boards shall be neatly trimmed and tightly butted together to provide a continuous cover over the membrane waterproofing.

   2. Care shall be taken during the backfilling operation to ensure that the membrane and protective layer/boards are not damaged.

H. Care shall be taken to protect under-tile membranes from puncture or damage at all times until topping materials have set.

I. Repair of any damage to the membrane waterproofing shall be in strict accordance with the manufacturer's recommendations.

3.03 CLEAN-UP

The installer shall take care to keep surfaces that will be exposed clean. At the completion of work, he shall clean all surfaces onto which waterproofing materials have been dropped, spattered, or brushed and repair damages or defects for which he is responsible. He shall also remove and properly dispose of leftover materials and debris.

END OF SECTION

NOTES TO ARCHITECT

NOTES TO ARCHITECT

SECTION 07510 - BUILT-UP BITUMINOUS ROOFING

PART I - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

Add to, delete from or modify this section to fit your project.

1.02 COORDINATION WITH OTHER SECTIONS

A. Coordinate installation of metal edging, pitch pocket pans, gutters, counterflashing, etc. with SHEET METAL Section.

B. Coordinate installation of vent pipe flashing and roof drains with PLUMBING Section.

C. Coordinate installation of wood strips related to roofing with CONCRETE and CARPENTRY AND RELATED WORK Sections.

Be sure to call for coordination with this section in your SHEET METAL, PLUMBING, CONCRETE, and CARPENTRY AND RELATED WORK Sections.

1.03 GENERAL REQUIREMENTS

A. The Contractor shall visit the job site to verify the site conditions and dimensions prior to submitting his bid.

Delete this paragraph for new work.

B. The roofing operations shall be so coordinated with appurtenant work such as sheet metal work that roof surfacing operations once started shall be continuous to completion.

C. The roofing contractor shall be an approved applicator of the manufacturer whose roofing system he proposes to apply and his men shall have been instructed by that manufacturer (or their representative or independent roofing auditor / inspector) in the proper application of his system.

D. The Roofing Manufacturer's Representative and their independent roofing auditor/inspector (where applicable) shall be competent, thoroughly trained and experienced in the work and shall be completely familiar with the products, equipment and the specified requirements and methods needed for the proper installation of the roofing membrane and flashings.

NOTES TO ARCHITECT

E. The Contractor, Roofer and the authorized Roofing Manufacturer's Representative and/or their independent roofing auditor/inspector shall attend a pre-construction conference to review the preparation and installation requirements for the roofing system and the coordinating and scheduling required with related work. They shall also inspect the roof surfaces at the following times:

1. Prior to the start of the roofing installation as noted under Section 3.01 A. where required by the manufacturer to validate his warranty.

2. At the actual start of the roofing application.

3. Once during the roofing application.

4. At job completion.

Note: It shall be the responsibility of the Contractor to notify the Roofer, Manufacturer's Representative or their independent roofing auditor/inspector (where applicable) and the Engineer of his schedule of operations. Parties shall be notified at least 5 days in advance to enable their attendance.

Change number to suit magnitude and complexity of your project. A minimum of One inspection is required during the roofing application for roofs < 7,000 s.f. with no unusual penetrations and with no A.C. equipment.

1.04 DRAWINGS

A. Should the Manufacturer's warranty requirements necessitate different drawing and details exceeding the requirements of those shown or specified, provide shop drawings and field adjustments at no cost to the State.

1.05 SUBMITTALS

NOTES TO ARCHITECT

A. The contractor shall submit the following to the Engineer:

1. Prior to the start of any work, a signed certificate from the proposed roofing manufacturer showing that the roofer is a trained and authorized applicator of his assemblies.

2. A signed certificate from the proposed roofing manufacturer naming their representative and their independent roofing auditor/inspector (where applicable) and showing that he is authorized to act on and make commitments in their behalf.

3. 5 complete sets of the following information for the roofing system he proposes to use. Submittals shall be marked-up as necessary to clearly identify the items being submitted and its conformance to the requirements of these specification:

   a. Manufacturer's material product data and Material Safety Data Sheets for the following items:

      1. Insulation.
      2. Insulation Fasteners.
      3. Wood Fiber Board.
      4. Dry Sheet.
      5. Base Sheet.
      6. Combination Base Sheet & Dry Sheet.
      7. Venting Medium.
      8. Ply Sheets.
      9. Cap Sheet.

Delete references to any and all materials which are not applicable to your job.

NOTES TO ARCHITECT

10. Base Flashing System.
11. Walk-on Pads.
12. Cant Strip.
13. Roofing vent.
14. Asphalt.
15. Flashing Cement.
16. Neoprene Flashing Cement.
17. Insulation Adhesive.
18. Emulsion and Coatings.

b. Detailed installation drawings and specifications for the proposed roofing system/assembly. The installation drawings shall indicate the layout of insulation and the location of mechanical fasteners.

Delete reference to insulation when it is not used.

c. Test report from a qualified testing laboratory indicating that the proposed roofing system has a fire classification rating of either Class A or Class B. The test report shall also indicate the maximum roof slope permitted for the proposed assembly.

d. Where required, Factory Mutual approval for the proposed roofing system.

All materials except the insulation, emulsions, coatings and the venting medium when it is under insulation and is therefore not an integral part of the roofing membrane shall be as labeled or approved by one manufacturer.

4. Detailed roofing inspection reports by the Manufacturer's Representative or their independent roofing auditor/inspector (once during the roof application and one at job completion.

Insert number of inspections as applicable. (See Section 1.03 E.3.)

5. Warranties and Guaranties as noted under Section 1.06.

NOTES TO ARCHITECT

1.06 GUARANTY

A. The Contractor shall furnish to the Engineer a written guaranty on the roofing membrane system and base flashing for a 2-year period after the Project Acceptance Date. The guaranty shall provide the following at no cost to the State:

Be sure to require a 2-year quaranty on sheet metal counterflashing and sealing in your SHEET METAL Section.

1. Repair of roofing and flashing as necessary to seal leaks which are attributable to faulty materials and/or workmanship;

2. Repair or replacement of damage to the building and/or its finishes, equipment and/or furniture when occasioned by such leaks; and

3. Inspection of the roofing and flashings together with the Engineer or his designated representative, on or about the 1st and 2nd anniversaries of the Project Acceptance Date, and repair or replacement of the roofing and/or flashings as necessary to correct any deficiencies in workmanship or materials, such as by eliminating blisters exceeding 12" in any dimension or re-adhering felts or cap sheets which have separated at the joints to a depth of one inch or more from the edge. Such repair or replacement of roofing and/or flashing shall be done in a manner which will preserve the integrity of the roofing membrane.

1.07 PRODUCT HANDLING

A. Delivery of Materials: All roofing materials shall be delivered to the site in the original unbroken manufacturer's wrapping material and containers with the original labels thereon intact. If any bulk or unlabeled materials are to be used, a properly attested certificate from the manufacturer stating that such materials comply with the requirements of the Contract

NOTES TO ARCHITECT

Documents shall be furnished to the Engineer prior to installation.

B. Storage of Materials at Job Site

1. Except when placed on roof decks immediately prior to installation, roofing materials shall be stored above the supporting surfaces, such as on pallets.

2. Roll goods, insulation, and any other materials which either absorb or are adversely affected by moisture shall be kept dry. Wet materials and/or materials which appear to have been deteriorated after getting wet shall not be permitted to be used on the job and shall be removed promptly.

Delete the word "insulation" when that material is not used.

3. Materials containing solvents shall be stored in a dry, cool area with proper fire and safety precautions.

4. Roll goods shall be stored on end.

5. If stored on other than the ground, all materials shall be distributed so that their resultant weight does not exceed the design live load on the deck (normally 20 lbs. per square foot on roofs and 40 lbs. per square foot on floors).

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

Delete references to any and all materials which are not applicable to your job.

NOTES TO ARCHITECT

B. General: Each package of built-up roof covering materials shall bear the label of a recognized agency having a service for the inspection of material and finished products during manufacture (e.g., ASTM, UL, etc.).

C. Asphalt: Standard brand complying with ASTM D312 Types III or IV, or modified roofing asphalt with its softening point (SP), flash point (FP) and equiviscous temp. (EVT) clearly marked on each package.

D. Asphalt Primer: Standard brand complying with ASTM D41.

E. Roof Insulation: Standard brand complying with the following:

Delete this paragraph if insulation is not used.

1. Mineral Fiber Insulation Board complying with ASTM C726.

2. Mineral Aggregate (Perlite) Thermal insulation Board complying with ASTM C728.

3. Faced Polyisocyanurate Insulation Board complying with Federal Specifications HH-I-1972 (polyisocyanurate only, polyurethane not permitted).

Be sure that insulation specified on metal decks will span flute-to-flute clear span.

Insulation shall have a minimum thermal resistance (R factor) of _____ btu/hr./sq/ft.

Specify thermal resistance when required. If not, delete sentence.

F. Roof insulation for slope build-up: Uniform thickness and tapered insulation of the types in Subsection 2.01 E above. May also be pre-tapered EPS (expanded polystyrene) conforming to ASTM C578, Type I, nominal density of 1.0 lb./cubic foot.

Delete this paragraph if slope build-up is not part of the project scope. Specify thickness if it is critical to detailing. Add Notes on appropriate plan details: "Insulation thickness assumed for plan detail is ____ inches. Required changes shall be coordinated if actual thickness is other than as shown."

1. Over non-combustible decks, unless otherwise required by the testing laboratory's report for a fire rated assembly, the EPS insulation shall be faced in the field with a minimum of 1/2" thick perlite insulation board or wood fiberboard. The maximum roof slope where a mineral surfaced cap sheet is provided is 1 inch per foot.

2. Over combustible decks, a thermal barrier board and/or facing board as required by the testing laboratory's report for a fire rated system shall be provided over the EPS insulation.

NOTE: If the Contractor elects to use insulation with a thickness other than that shown on the plans, he shall be responsible to prepare any revised detail drawings and to coordinate with other trades as may become necessary because of the thickness change. Any additional costs to implement such a change shall be borne by the Contractor.

NOTE: Where the testing laboratory's report permits the use of ESHAVENT venting medium directly over EPS insulation (without a thermal barrier or facing board), the EPS shall have a minimum density of 1.25 lbs. / cubic foot.

G. Roof Insulation Tape: Minimum 6" wide fiberglass roof insulation tape.

Delete when insulation is not used.

H. Wood Fiberboard: Standard brand complying with ASTM C208, asphalt coated on six sides and compatible with the insulation and roofing system as per the manufacturer's recommendations.

Delete when insulation is not used.

I. Cant Strip: Mineral fiber or perlite, compatible with the insulation and the roofing system. Cants shall be a minimum of 4 inches high with an exposed face at 45 degrees to the plane of the roof.

J. Mechanical Fasteners For Insulation: Manufactured products of the appropriate type and length for the proposed roof deck and insulation installation as recommended by the

Delete when insulation is not used.

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insulation manufacturer and approved by Factory Mutual as a component of the roofing system.

K. Roof Insulation Adhesive: Adhesive shall be asbestos free, waterproof (non-reemulsifying) and compatible with the insulation and substrate as recommended by the roof insulation manufacturer. Adhesive shall also be approved by Factory Mutual as a component of the roofing system.

Delete when insulation is not used.

L. Roofing Nails: Galvanized, of the appropriate type and length for the proposed installation as recommended by the roofing membrane manufacturer.

M. Plastic Cement: Standard brand, asbestos free, as recommended by the roof membrane manufacturer.

N. Neoprene Flashing Cement: Standard brand, asbestos-free, as recommended by the roof membrane manufacturer.

O. Emulsions and Coatings:

1. Emulsion shall be asbestos free and compatible with the finish coating as recommended by the roof membrane and roof coating manufacturer.

Delete this Sub-Section when colored or reflective coating is not desired as a finish.

2. Color Coating shall be as recommended by the roof membrane manufacturer, asbestos-free, and approved as part of the proposed fire rated roof membrane assembly by a qualified testing laboratory. Color shall be _____.

Delete when only reflective coating is to be used.

3. Reflective Coating shall be an asphalt-based, asbestos free, fibrated aluminum roof coating as recommended by the roof membrane manufacturer and approved as part of the fire rated roof membrane assembly by a qualified testing laboratory.

Specify color.

Delete when only color coating is to be used.

P. Gravel Surfacing: Roofing chips meeting the requirements of ASTM C33, Size No. 8, and free of loose dust. Coral chips shall not be used.

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Q. Dry Sheet: Rosin-sized paper weighing not less than 4#/100 s.f., unsaturated felt weighing 7-1/2#/100 s.f., or roof sheathing paper weighing approximately 6#/100 s.f.

R. Base Sheet: Asphalt coated glass fiber base sheet as recommended by the roof membrane manufacturer and complying with ASTM D4601, Type I.

S. Combination Base Sheet / Dry Sheet: Asphalt coated base sheet with laminated kraft paper backing conforming to ASTM D4601, Type I.

Use gravel surfacing only when directed by Central Services on reroofing projects where roof slope is inadequate to drain. Delete on new projects or when smooth or mineral surfaced finish is used.

Delete paragraphs "Q" and "S" when deck is other than wood.

T. Venting Medium:

1. Special venting sheets, such as Ventsulation by Johns-Manville, Channel Vent GB Base Sheet by Celotex Corp., Stratavent by GAF Corp. and "ESHAvent" by Malarkey Roofing Company.

Delete when venting medium is not used.

Insul Base by Intec/Permaglas may be used only on top of insulation on an insulated deck with a single layer of insulation.

Use over all decks of concrete, lightweight concrete, and nailable concrete fills such as perlite, vermiculite, gypsum or cellular concrete.

2. Mineral-surfaced cap sheet installed with granules down.

3. Glass fiber insulation.

U. Ply Felts/Sheets: Asphalt impregnated sheets reinforced with inorganic fibers and conforming to ASTM D2178, Type IV (Heavy Duty Ply Sheet).

V. Mineral Cap Sheet: Asphalt impregnated and coated sheets reinforced with inorganic fibers, uniformly surfaced on one face with inorganic mineral granules firmly embedded into the asphaltic coating and conforming to ASTM D3909. Color of finish shall be _____.

W. Torch-on Modified Bitumen Base Flashing: Flashing material shall be manufactured with atactic- polypropylene (APP) or

Delete this paragraph when smooth or gravel surfaced finish is used.

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styrene-butadiene-styrene (SBS) polymers and reinforced with inorganic fiber. Nominal thickness of the material shall be 160 mil (4.0 mm). Where two layers of flashing are required, the bottom layer shall be smooth surfaced. The finish of the surface layer shall match the adjacent roof surface.

Specify color.

X. Walk-on Pads: Composed of chopped rubber particles and synthetic binders. Pads shall be cut from rolls nominal 0.321 inch (8mm) thick x 31.5 inches (80 cm) wide x 32.8 feet (10 m) long. Pads shall be "Trafblock Walk Pad" as manufactured by Siplast or approved equal. Adhesive for pad application shall be compatible rubber based adhesives approved by the roofing membrane manufacturer. Finish surface of the pad shall match the adjacent roof surface.

Delete when walk-on pades are not used.

Y. Roofing Vent: Manufactured plastic assembly at least 6 inches high with minimum 2-inch base diameter vent stack and 10-inch diameter base flange. As an option, the vent assembly may be of copper meeting the above minimum dimensions.

This description is for a 2-way vent. Be sure to modity description if 1-way or solor vent is required.

Z. Termination Bar: 1" x 1" x 1/8" thick galvanized steel angle with slotted holes at 8" o.c. or approved equal.

Delete when termination bar is not used.

2.02 BUILT-UP ROOFING ASSEMBLIES

A. General Requirements:

1. In accordance with the Uniform Building Code, the roof covering assembly shall have a fire classification rating of either Class A or Class B when tested in accordance with U.B.C. Standard 32-7 or as

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otherwise tested and rated as either Class A or B by a qualified testing laboratory (Underwriters Laboratories (UL), Warnock Hersey, Factory Mutual (FM) or approved equal).

2. Roofing materials shall conform to Federal and/or ASTM specifications as indicated.

B. Built-up Roofing Assemblies

1. Roof insulation as called for in sub-paragraph 2.01 E. and F. above shall be installed as described herein where shown on the plans.

Delete this paragraph when insulation is not used.

2. Roofing membrane system shall consist of at least three solid layers of asphalt contained between the top felt or cap sheet and the roof deck, base sheet or insulation, as the case may be. (The flood coat into which aggregate is broadcast for gravel-surfaced roofing, the emulsion over smooth-surfaced roofing and the asphalt used to adhere insulation to the venting medium over a concrete or nailable concrete fill deck shall not be considered as one of the required layers.) Asphalt above the top felt or cap sheet, or below the insulation where such is used, shall not count as one of the required layers.

Delete references to materials such as gravel, emulsion, insulation, etc. when they are not used.

3. Roof and Base Flashings:

a. Flashings shall consist of either hot-mopped asphalt, 2 roofing plies and a mineral-surfaced cap sheet (granule-side up) or 1 or 2 layers of a modified bitumen base flashing, as specified in sub-paragraph 2.01 W. installed in accordance with plan details.

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Each layer of modified bitumen flashing shall be torched-on (heat-welded) onto the substrate in accordance with the manufacturer's instructions.

b. Flashings shall be secured to the vertical surfaces using appropriate type fasteners through tin caps at 8 inches o.c. along its top edge or where otherwise shown on plan details.

c. See paragraph 3.04 for minimum flashing over metal flanges, edging etc.

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

A. Before the work under this section is started, the Roofer, together with the Manufacturer's Representative or their independent roofing auditor/inspector (where applicable) and the Contractor shall meet with the Engineer at the job-site to examine all surfaces on which roofing will be placed and all adjoining work, including inserts, which will affect or be affected by the roofing work. All unacceptable areas and/or conditions such as those listed in subparagraph 3.02 A.5 shall be corrected by the contractor and verified and accepted by the Roofer and the Manufacturer's Representative or their roofing auditor/inspector prior to start of the work.

Include other related trades in the inspection group if/as applicable to your job (e.g. the sheet metal subcontractor where there are embedded reglets in parapet walls, etc.)

B. Before the work under this section is started, the Contractor and Engineer shall inspect and record the conditions of the building interior rooms and ceilings. The Contractor shall protect the interior finishes, furniture and equipment against damage.

Delete this paragraph for new construction projects.

3.02 APPLICATION

A. General

1. Workmanship: The Roofer shall have a responsible foreman on the job during

roofing operations who shall ensure that all work is done in accordance with the plans and specifications.

2. No roofing shall be installed during precipitation and shall not be started in the event there is a possibility of precipitation during application.

3. No roofing shall be started in the absence of the Engineer or his representative. The Contractor shall call the Engineer to give at least one day (24 hours minimum) advance notice of the starting of roofing operations.

4. The application of roofing shall be as specified or as shown in the plans.

5. Absolutely no roofing shall be applied before the deck and the work in connection therewith have met the following conditions:

   a. Wood decks shall be dry (moisture content 19% or less as measured on the Moisture Meter's Wood Scale); smooth; free from loose materials; properly graded to outlets; and swept clean. Knot holes or loose knots over one inch in dia. and cracks over 3/8" wide shall be covered with 24-gauge galvanized sheet metal nailed in place.

   Delete paragraphs for decking which are not applicable to your job.

   b. Concrete decks shall be cured (minimum 7 days) and dry (a test spot pour of hot bitumen shall not froth, bubble or be removable by hand after cooling), smooth, free from loose materials, properly graded to outlets, and swept clean. All sharp projections and lumpy places shall have been removed.

c. Concrete fill shall be tested for adequate holding power before roofing is started. A fastener of the type specified herein for the fill material used shall be driven and pulled out. No roofing shall commence until a minimum resistance of 50 pounds has been attained.

d. Sheet metal panels for insulated steel decks shall be so secured to supporting framework and to each other, and shall be in such condition, that insulation will bear on each rib and not have to bridge over deck discontinuities.

e. Adjoining work, such as roof drains, metal edging, metal counterflashing, gutters and lead collars for vent pipes shall either be in place, ready for the Roofer to work in, or shall be available for installation by others, as applicable. This work shall be coordinated so that the total roofing system will be watertight.

6. The temperature of the asphalt shall be monitored through the use of either accurate temperature gauges attached to the kettles or separate asphalt thermometers which shall be part of the Roofer's equipment. Asphalt shall be heated to no higher than 50€F below its flashpoint (FP), nor heated and held above its finished blowing temp. (FBT) for more than four hours. It shall also be applied at its equiviscous temperature (EVT) range (EVT +/- 25oF).

7. The elapsed time between the application of hot asphalt on the deck and the laying and brooming in of felt, insulation, or cap sheet shall be minimized to insure full bonding between the surfaces being cemented together with the asphalt. It

shall be the Roofer's responsibility to modify his operations to accomplish this considering the ambient conditions of weather, temperature, etc. A felt laying machine shall be used if necessary.

8. Felts shall be bonded to one another using a solid mopping of 25 lbs. of hot asphalt per square (30 lbs. for glass fiber felts). In solid mopping, asphalt shall be distributed evenly, covering each layer 100% so that felt does not touch felt in any place. This means that asphalt shall be carried to the outer edges of shingled felts and flashing strips.

9. Roofing felt shall be applied smoothly and squeegeed into the hot asphalt to eliminate air pockets and assure total contact with the layer below. Also, there shall be no stepping onto the membrane behind the applicator until the asphalt has cooled and hardened.

Felts may be laid with any felt laying machine other than the rotary drum type, except that automatic asphalt spreaders shall not be used where dock slopes are so steep that "runaway" flow occurs.

10. Laying of felts (lapping or shingling) shall be in accordance with the manufacturer's specifications. Unless otherwise specified therein, end laps shall be 4 inches and staggered not less than 12 in. apart.

11. Before application of the cap sheet, build-up all "bird-baths" by mopping in place with hot asphalt one (1) or more layers of felt to provide positive drainage.

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12. Mineral-surfaced cap sheets and coated felts weighing more than 45 lbs. per square shall be cut into lengths not less than 6 feet and not more than 12 feet and allowed to flatten before being laid. They shall be cut and laid so that their side laps do not "stack up" over the side laps of any of the roofing layers below. Each strip shall be laid, then broomed or rolled into a solid mopping of 25 lbs. of hot asphalt per square in any manner that will best eliminate air pockets and assure total contact with the membrane below. Laps for mineral-surfaced cap sheets shall be 2 inches on sides and 6 inches on ends. That for coated felts shall be 2 inches on sides and 4 inches on ends. End laps shall be staggered not less than 3 ft. apart in adjacent strips. There shall be no stepping onto the membrane behind the applicator until the asphalt has cooled & hardened.

For re-roofing projects, show location of bird-baths/ponding areas on the plans and address correction.

Delete this paragraph when smooth or gravel surface finish is used.

13. Where a mineral surfaced cap sheet is used, loose ceramic granules of matching color with the cap sheet shall be broadcast over excess bitumen seepage, spillage, etc., while the bitumen is still liquid in order to provide a neat and uniform finish similar to that of the surfacing sheet. Excess bitumen seepage shall be considered bitumen flowing out past the edge of the cap sheet more than 3/8".

Delete this paragraph when smooth or gravel surface finish is used.

14. For gravel surfaced roofs, not less than 400 lbs. per square of roofing chips shall be embedded in a flood coat (minimum 60 lbs. per square) of hot asphalt.

15. Phased construction (roofing purposely interrupted for a period to permit other work and trafficking over the membrane) shall not be permitted.

Delete when gravel surface finish is not used.

a. The complete roofing membrane, including emulsion surfacing in the case of smooth-surfaced roofing, shall be installed up to the line of

termination (but allowing for required lapping) at the end of the day's work.

b. At the end of the day's work, all incomplete roofing shall be protected using a water cut-off. The water cut-off shall consist of coated felt strips set in plastic cement and lapping both the finished membrane and the roof deck surface in such a manner as to seal all incomplete edges against intrusion of water.

c. Water cut-off shall be removed before continuing installation of the roofing system.

B. Insulation

1. General

a. The application of insulation shall be as specified herein or as shown in the plans unless otherwise stipulated in the specifications and details of the manufacturer of the insulation being used, as submitted to and approved by the Engineer.

Delete this sub-section in its entirety if insulation is not used.

b. Units of insulation shall be laid with their long joints perpendicular to the direction of laying of the roofing plies.

c. Units of insulation shall be laid so that they touch adjacent units along all sides.

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d. Where mineral fiber, mineral aggregate or isocyanurate insulation is applied in more than one layer, depending on the substrate, the first layer shall be mechanically fastened to the deck or hot-mopped onto the base sheet or venting medium. In either case, every layer thereafter shall be solid mopped with asphalt.

e. Unless otherwise indicated, where EPS insulation is used, it shall be laid into a solid mopping of hot asphalt that has been allowed to cool to approximately 225o to 250o F. or shall be adhered to the substrate using waterproof (non-emulsifying) adhesive in accordance with the manufacturer's recommendations.

Delete this paragraph when EPS insulation is not used.

f. If premanufactured, multi-layered EPS insulation is used for building up slopes or crickets, it shall be bonded together with waterproof (non-emulsifying) adhesive covering 100% of the bonded surfaces.

g. When insulation joints are not taped, the short joints shall be staggered.

Delete this paragraph when EPS insulation is not used.

h. When taped, insulation joints may be continuous in both directions. Tape shall be centered on the joint and embedded in hot asphalt applied at a rate of 15 lbs. per square.

i. All joints in EPS insulation shall be tightly butted together. Joints of the field applied facing boards shall be tightly butted together, staggered, offset from the insulation joints below and taped with roof insulation tape. Care shall be taken in applying hot asphalt above the insulation so that it does not contact insulation already in place.

Delete this paragraph when EPS insulation is not used.

2. Acceptability

a. Insulation which shows signs of deterioration (such as reduced resistance to delamination, edge disintegration, etc.) shall not be used.

b. Insulation which has been installed but is still exposed shall be covered immediately when there is any danger that it will get wet.

c. Installed insulation which gets wet shall be handled as follows before any roofing is applied over it:

(1) All insulation shall be completely dried out as determined by a moisture meter.

(2) Glass fiber insulation which gets waterlogged after installation shall be removed and replaced with dry material.

(3) The exposed portions of perlite aggregate insulation board shall be broomed lightly to remove any surface "skin" degradation that may have formed due to wetting. Boards that are gouged or broken in the process shall be removed and replaced.

(4) The location of a joint between perlite aggregate insulation units shall be so marked in the vicinity of the center of the wetted area that an additional roofing vent can be installed directly over it after completion of the roofing membrane.

d. Insulation units with broken corners or similar defects shall be trimmed

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and repaired (gap filled with similar material) or discarded.

e. Any EPS insulation which is damaged because it is subjected to excessive heat shall be removed and replaced with properly installed units.

Delete this paragraph when EPS insulation is not used.

C. Installation

1. On wood and plwood decks:

a. Dry sheet shall be lapped 2 inches on sides and ends and sprinkle-nailed to the deck. A coated base sheet with minimum 2-inch side laps and 6-inch end laps shall be laid over the dry sheet and nailed 9 inches o.c. along all laps and 18 inches o.c. and staggered along lines 12 inches in from each edge. Both sheets may be nailed jointly provided their laps are staggered. Where the roof slope is greater than 1-1/2" per foot, the base sheet shall be laid in the direction of the slope and extended over the ridge where possible.

In high wind areas and open areas subject to high wind conditions, require nailing of insulation in the number and pattern similar to that required for an FM approved I-90 installation along with additional nailing of the base sheet in the outer 4' of the building perimeter. Verify with your project coordinator if your project is in this category.

b. If available, a combination dry sheet/base sheet may be used in lieu of the individual plies of dry sheet and base sheet. The combination sheet shall be nailed as described above for the base sheet.

c. The roofing membrane shall be laid onto the coated base sheet or

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combination base sheet in a solid mopping of hot asphalt.

d. Mineral fiber and mineral aggregate insulation shall be hot-mopped to the base sheet in a solid mopping of 30 lbs. per square of hot asphalt. The roofing membrane shall then be laid over the insulation in a solid mopping of asphalt.

Delete paragraph when insulation is used.

Delete paragraphs "d", "e" and "f" where insulation is note used.

(1) As an alternative, the insulation may be mechanically attached directly to the deck using screw fasteners in the number and pattern recommended by the roof insulation manufacturer. No dry sheet will be required when this alternative is used.

e. Where used, polyisocyanurate insulation shall be fastened to the deck as noted in item (1) above. A venting base sheet or coated base sheet shall be spot-mopped onto the insulation and the roofing membrane shall then be laid onto the venting sheet in a solid mopping of hot asphalt.

f. Where EPS insulation is used for slope build-up, barrier boards placed atop the deck and/or facing boards placed atop the EPS insulation as noted under Subsection 2.01 F. shall be provided as necessary to conform to the requirements for a fire rated assembly and installed in accordance with the insulation manufacturer's

Delete this paragraph when EPS insulation is not used.

recommendations. Where barrier boards are provided, provision of the dry sheet and base sheet may be deleted. The roofing membrane shall be laid onto the facing boards in a solid mopping of hot asphalt.

2. On nailable concrete fill decks (perlite, vermiculite, gypsum or cellular concrete).

a. Venting medium shall be cut into lengths not to exceed 18 ft. and allowed to relax and flatten before laying.

b. The venting sheets shall then be laid over the deck with side laps equal to the selvage (2 inches if none) and end laps of 4 in. staggered at least 12 in. between adjacent strips.

c. Finally, the sheets shall be nailed to the deck using mechanical fasteners appropriate to the deck material in the number and pattern recommended by the roof membrane manufacturer. Fasteners shall be located so that they do not coincide with roof vent locations.

d. The roofing membrane shall be laid onto the venting medium in a solid mopping of hot asphalt.

Delete this paragraph when insulation is used.

e. Mineral fiber and mineral aggregate insulation shall be hot-mopped to the venting medium in a solid mopping of 30 lbs. of asphalt per square. The roofing membrane shall be laid over the insulation in a solid mopping of hot asphalt.

Delete paragraphs "e", "f", "g" and "h" when insulation is not used.

f. If mineral fiber insulation is used

for venting in lieu of the venting medium noted above, it shall be mechanically fastened to the deck using screw fasteners in the number and pattern recommended by the roof insulation manufacturer. Fasteners shall be located so that they do not coincide with roofing vent locations. The roofing membrane shall be laid onto the insulation in a solid mopping of hot asphalt.

g. Where used, polyisocyanurate insulation shall be hot-mopped to the venting medium in a solid mopping of 30 lbs. of asphalt per square. A venting base sheet or coated base sheet shall be spot-mopped onto the insulation and the roofing membrane shall then be laid onto the venting sheet in a solid mopping of hot asphalt.

h. Where used for slope build-up, EPS insulation and facing boards as described under Sub-section 2.01 F. shall be placed onto the venting medium as described under Sub-section 3.02 B.1.e. The roofing membrane shall then be laid onto the facing material in a solid mopping of hot asphalt.

Delete this paragraph when EPS insulation is not used.

3. On concrete decks.

a. When the deck is dry enough to receive roofing (see subparagraph 3.02 A.5.b.), it shall be primed with asphalt primer applied at a rate of one gallon per 100 square feet.

See Tech Memo No. 47 for reroofing projects. re: Deletion of asphalt primer.
Delete paragraph is not applicable to your project.

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b. After being cut and relaxed as described in subparagraph 3.02 C.2. above, the venting sheets shall be spot-mopped to the deck using a minimum of 12 lbs. per square of asphalt. The spots shall be approximately 12 inches in diameter, spaced 18 inches o.c. and staggered, and shall be carefully mopped so that no asphalt is dripped between spots. They shall be located so that they do not cover or encroach into roofing vent locations.

   The venting sheets shall be laid with side laps equal to the selvage (2 inches if none) and end laps of 4 inches staggered at least 12 inches between adjacent strips. Special perforated venting sheets when used shall be installed in accordance with the manufacturer's instructions.

c. The roofing membrane shall be laid onto the venting medium in a solid mopping of hot asphalt.

d. Mineral fiber and mineral aggregate insulation shall be hot-mopped to the venting medium in a solid mopping of 30 lbs. of asphalt per square. The roofing membrane shall be laid over the insulation in a solid mopping of hot asphalt.

Delete this paragraph where insulation is used.

Delete paragraphs "d", "e", "f" and "g" where insulation is not used.

e. If mineral fiber insulation is used for venting in lieu of the venting medium noted above, it shall be spot-mopped to the deck at a rate of 12-16 lbs. of asphalt per square. The roofing membrane shall be laid onto the insulation in a solid mopping of hot asphalt.

f. Where used, polyisocyanurate insulation shall be hot-mopped to the venting medium in a solid mopping of 30 lbs. of asphalt per square. A venting base sheet or coated base

sheet shall be spot-mopped onto the insulation and the roofing membrane shall then be laid onto the venting sheet in a solid mopping of hot asphalt.

g. Where used for slope build-up, EPS insulation and facing boards as described under Sub-section 2.01 F. shall be placed onto the venting medium as described under Sub-section 3.02 B.1.e. The roofing membrane shall then be laid onto the facing material in a solid mopping of hot asphalt.

Delete this paragraph when EPS insulation is not used.

4. On steel decks

a. Insulation shall be laid so that edges parallel to flutes bear on the deck flange surfaces. Joints shall not terminate unsupported over rib openings.

b. The insulation shall be fastened to the deck using mechanical fasteners as described under Subsection 2.01 J. in the numbers and patterns required for a Factory Mutual approved Class 1, I-90 installation.

c. Where mineral fiber or mineral aggregate insulation is used, the roofing membrane shall be laid onto the insulation in a solid mopping of hot asphalt. Where polyisocyanurate insulation is used, a venting base sheet or coated base sheet shall be spot-mopped onto the insulation and the roofing membrane shall then be laid onto the venting sheet in a solid mopping of hot asphalt.

d. Where EPS insulation is used to provide slope build-up, a thermal

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barrier shall first be fastened to the metal deck using mechanical fasteners as described in Subsection 2.01 J. The thermal barrier, insulation and facing boards shall be installed as required so that the total assembly conforms to a Factory Mutual approved Class 1, I-90 installation. The roofing membrane shall be laid onto the facing boards in a solid mopping of hot asphalt.

Delete this paragraph when EPS insulation is not used.

D. Cant Strips.

1. Install cant strips at the intersections with curbs, walls and parapets. They shall be continuous, installed in lengths as long as possible and set in a heavy mopping of asphalt.

E. Roof and Base Flashings.

1. Prior to the application of roof and base flashings, the substrate shall be primed with asphalt primer to ensure proper adhesion of the flashing material.

2. Base flashings shall be secured to the vertical surfaces using appropriate type fasteners, suitable for the substrate condition, through tin caps spaced at 8 inches o.c. along its top edge, unless otherwise shown on the plans.

3. Where a termination bar is called for, it shall be secured to the vertical surface using appropriate type fasteners suitable for the substrate condition through the slotted holes in the bar spaced at 8 inches o.c. Fasteners shall be set in a bead of flashing cement. A cant of

Delete this paragraph when termination bars

	NOTES TO ARCHITECT
flashing cement sloped to the outside edge of the bar shall be formed atop the termination bar.	are not used.
4. See Subsection 3.04 for minimum flashing requirements over metal flanges, edging, etc.	Show detail on plans. Refer to DAGS Std. Detail No. R-3 and R-4a dated 7/91.
5. New roofing which adjoins existing roofing shall be flashed as shown in the plans.	

F. Gravel Surfacing.

1. Not less than 400 lbs. per square of roofing chips shall be embedded in a flood coat (minimum 60 lbs. per square) of hot asphalt for gravel-surfaced roofing.	Show detail on plans. Refer to DAGS Std. Detail No. R-16 dated 9/91. Delete this paragraph when gravel surfacing is not used.

G. Emulsions and Coatings.

1. Emulsion surfacing shall be applied by brushing or rolling and shall be thoroughly cured before color or reflective coating is applied. The minimum curing time shall be as recommended by the manufacturer of the coating, but in any case shall extend until the material does not come off when walked upon, water does not "bead" on its surface and it does not bleed or discolor the color or reflective coating.	Delete this paragraph where emulsion and coating finish is not used.
2. Coating finish shall be applied in strict accordance with the manufacturer's recommendations and instructions. In addition, they shall be applied in the quantities and rates noted on the tesitng	

NOTES TO ARCHITECT

laboratory's report as required to provide a fire rated assembly.

H. Walk-on Pads.

1. Pads shall be cut to size and installed with a compatible rubber based adhesive approved by the roofing system manufacturer.

Delete this paragraph when walk-on pads are not used.

3.03 INSPECTION - FIELD SAMPLES OR CUTOUTS

A. After completion of the specified roofing plies, but prior to the application of the final pour coat and the cap sheet (for mineral-surfaced cap sheet assemblies), or after installation of all roofing but the emulsion coating (for smooth-surfaced assemblies), field samples of the roofing shall be taken at locations selected by the Engineer. The sampling operation shall be performed by the Roofer at no expense to the State and in the presence of the Engineer. The Roofer shall provide all equipment required.

Delete type of roofing finish not applicable to your project.

B. Sampling Requirements: Samples shall be 4 inches x 36 inches cut across the laps of the plies in a manner to expose the specified number of plies and shall be cut to an accurate template (a template may be of a type for self-cutting). Not less than 2 samples shall be cut from the roof for each 100 squares or fraction thereof. This requirement may be increased at the request of the Engineer if he deems it necessary.

C. The samples shall be examined for free water between the plies, the quantity of bitumen used, the adhesive strength of interply moppings, the completeness of interply bonding and the number of plies. They shall then be weighed to determine the total amount of bitumen. The test sample shall not weigh less than 90% of the weight of one square foot of the applicable roof (less the parts of the assemblies as described

NOTES TO ARCHITECT

above) as indicated in the approved manufacturer's specifications.

D. Should the sample show free water, absence of bitumen or a deficiency in the amount of bitumen applied, additional samples shall be taken to determine the extent of the deficiency.

1. Where free water is found between plies, the affected portion of the roof shall be removed completely and reconstructed.

2. Where bitumen deficiencies or poor interply bonding conditions are found, the deficient areas shall have an additional specified ply applied in a full mopping of specified bitumen.

3. Where insulation is found to be wet and the roofing membrane is not adhering, the insulation and membrane over the affected area shall be removed and replaced.

4. Where insulation is found to be wet, but the roofing assembly is otherwise sound, provisions shall be made to permit the water vapor from the insulation to be vented.

Delete paragraphs "3" and "4" when insulation is not used.

5. Correction of any of the above deficiencies shall be made by the Roofer at no additional cost to the State.

6. Roofing shall not proceed until all deficiencies (that may have been disclosed as the result of the "cut-out" test) have been corrected and approved.

E. Cutting edge of the sampling device shall be kept clean by washing in a suitable solvent after each cut.

NOTES TO ARCHITECT

F. Immediately after the sample has been examined and weighed, the "cut-out" area from which a satisfactory sample was taken shall be patched as follows:

1. For wooden decks, a dry sheet and a base sheet of the type cut shall be placed in the bottom of the cut-out and sprinkle-nailed. The base sheet shall be heavily coated with plastic cement and the previously removed sample shall be placed thereon and pressed firmly into the cement. The area shall then be covered with the same number and type of plies as was originally specified. These shall be hot-mopped in place with the first ply overlapping the cut-out area 6 inches on all sides and each succeeding ply overlapping the preceding ply 3 inches on all sides.

Delete paragraphs for decking which are not applicable to your job.

2. For concrete fill decks without insulation a venting sheet of the type cut shall be placed in the bottom of the cut-out and nailed to the deck near each end of the sample with the appropriate fastener. The venting sheet shall be heavily coated with plastic cement. The balance of the patching shall be identical to that for wooden decks as described above.

3. For concrete decks (or decks with insulation), the bottom of the cut-out shall be heavily coated with hot bitumen and the previously removed sample shall be placed thereon and pressed firmly into the bitumen. The area shall then be covered with the same number and type of plies as specified. These shall be hot-mopped in place, with the first ply overlapping the cut-out area 6 inches on all sides and each succeeding ply overlapping the preceding ply 3 inches on all sides.

4. Where roofing over insulation is tested, bitumen shall be carefully separated from the insulation. Any damaged insulation shall be replaced in kind and in the same manner as originally installed.

NOTES TO ARCHITECT

Delete this paragraph when insulation is not used.

3.04 INSTALLATION OF ADJOINING WORK

A. All adjoining work (such as vent pipe flashings, roof vents, etc.) shall be as specified or as shown in the plans.

B. Where modified bitumen flashings are provided, neoprene flashing cement as specified in paragraph 2.01 N. shall be used.

Be sure to call for the furnishing of items of adjoining work in the appropriate specification sections. Delete paragraphs which are not applicable to your project or add paragraphs as required. Describe work in detail and show details on plans (e.g. Roof Scupper, Expansion Joint, Equipment Curbs and Mountings, etc.).

C. Wood Blocking: Wood blocking shall be installed where shown on the plans and shall be secured to the deck with appropriate fasteners spaced at maximum 48 inches o.c.

D. Metal Edging

1. On Mineral-Surfaced Cap Sheet System: Metal edging shall be set in a full bed of flashing cement on top of all roofing plies, not including the mineral-surfaced cap sheet. The edging shall be overlapped (nested, not cut) at least 5 inches at joints with a flexible non-hardening sealant which is compatible with the flashing cement and asphalt placed between the 2 layers of metal in such a manner that metal does not touch metal anywhere. The edging flange shall be securely fastened to edge nailing strips using large-headed nails at least l-l/2" long. Nailing shall be 3 inches o.c. and staggered on either side of flange centerline. Laps shall be double nailed. The flange shall then be primed and flashed with either 2 strips of the specified roofing plies, one 3 inches wider than the flange and the second 3 inches wider than the first; or one layer of torched-on modified bitumen membrane 6

Delete type of roofing system not applicable to your project.

Show detail on plans. Refer to DAGS Std. Detail No. R-6a dated 7/91. If roof drains over edging, call for "0" lips. Use 3/8" height of lip for gravel surfaced roofing.

Provide closely spaced substantial anchorage of the face flange in high wind areas or areas

NOTES TO ARCHITECT

inches wider than the flange, as shown on the plans. The mineral-sufaced cap sheet shall then be laid in hot asphalt over the entire assembly with the edge 1/4" away from the outside corner of the metal edging. A continuous bead of flashing cement shall be applied and pressed into this edge.

exposed to high wind conditions. Continuous sheet metal clips with closely space fasteners or direct nailing of the face flange which closely spaced fasteners having neoprene washers are acceptable. Verify with your Project Coordinator if your project is in this category.

2. On Smooth/Gravel Surfaced System: All metal edging shall be set in a full bed of flashing cement on top of the completed roofing membrane. The edging shall be overlapped (nested, not cut) at least 5 inches at joints, with a flexible, non-hardening sealant which is compatible with the flashing cement and asphalt placed between the two layers of metal in such a manner that metal does not touch metal anywhere. The edging flange shall be securely fastened to edge nailing strips using large-headed nails at least 1-1/2" long. Nailing shall be 3 inches o.c. and staggered on either side of flange centerline. Laps shall be double nailed. The flange shall then be primed and flashed with either three strips of the specified roofing plies, the first 3 inches wider than the flange, the second 3 inches wider than the first, and the third 3 inches wider than the second; or one strip of torched-on modified bitumen membrane 6 inches wider than the flange, as shown of the plans. A continuous bead of flashing cement shall be applied and pressed into the gap between the edge of flashing plies and the outside edge of the metal flashing.

Show detail on plans. Refer to DAGS Std. Detail No. R-6 dated 7/91.

NOTES TO ARCHITECT

3. The face flange of the metal edging shall be anchored as shown in the plan details.

E. Lead Vent Pipe Flashing:

1. Clean off rust from existing vent pipes and extend pipes to a minimum of 6 inches above the finished roofing system.

2. The top and bottom of the lead flashing flange shall be primed and set on top of the completed roofing membrane in a full bed of flashing cement. The flange shall then be flashed with a square piece of the specified roofing ply and one of the mineral-surfaced cap sheet, for a cap sheet system; of two square pieces of the specified roofing plies, for smooth-surface roofing; or of one layer of torch-on modified bitumen membrane with finish matching the adjacent surfacing.

Delete this sentence for new construction projects.

Show detail on plans. Refer to DAGS Std. Detail No. R-8 dated 7/91.

The bottom square shall have dimensions 6 inches more than the pipe flashing flanges and the top square (the cap sheet piece in a cap sheet system) or the modified bitumen flashing piece, 12 inches more. A hole about 1/8" larger than the pipe flashing shall be cut out of the center of the squares, which shall then be successively laid in hot asphalt over the flashing flange (except the modified bitumen piece shall be torched on). A cant of flashing cement shall be formed around the base of the pipe flashing collar after the top flashing square is in place.

3. Finally, the Roofer shall ensure that the lead flashing sleeve is turned down a minimum of one inch into and snugly against the interior surface of the vent pipe. A 1/8 inch mesh screen secured with

NOTES TO ARCHITECT

a stainless steel clamp shall be installed over each vent pipe.

F. Roof Drain:

1. Clean the existing locking ring before tightly bolting it to the drain housing to ensure a watertight system.

2. Replace all broken or missing locking rings, bolts and strainers.

3. Install roofing membrane and lead flashing as indicated on the plans.

Delete paragraphs "1" and "2" for new construction projects.

4. Clean all drainage channels through locking rings thoroughly after reroofing to ensure unimpeded flow of water into the drain.

Show detail on plans. Refer to DAGS Std. Detail No. R-7 dated 9/91 or R-7a dated 7/91.

G. Roofing Vents:

1. Install roofing vents in locations indicated on the plans.

2. Cut a hole with diameter equal to that of the vent stack through the roofing system, including insulation, to the deck.

3. Prime top and bottom of the vent flange and set on top of the completed roofing membrane in a full bed of flashing cement. Complete flashing installation similar to lead vent pipe flashing.

Show location of roof vents and detail of vent on plans. Refer to DAGS Std. Detail No. R-12 dated 9/91 for detail and notes regarding vent location.

H. Temporarily remove electrical conduits, mechanical piping and equipment as necessary to clear the roof for installation of new roofing and reinstall upon completion.

I. Metal Counter-Flashing at Curbs and Parapets:

Delete this paragraph for new construction projects.

1. Existing reglet to remain: Completely remove existing sealant prior to

NOTES TO ARCHITECT

installation of new work. Fill reglet as required in accordance with the roofing manufacturer's instructions.

Delete paragraphs "1" through "4" for new construction projects.

2. Remove existing sheet metal work as necessary to allow for new sheet metal work.

Show detail of flashing on plans. Refer to DAGS Std. Detail No. R-4 dated 9/91 and R-5 dated 7/91.

3. Existing sheet metal work which is called to be re-used in the new work shall be carefully removed and properly stored.

4. Remove existing cant strips and replace with new.

Be sure to specify appropriate sealant materials (e.g. polyurethane or Terpolymer sealants) and proper application procedures (e.g. cleaning and priming of existing surfaces) for sealing of counterflashing in SHEET METAL Section. Do not install metal reglets on horizontal surfaces or curbs.

5. Sheet Metal Reglet: Reglets shall be installed where and as shown in the plans.

6. Metal counter-flashing shall be installed, anchored and sealed as specified herein, as detailed in the plans or, if a manufactured system is used, as instructed by the manufacturer. Sealant material and application shall be as specified in the SHEET METAL Section.

J. Pitch Pocket: Sheet metal pitch pockets shall be installed around all poles, brackets, pipe support and other items which rest directly on or are attached to the roof deck. Pitch pocket pans shall have dimensions at least 2 inches larger than the dimensions of the poles, brackets, pipe supports, etc. They shall have flanges not less than 4 inches wide which shall be primed on the top and bottom and set on top of the completed roofing membrane in a full bed of flashing cement. The flange shall then be flashed with a strip of the specified roofing ply topped by a strip of the cap sheet, for a cap sheet system; two strips of the specified roofing plies, for smooth-surfaced roofing; or one layer of torched-on modified bitumen membrane with finish matching the adjacent surfacing.

Show detail on plans. Refer to DAGS Std. Detail No. R-9 and R-9a dated 9/91.

NOTES TO ARCHITECT

The flashing strips shall be set in hot asphalt (except the modified bitumen membrane shall be torched-on) with each strip wider than that below it by at least 6 inches (12 inches for modified bitumen flashing) and lapped full width at corners. A cant of flashing cement shall be applied to the exterior base of the pitch pocket. After the flashing plies have been installed, the bottom 1/3 depth of the pitch pocket pans shall be filled with flashing cement, and the balance filled with asphalt. After the asphalt has cooled and settled, the pitch pocket pans shall be topped-off using flashing cement and their tops shall be sloped to drain to the outside edges. Finally, a sheet metal skirt with dimensions adequate to extend at least 1 inch beyond the pan at its widest point and 1/2 inch below its top edge shall be fitted, sealed and clamped (or soldered) onto the poles, brackets, etc.

K. Sheet Metal Housing: Conduits, pipes, etc. (other than vent pipes) which penetrate the roof shall be routed laterally through sheet metal housings. The housings shall cover the openings in the roof and have flanges at least 4 inches wide. The assemblies shall be emplaced and flashed similar to pitch pockets.

Show detail on plans. Refer to DAGS Std. Detail No. R-11 dated 9/91.

3.05 PROTECTION AND CLEANING

A. Protection

1. Any work or materials damaged during the handling of bitumens and roofing materials shall be restored to their original (undamaged) condition or replaced.

2. The work of other trades shall not be marred or injured. Asphalt daubed or splashed onto adjoining surfaces shall be removed and the surface or finish restored to its original finish and appearance. Asphalt runs, sags and streaks over sheet metal surfaces shall be carefully removed so as not to scratch those surfaces.

3. Protective coverings shall be installed at all pavement and exposed building walls

adjacent to hoist, kettles, asphalt conveyor pipe, etc. prior to the start of work.

4. Protection shall remain in place for the duration of the roofing work.

B. Cleaning

1. Debris from roofing work shall be removed from the premises and disposed of at the end of each working day and upon completion of the work to the satisfaction of the Engineer. The roof shall be left in good, clean condition.

2. Bitumen shall be removed completely from all surfaces other than the bituminous roofing, especially those to which sealants must be bonded. Metal flashings other than those embedded in roofing surfaces shall not be mopped with asphalt.

3. Gutters, downspouts, roof drains, etc. shall be cleaned out and all blockages shall be removed prior to acceptance of the project.

END OF SECTION

NOTES TO ARCHITECT

SECTION 07530 - ELASTOMERIC SHEET ROOFING

PART I - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

For reroofing projects, add to, delete from or modify this section to fit your project.

1.02 COORDINATION WITH OTHER SECTIONS

A. Coordinate installation of metal edging, pitch pocket pans, gutters, counterflashing, etc. with SHEET METAL Section.

B. Coordinate installation of vent pipe flashing and roof drains with PLUMBING Section as applicable.

C. Coordinate installation of wood strips related to roofing with CONCRETE and CARPENTRY AND RELATED WORK Sections.

Be sure to call for coordination with this section in your SHEET METAL, PLUMBING, CONCRETE and CARPENTRY AND RELATED WORK Sections.

1.03 GENERAL REQUIREMENTS

A. The roofing operations shall be so coordinated with appurtenant work such as sheet metal work that roof surfacing operations once started shall be continuous to completion.

B. The Roofing Contractor shall be an approved applicator of the manufacturer whose roofing system he proposes to apply and his men shall have been trained by that manufacturer in the application of his system.

C. The Contractor shall notify the local authorized representative of the manufacturer whose roofing system he proposes to use of his intent and shall arrange for the latters to attend the preconstruction conference and to inspect the roof surfaces and the roofing installation before application, at the actual start of application, at least once during application and at job completion.

Delete references to any and all materials which are not applicable to your job.

1.04 SUBMITTALS

A. The contractor shall submit to the Engineer for approval five (5) complete sets of the manufacturer's materials and detailed installation specifications for the roofing system which he proposes to use. All materials

except insulation, emulsion, coatings and the substrate cover board shall be as labeled or approved by one manufacturer.

B. The Contractor shall submit to the Engineer a signed certificate from the proposed roofing system manufacturer showing that the Roofer is an authorized applicator of his assemblies.

C. The Contractor shall submit to the Engineer for approval five (5) sets of shop drawings with the same numbering system as on the Contract Drawings. The drawings shall show the following:

1. Outline of roof and roof dimensions.

2. Locations and types of all roof penetrations.

3. Total square feet of membrane required.

4. Flashing widths and lineal feet required.

5. Details of splices, walkways, joints, flashings, terminations, caps and penetrations.

6. Warranty type and period.

1.05 PRODUCT HANDLING

A. Delivery of Materials: All roofing materials shall be delivered to the site in the original unbroken manufacturer's wrapping material and containers with the original labels thereon intact.

B. Storage of Materials at Job Site

1. Materials delivered and stored at the jobsite shall be protected from dirt, moisture, oil, high temperatures and physical damage.

2. Insulation and any other materials which either absorb or are adversely affected by moisture shall be kept dry. Wet materials

Delete the word "insulation" when that material is not used.

and/or materials which appear to have been deteriorated after getting wet shall not be permitted to be used on the job and shall be removed promptly.

3. Materials containing solvents shall be stored in a dry, cool area with proper fire and safety precautions.

4. If stored on other than the ground, all materials shall be distributed so that their resultant weight does not exceed the design live load on the deck (normally 20 lbs. per square foot on roofs and 40 lbs. per square foot on floors).

1.06 PROTECTION AND CLEANING

A. Protection

1. Any work or materials damaged during roofing operations shall be restored to their original (undamaged) condition or replaced.

2. Protective coverings shall be installed at all pavement and exposed building walls as necessary to prevent the marring of existing surfaces.

3. Protection shall remain in place for the duration of the roofing work.

B. Cleaning

1. Debris from roofing work shall be removed from the premises and disposed of upon completion and the roof left in good, clean condition.

2. Any adhesives and cements splashed onto adjacent surfaces shall be removed completely, especially from flashings to which sealants must be bonded and/or metal flashings which are to be painted.

3. Gutters, downspouts, roof drains, etc. shall

NOTES TO ARCHITECT

be cleaned out and all blockages shall be removed prior to acceptance of the project.

1.07 CAUTIONS AND WARNINGS

A. Asphalt roofing cement shall not be used.

B. Oil, grease, mineral solvents or live steam may be deleterious to certain membrane materials. The Contractor shall apprise the Engineer of and seek the advice of the roofing system manufacturer if such conditions are noted on the site.

C. Vapors from bonding adhesives and lap cements may be harmful if breathed in. They may also be flammable. The Contractor should consult container labels and material safety data sheets for specific information on the products being used.

Be sure to require a 2-year guarantee on sheet metal counterflashing and sealing in your SHEET METAL Section.

NOTE: Under Tech Memo #53 dated July 16, 1997, the use of single-ply membranes under ponding conditions is restricted to EPDM systems. Therefore, under paragraphs 1.08 A and B, delete portion of sentence reading "and damage resulting from lack of positive drainage (i.e. ponding conditions)" when EPDM

1.08 GUARANTY

A. The Contractor shall furnish to the Engineer a written guarant**y** on the roofing and base flashing for a 2-year period after Project Acceptance Date. The guarant**y** shall **cover seams and damage resulting from lack of positive drainage (i.e. ponding conditions) and shall also** provide the following at no cost to the State:

1. Repair of roofing and flashing, as necessary to seal leaks which are attributable to faulty materials and/or workmanship;

2. Repair or replacement of damage to the building and/or its finishes when occasioned by such leaks; and

NOTES TO ARCHITECT

3. Inspection of the roofing together with the Engineer or his designated representative, on or about the 1st and 2nd anniversaries of the Project Acceptance Date, and repair or replacement of roofing as necessary to correct any deficiencies in workmanship or materials, such as by eliminating blisters exceeding 12" in any dimension or re-adhering open seams. Such repair or replacement of roofing shall be done in a manner which will preserve the integrity of the roofing membrane.

membranes are not specified.

B. The roofing system manufacturer shall submit to the Engineer a 10-year membrane system warranty. The warranty shall **cover seams and damage resulting from lack of positive drainage (i.e. ponding conditions), and shall also** provide the following at no additional cost to the State:

In the event of failure due to normal weathering and wind conditions during the remainder of the warranty period (the 3rd through 10th years after project acceptance) the roofing system manufacturer will make repairs as necessary to maintain the roof in watertight condition.

PART 2 - PRODUCTS

2.01 MATERIALS

A. **[Insert paragraph from succeeding page and revise alphabetical listing accordingly.]**

NOTE: The asbestos prohibition clause has been deleted and is covered under Section 00700 - Interim General Conditions.

B. Membranes systems

1. Ethylene propylene diene monomer (EPDM)
2. Polyvinyl chloride (PVC)
3. Polyisobutylene (PIB)
4. Chlorosulfonated polyethylene (CSPE)
5. Chlorinated polyethylene (CPE)

Delete this paragraph if insulation is not used. Be sure that insulation

NOTES TO ARCHITECT

C. Roof Insulation: Standard brand complying with A.S.T.M. C726 (Mineral Fiber Roof Insulation Board), Federal Specifications HH-I-526C (mineral fiber) or HH-I-529B (mineral aggregate) or HI-1972 (polyisocyanurate only, polyurethane not permitted). Insulation shall have a minimum thermal resistance (R factor) of _____ btu/hr./sq./ft.

specified on metal decks will span the flute-to-flute clear span.

Delete this paragraph if slope build-up is not part of the project scope.

D. Roof insulation for slope build-up: Uniform thickness and tapered insulation of the types in Subsection 2.01 D above. May also be pre-tapered EPS (expanded polystyrene) with min. 1/2" wood fiberboard or perlite board facing applied over the insulation in the field. (EPS insulation is permitted on combustible decks only where gravel-surfaced and mineral-surfaced cap sheet roofing is specified. Maximum slope of deck for latter is 1/2" per foot.)

Specify thickness if it is critical to the detailing.

NOTE: If the Contractor elects to use insulation with a thickness other than that shown on the plans, he shall be responsible to prepare any revised detail drawings and to coordinate with other trades as may become necessary because of the thickness change. Any additional costs to implement such a change shall be borne by the Contractor.

Note on appropriate plan details: "Insulation thickness assumed for plan details is _____ inches. Required changes (such as insulation stop thickness) shall be coordinated if actual thickness is other than as shown."

2.02 ROOFING ASSEMBLIES

A. General Requirements:

1. Roof covering shall be fire retardant either as stipulated in the Uniform Building Code or as approved in published U.B.C. reports. All materials shall be labeled in accordance with the appropriate requirements they meet, such as U.L. labeling.

2. Roofing materials shall conform to Federal and/or A.S.T.M. specifications as indicated.

Specify color if used.

3. Color of membrane/coating shall be _____.

NOTES TO ARCHITECT

B. Built-Up Roofing Assemblies:

1. Roof insulation as called for in subparagraph 2.01 D. above shall be installed where shown on the plans.

2. Acceptable roofing membrane systems are listed in Table A.

3. Base and Miscellaneous Flashings shall be in accordance with the recommendations and details of the membrane manufacturer unless otherwise shown on the plans.

TABLE A

Table of Single Ply Membrane Systems

Manufacturer	Trade Name	Assembly No.	*Remarks

*In accordance with brochures on file with the State Division of Public Works

Fill Table in from assemblies listed in Single Ply tables which fit your project requirements.

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

Before the work under this section is started, the Roofer, together with the Contractor and the Engineer, shall examine all surfaces on which roofing will be placed and all adjoining work, including inserts, which will affect or be affected by the roofing work. All unacceptable areas and/or conditions such as those listed in subparagraph 3.02 A.3 shall be corrected by the contractor and verified and accepted by the Roofer prior to start of the work.

Include other related trades in the inspection group if/as applicable to your job (e.g., the sheet metal subcontractor where there are embedded reglets in parapet walls, etc.).

3.02 APPLICATION:

A. General:

1. No roofing shall be started in the absence of the engineer or his representative. The Contractor shall call the Engineer to give at least one day (24 hours minimum) advance notice of the starting of roofing operations.

NOTES TO ARCHITECT

Delete paragraphs for decking which are not applicable to your job.

2. Absolutely no roofing shall be applied before the deck and the work in connection therewith have met the following conditions:

   a. Wood decks shall be dry (moisture content 19% or less); smooth; free from loose materials; properly graded to outlets; and swept clean. Knot holes or loose knots over one inch in dia. and cracks over 3/8" wide shall be covered with 24-gauge galvanized sheet metal nailed in place.

   b. Concrete decks shall be cured (minimum 7 days) and dry (a test spot pour of hot bitumen shall not froth, bubble or be removable by hand after cooling), smooth, free from loose materials, properly graded to outlets, and swept clean. All sharp projections and lumpy places shall have been removed.

   c. Concrete fill shall be tested for adequate holding power before roofing is started. A fastener of the type proposed to be used shall be driven and pulled out. No roofing shall commence until a minimum resistance of 50 pounds has been attained.

   d. Sheet metal panels for insulated steel decks shall be so secured to supporting framework and to each other, and shall be in such condition, that insulation will bear on each rib and not have to bridge over deck discontinuities.

   e. Adjoining work, such as roof drains, metal edging, metal counterflashing and gutters shall either be in place, ready for the Roofer to work in, or shall be available for installation by others, as applicable. This work shall be coordinated so that the

NOTES TO ARCHITECT

total roofing system will be watertight.

B. Insulation

Unless otherwise shown on the plans or specified herein, the application of insulation shall be in strict conformance with the recommendations and specifications of the manufacturer of the roofing assembly being used, as submitted to and approved by the Engineer.

C. Roofing Assembly

Unless otherwise shown on the plans or specified herein, the application of roofing shall be in strict conformance with the specifications of the manufacturer of the assembly being installed or material being used (such as coatings), as submitted to and approved by the Engineer.

3.03 INSTALLATION OF ADJOINING WORK

Be sure to call for the furnishing of items of adjoining work in the appropriate specification sections.

Unless otherwise shown on the plans, all adjoining work shall be done in accordance with the specifications and details of the manufacturer of the roofing assembly being used. The Contractor shall coordinate the Roofer's installation and any work that requires tying-in with the roofing so that the combined installation is leakproof.

END OF SECTION

NOTES TO ARCHITECT

Type Deck: Noncombustible

Method of Application: Fully Adhered

Manufacturer	Trade Name	Assembly No.	Remarks[1]
Barra Corp.	Rubber Shield****	RS-6011F (Black) RS-6012F (White)	(Maximum allowable slope: 1/4 inch per foot).
Carlisle Syntec Systems	Sure Seal*	Sure Seal (STD) Design AAT, A or E	Design E only: Surfaced with one coat "EM-8 Hypalon" coating at 2/3 gal/sq and dry silica sand added at 35 lbs/sq.
		Sure Seal (FR) Design A	(Maximum allowable slope: 3/4"/')
Evanite Permaglass Inc.	Evanite****	Spec No. EPDM-401-FAS	(Maximum allowable slope: 1/4"/')
Firestone Building Products	Rubber / Gard	Rubber / Gard System 100 (STD)	Surfaced with Hypalon P-100 coating at 3/4 to 1-1/2 gal/sq.
		Rubber / Gard System 100 (FR)	
		Rubber / Gard (STD & FR) (White)	Surfaced with one coat "EM-8 Hypalon" coating at 1-1/2 gal/sq and silica sand added at 35#/sq.
Good Year Tire and Rubber	Versigard****	Versigard	
		Versigard II	
Huber &Suhner AG	PMS/Sucoflex	Sucoflex F-132 (light/dark gray membrane)	(Maximum allowable slope: 1/4 inch per foot).
Manville Building Materials Corp.	SPM-60	Spec No. SE6A: SPM-60FR	(Positive drainage - min. 1/4" / ' - req'd to qualify for warranty.)
		Spec No. SE6A: SPM-60W****	(Maximum allowable slope: 1/4 inch per foot).
Tremco Inc.	Tremco	Tremply 120	
		Lex Ply	

Type Deck: Combustible

Method of Application: Fully Adhered

Manufacturer	Trade Name	Assembly No.	Remarks[1]
Carlisle Syntec Systems	Sure Seal*	Sure Seal (STD) Design A, AAT, or E	Design E only: Surfaced with one coat "EM-8 Hypalon" coating at 2/3 gal/sq and dry silica sand at 35 lbs/sq. (Maximum allowable slopes: Design A and AAT: 1/2 inch per foot. Design E: 1/8 inch per foot).
Firestone Building Products	Rubber / Gard	Rubber / Gard (STD & FR) (White)	Surfaced with Hypalon P-100 coating at 1-1/2 gal/sq.
Good Year Tire and Rubber Co.	Versigard****	Versigard	(Maximum allowable slope: 1/2 inch per foot).
Huber &Suhner AG	PMS/Sucoflex	Sucoflex F-132 (light/dark gray membrane)	(Maximum allowable slope: 1/4 inch per foot).
Tremco Inc.	Tremco	Tremply 120	

Type Roofing: Single Ply Membrane System

Type Deck: Noncombustible

Method of Application: Mechanically Fastened

Manufacturer	Trade Name	Assembly No.	Remarks[1]
Barra Corp.	Rhenofol	Rhenofol CV, CVT or CV48 (Gray or White)	Glass based slip sheet required between polystyrene or perlite insulation and membrane. Optional between other insulations and membranes.
	Rubber Shield****	RS-6011F (Black) RS-6012F (White)	(Maximum allowable slope: 1/4 inch per foot).
Carlisle Syntec Systems	Sure Seal*	M.A.R.S. Design "NP"	(Maximum allowable slope: 3/4 inch per foot).
Cooley Roofing Systems	Cool Top	Cool Top 40 (CPE)	(Minimum roof slope: 1/4 inch per foot to meet Warranty terms).
Evanite Permaglass, Inc.	Evanite****	Spec No. EPDM-301-MAS	(Maximum allowable slope: 1/4 inch per foot).
Firestone Building Products	Rubber / Gard*	Rubber / Gard System 100 (STD)	
		Rubber / Gard System 100 (FR)	
	Ultra Ply (White)	System 78 (White)	
Good Year Tire and Rubber Co.	Versigard****	Versigard	
		Versigard II	
J P Stevens & Co.	Hi-Tuff	Hi-Tuff Roofing Systems	
Manville Building Materials Corp.	SPM-60	Spec No. SE6M: SPM-60FR	(Positive drainage - min. 1/4" / ' - slope - req'd to qualify for Warranty).

Type Roofing: Single Ply Membrane System

Type Deck: Combustible

Method of Application: Mechanically fastened

Manufacturer	Trade Name	Assembly No.	Remarks[1]
Barra Corp.	Rhenofol	Rhenofol CV, CVT or CV48 (White or gray)	Slip sheet: Foil faced glass based felt.
Carlisle Syntec Systems	Sure Seal*	M.A.R.S. Design "NP"	(Maximum allowable slope: 1/2 inch per foot).
Cooley Roofing Systems	Coot Top	Cool Top 40 (CPE)	(Minimum roof slope of 1/4 inch per foot req'd to meet Warranty terms).
Firestone Building Products	Rubber / Gard	Rubber / Gard (STD & FR) (White)	Surface with Hypalon P-100 coating at 1-1/2 gal/sq and add silica sand at 35#/sq.
Good Year Tire and Rubber Co.	Versigard	Versigard	Surfaced with Hypalon P-100 coating at 1-1/2 gal/sq.
		Versigard II	
J P Stevens & Co.	Hi-Tuff	Hi-Tuff Roofing Systems	Slip sheet: "Manniglas 1200", 50 mil minimum.

Notes and Legends.

[1] Comments in "Remarks" column (except in parentheses) are required assembly modifications BE SURE TO INCLUDE THEM IN YOUR FINAL TABLE!

Notes to the Architect / Engineer:

* Non-surfaced black membrane.

** Black or white ceramic granulated membrane.

*** Smooth surfaced black or granulated membrane (gray / tan) with fibrated aluminum coating.

**** Non-surfaced black or white membrane.

( ) & * Information for designer use only. DO NOT INCLUDE IN FINAL TABLE.

NOTES TO ARCHITECT

SECTION 07535 - MODIFIED BITUMEN SHEET ROOFING (TORCHED-ON)

PART I - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

Add to, delete from or modify this section to fit your project.

1.02 COORDINATION WITH OTHER SECTIONS

A. Coordinate installation of metal edging, pitch pocket pans, gutters, counterflashing, etc. with SHEET METAL Section.

B. Coordinate installation of vent pipe flashing and roof drains with PLUMBING Section.

C. Coordinate installation of wood strips related to roofing with CONCRETE and CARPENTRY AND RELATED WORK Sections.

Be sure to call for coordination with this section in your SHEET METAL, PLUMBING, CONCRETE and CARPENTRY AND RELATED WORK Sections.

1.03 GENERAL REQUIREMENTS

A. The Contractor shall visit the job site to verify the site conditions and dimensions prior to submitting his bid.

Delete this paragraph for new work.

B. The roofing operations shall be so coordinated with appurtenant work such as sheet metal work that roof surfacing operations once started shall be continuous to completion.

C. The Roofing Contractor shall be an approved applicator of the manufacturer whose roofing system he proposes to apply and his men shall have been instructed by that manufacturer (or their representative or independent roofing auditor/inspector) in the proper application of his system.

D. The Roofing Manufacturer's Representative and their independent roofing auditor/inspector (where applicable) shall be competent, thoroughly trained and experienced in the work and shall be completely familiar with the products, equipment and the specified requirements and methods needed for the proper

installation of the roofing membrane and flashings.

E. The Contractor, Roofer and the authorized Roofing Manufacturer's Representative and/or their independent roofing auditor/inspector shall attend a pre-construction conference to review preparation and installation procedures for the roofing system and coordinating and scheduling required with related trades. They shall also inspect the roof surfaces at the following times:

1. Prior to the start of the roofing installation as noted under Section 3.01 A. where required by the manufacturer to validate his warranty.

2. At the actual start of the roofing application.

3. Once during the roofing application.

4. At job completion.

(Note: It shall be the responsibility of the Contractor to notify the Roofer, Manufacturer's Representative or their independent roofing auditor/inspector (where applicable) and the Engineer of his schedule of operations. Parties shall be notified at least 5 days in advance to enable their attendance.

Change number to suit magnitude and complexity of your project. A minimum of One inspection is required during the roofing application for roofs <7,000 s.f. with no unusual penetrations and with no A.C. equipment.

1.04 DRAWINGS

A. Should the Manufacturer's warranty requirements necessitate different drawings and details exceeding the requirements of those shown or specified, provide shop drawings and field adjustments at no cost to the State.

1.05 SUBMITTALS

NOTES TO ARCHITECT

A. The contractor shall submit the following to the Engineer:

1. Prior to the start of any work, a signed certificate from the proposed roofing manufacturer showing that the roofer is a trained and authorized applicator of his assemblies.

2. A signed certificate from the proposed roofing manufacturer naming their representative and their independent roofing auditor/inspector (where applicable) and showing that he is authorized to act on and make commitments in their behalf.

3. 5 complete sets of the following information for the roofing system he proposes to use. Submittals shall be marked-up as necessary to clearly identify the item being submitted and its conformance to the requirements of these specifications.

   a. Manufacturer's material product data and Material Safety Data Sheets for the following items: which are not

      1. Insulation.
      2. Insulation Fasteners.
      3. Wood Fiber Board.
      4. Dry Sheet.
      5. Base Sheet.
      6. Combination Base Sheet & Dry Sheet.
      7. Venting Medium.
      8. Modified Bitumen Cap Sheet.
      9. Base Flashing System.
      10. Walk-on Pads.
      11. Cant Strip.
      12. Roofing Vent.

Delete references to any and all materials which are not applicable to your job.

NOTES TO ARCHITECT

13. Asphalt.
14. Neoprene Flashing Cement.
15. Insulation Adhesive.
16. Emulsions and Coatings.

Plastic cement is not compatible with modified bitumen. Be sure plastic cement is not specified in the FLASHING AND SHEETMETAL section of the specs.

b. Detailed installation drawings and specifications for the proposed roofing system/assembly. The installation drawings shall indicate the layout of insulation and the location and pattern of fasteners.

Delete reference to insulation when it is not used.

c. Test report from a qualified testing laboratory indicating that the proposed roofing system has a fire classification rating of either Class A or Class B. The test report shall also indicate the maximum roof slope permitted for the proposed assembly.

d. Where required, Factory Mutual approval for the proposed roofing system.

All materials except the insulation, emulsion, coatings and the venting medium when it is under insulation and is therefore not an integral part of the roofing membrane shall be as labeled or approved by one manufacturer.

4. Detailed roofing inspection reports by the Manufacturer's representative or their independent roofing auditor/inspector (once during the roof application and one at job completion).

Insert number of inspections as applicable. (See Section 1.03 E.3)

5. Warranties and Guaranties as noted under Section 1.06.

1.06 WARRANTIES AND GUARANTIES

NOTES TO ARCHITECT

A. The Contractor shall furnish to the Engineer the following:

Be sure to require a 2-year guaranty on sheet metal counterflashing and sealing in your SHEET METAL Section.

1. A written guaranty on the roofing membrane system and built-up base flashing for a 2-year period after the Project Acceptance Date. The guaranty shall provide the following at no cost to the State:

   a. Repair of roofing and flashings as necessary to seal leaks which are attributable to faulty materials and/or workmanship;

   b. Repair or replacement of damage to the building and/or its finishes, equipment and/or furniture when occasioned by such leaks; and

   c. Inspection of the roofing and flashings together with the Engineer or his designated representative, on or about the 1st and 2nd anniversaries of the Project Acceptance Date, and repair or replacement of roofing and/or flashing as necessary to correct any deficiencies in workmanship or materials, such as by eliminating blisters exceeding 12" in any dimension or re-adhering open seams.

   Such repair or replacement of roofing and/or flashings shall be done in a manner which will preserve the integrity of the roofing membrane.

2. A <u>10-year roof membrane system warranty and flashing endorsement</u> from the roofing manufacturer. The warranty shall cover both material and workmanship and shall provide that in the event of failure due to normal weathering and wind conditions during the

remainder of the warranty period (the 3rd through 10th years after the Project Acceptance Date), the roofing system manufacturer will make repairs as necessary to maintain the roof in a watertight condition at no cost to the State. The warranty shall also state the manufacturers acceptance and certification that the roof has been installed in accordance with the manufacturer's instructions and that the owners personnel have been properly instructed in its maintenance.

1.07 PRODUCT HANDLING

A. Delivery of Materials: All roofing materials shall be delivered to the site in the original unbroken manufacturer's wrapping material and containers with the original labels thereon intact. If any unlabeled materials are to be used, a properly attested certificate from the manufacturer stating that such materials comply with the requirements of the Contract Documents shall be furnished to the Engineer prior to installation.

B. Storage of Materials at Job Site

1. Except when placed on roof decks immediately prior to installation, roofing materials shall be stored above the supporting surfaces, such as on pallets.

2. Roll goods, insulation, and any other materials which either absorb or are adversely affected by moisture shall be kept dry. Wet materials and/or materials which appear to have been deteriorated after getting wet shall not be permitted to be used on the job and shall be promptly removed.

Delete the word "insulation" when that material is not used.

3. Materials containing solvents shall be

NOTES TO ARCHITECT

stored in a dry, cool area with proper fire and safety precautions.

4. Roll goods shall be stored on end.

5. If stored on other than the ground, all materials shall be distributed so that their resultant weight does not exceed the design live load on the deck (normally 20 lbs. per square foot on roofs and 40 lbs. per square foot on floors).

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

Delete references to any and all materials which are not applicable to your job.

B. General: Each package of modified bitumen roof covering materials shall bear the label of a recognized agency having a service for the inspection of material and finished products during manufacture (e.g., ASTM, UL, etc.).

C. Asphalt: Standard brand complying with A.S.T.M. D312 Types III or IV, or modified roofing asphalt with its softening point (SP), Flash Point (FP), Finished Blowing Temperature (FBT) and Equiviscous Temperature (EVT) clearly marked on each package.

D. Asphalt Primer: Standard brand complying with A.S.T.M. D41.

E. Roof Insulation: Standard brand complying with the following:

Delete this paragraph if insulation is not used.

1. Mineral Fiber Insulation Board complying with ASTM C726.

2. Mineral Aggregate (perlite) Thermal Insulation Board complying with ASTM C728.

Be sure that insulation specified on metal decks will span the flute-to-flute clear span.

NOTES TO ARCHITECT

3. Faced Polyisocynurate Insulation Board complying with Federal Specifications HH-I-1972 (polyurethane not permitted).

Insulation shall have a minimum thermal resistance (R factor) of _____ btu/hr./sq.ft.

Specify thermal resistance where required. If not, delete sentence.

F. Roof insulation for slope build-up: Uniform thickness and tapered insulation of the types in Subsection 2.01 E above. May also be expanded polystyrene (EPS) insulation conforming to ASTM C578, Type I, nominal density of 1.0 lb./cubic foot.

Delete this paragraph if slope build-up is not part of the project scope.

1. Over non-combustible decks, unless otherwise required by the testing laboratory's report for a fire rated assembly, the EPS insulation shall be faced in the field with a minimum of 1/2" thick perlite insulation board or wood fiberboard. The maximum roof slope where a mineral surfaced cap sheet is provided is 1 inch per foot.

Specify thickness if it is critical to detailing.

2. Over combustible decks, a thermal barrier board and/or facing board as required by the testing labratory's report for a fire rated system shall be provided over the EPS insulation.

Add Notes on appropriate plan details: "Insulation thickness assumed for plan details is _____ inches. Required changes shall be coordinated if actual thickness is other than as shown."

NOTE: If the Contractor elects to use insulation with a thickness other than that shown on the plans, he shall be responsible to prepare any revised detail drawings and to coordinate the work with other trades as may become necessary because of the thickness change. Any additional costs to implement such a change shall be borne by the Contractor.

NOTE: Where the testing laboratory's report permits the use of ESHAVENT venting medium

NOTES TO ARCHITECT

directly over EPS insulation (without a thermal barrier or facing board), the EPS shall have a minimum density of 1.25 lbs. / cubic foot.

G. Roof Insulation Tape: Minimum 6" wide fiberglass roof insulation tape.

Delete when insulation is not used.

H. Wood Fiberboard:Standard brand complying with ASTM C208, asphalt coated on six sides and compatible with the insulation and roofing system as per the manufacturer's recommendations.

Delete when insulation is not used.

I. Cant Strip: Mineral Fiber or Perlite, compatible with the insulation and roofing system. Cants shall be a minimum of 4 inches high with an exposed face at 45° to the plane of the roof.

J. Mechanical Fasteners for Insulation: Manufactured products of the appropriate type and length for the proposed roof deck and insulation installation as recommended by the insulation manufacturer and approved by Factory Mutual as a component of the roofing system.

Delete when insulation is not used.

K. Roof Insulation Adhesive: Adhesive shall be asbestos free, waterproof (non-reemulsifying) and compatible with the insulation and substrate as recommended by the roof insulation manufacturer. Adhesive shall also be approved by Factory Mutual as a component of the roofing system.

Delete when insulation is not used.

L. Roofing Nails: Galvanized, of the appropriate type and length for the proposed installation as recommended by the roofing membrane manufacturer.

M. Neoprene Flashing Cement: Standard brand, asbestos-free as recommended by the roof membrane manufacturer.

N. Emulsions and Coatings:

1. Emulsion shall be asbestos free, compatible with the finish coating and as recommended by the roof membrane and finish coating manufacturer.

Delete this Sub-section when colored or

NOTES TO ARCHITECT

2. Color Coatings shall be as recommended by the roof membrane manufacturer, asbestos-free and approved as part of the proposed fire rated roof membrane assembly by a qualified testing laboratory. Color shall be _____.

reflective coating is not desired as a finish. Delete when only reflective coating is to be used.

Specify Color.

3. Reflective Coating shall be an asphalt-based, asbestos-free, fibrated aluminum roof coating, as recommended by the roof membrane manufacturer and approved as part of the fire rated roof membrane assembly by a qualified testing laboratory.

Delete when only color coating is to be used.

O. Dry Sheet: Rosin-sized paper weighing not less than 4#/100 s.f., unsaturated felt weighing 7-1/2#/100 s.f., or roof sheathing paper weighing approximately 6#/100 s.f.

Delete when deck is other than wood.

P. Base Sheet: Asphalt coated glass fiber base sheet as recommended by the roof membrane manufacturer and complying with ASTM D4601, Type I.

Q. Combination Base Sheet/Dry Sheet: Asphalt coated base sheet with laminated kraft paper backing conforming to ASTM D4601 Type I.

Delete when deck is other than wood.

R. Venting Medium

1. Special venting sheets, such as Ventsulation by Johns-Manville, Channel Vent GB Base Sheet by Celotex Corp., Stratavent by GAF Corp. and "ESHAvent" by Malarkey Roofing Company.

Delete when venting medium is not used.

Insul Base by Intec/Permaglas may be used only on top of insulation on an insulated deck with a single layer of insulation.

Use over all decks of concrete, lightweight concrete and nailable concrete fills such as

NOTES TO ARCHITECT

2. Mineral-surfaced cap sheet installed with granules down.

perlite, vermiculite gypsum or cellular concrete.

3. Glass fiber insulation.

S. Modified Bitumen Cap Sheet:

1. Cap sheet shall be manufactured with bitumen modified with atactic-polypropylene (APP) or styrene-butadiene-styrene (SBS) polymers and reinforced with inorganic fibers. Nominal thickness of the APP modified cap sheet shall be 160 mil (4.0 mm). Nominal thickness of SBS modified cap sheet shall be 120 mil (3.0 mm).

Delete paragraph 2 when smooth surface roof finish is desired.

2. Finish surface of cap sheet shall be factory applied fine mineral granules. Color of finish shall be _____.

T. Modified Bitumen Roof & Base Flashing:

Specify Color.

1. Flashing materials shall be modified bitumen cap sheet as noted under subparagraphs 2.01 S above. Where two layers of flashing are required, the bottom layer shall be smooth surfaced. The finish of the surface layer shall match the adjacent roof surface.

U. Walk-on Pads:Composed of chopped rubber particles and synthetic binders. Pads shall be cut from rolls nominal .321 inch (8mm) thick x 31.5 inches (80 cm) wide x 32.8 feet (10 m) long. Pads shall be "Trafblock Walk Pad" as manufactured by Siplast or approved equal. Adhesive for pad application shall be compatible rubber based adhesives approved by the roofing membrane manufacturer. Finish surface of the pad shall match the adjacent roof surface.

Delete when walk-on pads are not used.

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V. Roofing Vent: Manufactured plastic assembly at least 6 inches high with minimum 2-inch base diameter vent stack and 10-inch diameter base flange. As an option, the vent assembly may be of copper meeting the above minimum dimensions.

This description is for a 2-way vent. Be sure to modify description if 1-way or solar vent is required.

W. Termination Bar: 1" x 1" x 1/8" thick galvanized steel angel with slotted holes @ 8" o.c. or approved equal.

Delete when termination bar is not used.

2.02 MODIFIED BITUMEN ROOFING ASSEMBLIES

A. General Requirements

1. In accordance with the Uniform Building Code, the roof covering assembly shall have a fire classification rating of either Class A or Class B when tested in accordance with U.B.C. Standard No. 32-7 or as otherwise tested and rated as either Class A or B by a qualified testing laboratory (Underwriters Laboratories (UL), Warnock Hersey, Factory Mutual (FM) or approved equal).

2. Roofing materials shall conform to Federal and/or A.S.T.M. specifications as indicated.

Note: Where the roof slope exceeds 1/2" per ft., installation of the roof membrane parallel with the roof slope and/or backnailing of the membrane may be necessary depending upon the membrane manufacturer to prevent slippage. This may necessitate the installation of wood nailers with in-fill insulation on non-combustible decks. Therefore, modify your design and specs where necessary to address this potential problem.

B. Built-Up Roofing Assemblies

1. Roof insulation as called for in sub-paragraph 2.01 E. and F. above shall be installed as described herein where shown on the plans.

2. Roofing membrane system shall be composed of a minimum of two layers, a base sheet and a cap sheet.

Delete paragraph 2.02 B.1. when insulation is not used.

a. As a minimum, the base sheet shall be an

asphalt-coated sheet as described under Sub-section 2.01 P. It shall be installed in a solid mopping of asphalt spread at a rate of 25# per square unless otherwise described under 3.02 C. The cap sheet shall be a modified bitumen sheet as described under Sub-section 2.01 S. and torched-on (heat welded) to the base sheet in accordance with the manufacturer's recommendations.

b. As an option, venting mediums or special venting sheets installed over non-combustible decks, or coated base sheets (perforated venting sheets not permitted) placed over combustible decks or polyisocyanurate insulation may be substituted for the base sheet of the roofing membrane provided it is an approved component of the fire rated assembly.

3. Roof and Base Flashings as called for in subparagraph 2.01 T. above shall be installed as described herein where shown on the plans.

a. Flashings shall be composed of modified bitumen interply sheet(s) and cap sheet in the number of layers as specified or as shown on the drawings. Each layer of flashing shall be torched-on (heat welded) onto the substrate and/or underlying layer in accordance with the manufacturer's recommendations.

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

A. Before the work under this section is started, the Roofer, together with the Manufacturer's Representative or their independent roofing auditor/inpsector (where applicable) and the Contractor shall meet with the Engineer at the job-site to examine all surfaces on which roofing will be placed and all adjoining work, including inserts, which will affect or be affected by the roofing work.

Include other related trades in the inspection group if/as applicable to your job (e.g., the sheet metal subcontractor where

NOTES TO ARCHITECT

there are embedded reglets in parapet walls, etc.)

All unacceptable areas and/or conditions such as those listed in subparagraph 3.02 A.5 shall be corrected by the contractor and verified and accepted by the Roofer and the Manufacturer's Representative or their independent roofing auditor/inpsector prior to start of the work.

Delete this paragraph for new construction projects.

B. Before the work under this section is started, the Contractor and Engineer shall inspect and record the conditions of the building interior rooms and ceilings. The Contractor shall protect the interior finishes, furniture and equipment against damage.

3.02 APPLICATION

A. General

1. Workmanship: The Roofer shall have a responsible foreman on the job during roofing operations who shall ensure that all work is done in accordance with the plans and specifications.

2. No roofing shall be installed during precipitation and shall not be started in the event there is a possibility of precipitation during application.

3. No roofing shall be started in the absence of the Engineer or his representative. The Contractor shall call the Engineer to give at least one day (24 hours minimum) advance notice of the starting of roofing operations.

4. The application of roofing shall be as specified or as shown in the plans.

5. Absolutely no roofing shall be applied before the deck and the work in connection

Delete paragraphs for

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decking which are not applicable to your job.

therewith have met the following conditions:

a. Wood decks shall be dry (moisture content 19% or less as measured on the Moisture Meter's Wood Scale); smooth; free from loose materials; properly graded to outlets; and swept clean. Knot holes or loose knots over one inch in dia. and cracks over 3/8" wide shall be covered with 24-gauge galvanized sheet metal nailed in place.

b. Concrete decks shall be cured (minimum 7 days) and dry, smooth, free from loose materials, properly graded to outlets, and swept clean. All sharp projections and lumpy places shall have been removed.

c. Concrete fill shall be tested for adequate holding power before roofing is started. A fastener of the type specified herein for the fill material used shall be driven and pulled out. No roofing shall commence until a minimum resistance of 50 pounds has been attained.

d. Sheet metal panels for insulated steel decks shall be so secured to supporting framework and to each other, and shall be in such condition, that insulation will bear on each rib and not have to bridge over deck discontinuities.

e. Adjoining work, such as roof drains, metal edging, metal counterflashing, gutters and lead collars for vent pipes shall either be in place, ready for the Roofer to work in, or shall be available for installation by others, as applicable. This work shall be coordinated so that the total roofing

system will be watertight.

6. The temperature of the asphalt shall be monitored through the use of either accurate temperature gauges attached to the kettles or separate asphalt thermometers which shall be part of the Roofer's equipment. Asphalt shall be heated to no higher than 50 degrees F below its flashpoint (FP), nor heated and held above its finished blowing temp. (FBT) for more than four hours. It shall also be applied at its equiviscous temperature (EVT) range (EVT +/- 25 degrees F).

7. The elapsed time between the application of hot asphalt on the deck and the laying in of insulation or membrane base sheet shall be minimized to ensure full bonding between the surfaces being cemented together with the asphalt.

It shall be the Roofer's responsibility to modify his operations to accomplish this considering the ambient conditions of weather, temperature, etc. A felt laying machine shall be used if necessary.

8. All layers of roofing shall be laid free of wrinkles, creases or fishmouths. Sufficient pressure or brooming shall be exerted on the roll during application to ensure prevention of air pockets.

9. Before application of the cap sheet, build-up all "bird-baths" by mopping in place with hot asphalt one (1) or more overlapping layers of base sheet(s) to provide positive drainage.

10. Loose ceramic granules, of matching color with the mineral surfaced cap sheet shall be broadcast over excess bitumen seepage,

For re-roofing projects, show location of bird-baths/ponding areas on plans and address

NOTES TO ARCHITECT

spillage, etc., while the bitumen is still liquid in order to provide a neat and uniform finish similar to that of the surfacing sheet. Excess bitumen seepage shall be considered bitumen flowing out past the edge of the roofing ply more than 3/8".

corrections.

Delete this paragraph if smooth surface finish is used.

11. Phased construction (roofing purposely interrupted for a period to permit other work and trafficking over the membrane) shall not be permitted.

    a. The complete roofing membrane, including emulsion surfacing in the case of smooth-surfaced roofing, shall be installed up to the line of termination (but allowing for required lapping) at the end of the day's work.

    b. At the end of the day's work, all incomplete roofing shall be protected using a water cut-off. The water cut-off shall consist of coated felt strips set in neoprene flashing cement and lapping both the finished membrane and the roof deck surface in such a manner as to seal all incomplete edges against intrusion of water.

    c. Water cut-off shall be removed before continuing installation of the roofing system.

B. Insulation

1. General

    a. The application of insulation shall be as specified herein or as shown in the plans unless otherwise stipulated in the

Delete this subsection

NOTES TO ARCHITECT

specifications and details of the manufacturer of the insulation being used, as submitted to and approved by the Engineer.

in its entirety if insulation is not used.

b. Units of insulation shall be laid with their long joints perpendicular to the direction of laying of the roofing plies.

c. Units of insulation shall be laid so that they touch adjacent units along all sides.

d. Where mineral fiber, mineral aggregate or isocyanurate insulation is applied in more than one layer, depending upon the substrate, the first layer may either be mechanically fastened to the deck or hot-mopped onto a base sheet or venting medium. In either case, every layer thereafter shall be solid-mopped with asphalt.

e. Unless otherwise indicated, where EPS insulation is used, it shall be laid into a solid mopping of hot asphalt that has been allowed to cool to approximately 225 degrees to 250 degrees F. or shall be adhered to the substrate using waterproof (non-reemulsifying) adhesive in accordance with the manufacturer's recommendations.

Delete this paragraph when EPS insulation is not used.

f. If premanufactured, multi-layered EPS insulation is used for building up slopes or crickets, it shall be bonded together with waterproof (non-emulsifying) adhesive covering 100% of the bonded surfaces.

Delete this paragraph when EPS insulation is not used.

g. When insulation joints are not taped,

the short joints shall be staggered.

h. When taped, insulation joints may be continuous in both directions. Tape shall be centered on the joint and embedded in hot asphalt applied at a rate of 15 lbs. per square.

i. All joints in EPS insulation shall be tightly butted together. Joints of the field applied facing boards shall be tightly butted together, staggered, offset from the insulation joints below and taped with roof insulation tape. Care shall be taken in applying hot asphalt to the tape so that it does not contact insulation already in place.

Delete this paragraph when EPS insulation is not used.

2. Acceptability

a. Insulation which shows signs of deterioration (such as reduced resistance to delamination, edge disintegration, etc.) shall not be used.

b. Insulation which has been installed but is still exposed shall be covered immediately when there is any danger that it will get wet.

c. Installed insulation which gets wet shall be handled as follows before any roofing is applied over it:

(1) All insulation shall be completely dried out as determined by a moisture meter.

(2) Glass fiber insulation which gets waterlogged after installation shall be removed and replaced with dry material.

(3) The exposed portions of perlite aggregate insulation board shall be broomed lightly to remove any surface "skin" degradation that may have formed due to wetting. Boards that are gouged or broken in the

process shall be removed and replaced.

(4) The location of a joint between perlite aggregate insulation units shall be so marked in the vicinity of the center of the wetted area that an additional roofing vent can be installed directly over it after completion of the roofing membrane.

d. Insulation units with broken corners or similar defects shall be trimmed and repaired (gap filled with similar material) or discarded.

e. Any EPS insulation which is damaged because it is subjected to excessive heat shall be removed and replaced with properly installed units.

C. Installation

Delete this paragraph when EPS insulation is not used.

1. On wood and plywood decks:

a. Dry sheet shall be lapped 2 inches on sides and ends and sprinkle-nailed to the deck. A coated base sheet with minimum 2-inch side laps and 6-inch end laps shall be laid over the dry sheet and nailed 9 inches o.c. along all laps and 18 inches o.c. and staggered along lines 12 inches in from each edge. Both sheets may be nailed jointly provided their laps are staggered.

In high wind areas and open areas subject to high wind conditions, require nailing of insulation in the number and pattern similar to that required for an FM approved I-90 installation in the outer 4' of building perimeter.

b. If available, a combination dry sheet/base sheet may be used in lieu of the individual plies of dry sheet and base sheet. The combination sheet shall be nailed as described above for the base sheet.

NOTES TO ARCHITECT

c. The roofing membrane assembly shall be laid onto the coated base sheet or combination base sheet.

Verify with your Project Coordinator if your project is in this category.

(1) Where this coated base sheet is substituted in lieu of the base sheet of the roofing membrane assembly, as described in Sub-section 2.02 B.2., side and end laps of the base sheet shall be sealed prior to application of the roofing membrane to prevent flame penetration to the combustible deck. The cap sheet shall be torched-on onto the coated base sheet.

Delete paragraph where insulation is used.

d. Mineral fiber and mineral aggregate insulation shall be hot-mopped to the base sheet in a solid mopping of 30 lbs. per square of asphalt. The roofing membrane shall then be laid onto the insulation.

(1) As an alternative, the insulation may be mechanically attached directly to the deck using screw fasteners in the number and pattern recommended by the roof insulation manufacturer. No dry sheet or coated base sheet will be required when this alternative is used.

Delete paragraph "d", "e" and "f" where insulation is not used.

e. Where used, polyisocyanurate insulation shall be fastened to the deck as noted in item (1) above. A venting base sheet or coated base sheet spot-mopped to the insulation shall be installed. The roofing membrane shall then be laid onto the venting sheet or coated base sheet.

NOTES TO ARCHITECT

f. Where EPS insulation is used for slope build-up, barrier boards placed atop the deck and/or facing boards placed atop the EPS insulation as noted under Subsection 2.01 F. shall be provided as necessary to conform to the requirements for a fire rated assembly and installed in accordance with the insulation manufacturer's recommendations . Where barrier boards are provided, provision of the dry sheet and base sheet may be deleted. The roofing membrane shall then be laid onto the facing boards.

Delete this paragraph where EPS insulation is not used.

2. On nailable concrete fill decks (perlite, vermiculite, gypsum or cellular concrete).

a. Venting medium shall be cut into lengths not to exceed 18 ft. and allowed to relax and flatten before laying.

b. The venting sheets shall then be laid over the deck with side laps equal to the selvage (2 inches if none) and end laps of 4 in. staggered at least 12 in. between adjacent strips.

c. Finally, the sheets shall be nailed to the deck using mechanical fasteners appropriate to the deck material in the number and pattern recommended by the roof membrane manufacturer. Fasteners shall be located so that they do not coincide with roofing vent locations.

d. The roofing membrane shall then be laid onto the venting medium.

e. Mineral fiber and mineral aggregate insulation shall be hot-mopped to the venting medium in a solid mopping of 30

NOTES TO ARCHITECT

lbs. of asphalt per square. The roofing membrane shall then be laid over the insulation.

Delete this paragraph when insulation is used.

Delete paragraphs "e", "f", "g" and "h" where insulation is not used.

f. If mineral fiber insulation is used for venting in lieu of the venting medium noted above, it shall be mechanically fastened to the deck using screw fasteners in the number and pattern recommended by the roof insulation manufacturer. Fasteners shall be located so that they do not coincide with roofing vent locations. The roofing membrane shall then be laid onto the insulation .

g. Where used, polyisocyanurate insulation shall be hot-mopped to the venting medium in a solid mopping of 30# per square of asphalt. A venting base sheet or coated base sheet shall be spot-mopped onto the insulation and the roofing membrane shall then be laid onto the venting sheet.

h. Where used for slope build-up, EPS insulation and facing boards as described under Subsection 2.01 F. shall be placed onto the venting medium as described under Sub-section 3.02 B.1.e. The roofing membrane shall then be laid onto the facing material.

Delete this paragraph when EPS insulation is not used.

3. On concrete decks.

a. When the deck is dry enough to receive roofing (see subparagraph 3.02 A.5.b.), it shall be primed with asphalt primer applied at a rate of one gallon per 100 square feet.

b. After being cut and relaxed as described in subparagraph 3.02 C.2. above, the

See Tech Memo No. 47 for

NOTES TO ARCHITECT

venting sheets shall be spot-mopped to the deck using a minimum of 12 lbs. per square of asphalt. The spots shall be approximately 12 inches in diameter, spaced 18 inches o.c. and staggered, and shall be carefully mopped so that no asphalt is dripped between spots. They shall be located so that they do not cover or encroach into roofing vent locations. The venting sheets shall be laid with side laps equal to the selvage (2 inches if none) and end laps of 4 inches staggered at least 12 inches between adjacent strips. Special perforated venting sheets when used shall be installed in accordance with the manufacturer's instructions.

reroofing projects. re: Deletion of asphalt primer.
Delete paragraph if not applicable for your project.

c. The roofing membrane shall then be laid onto the venting medium.

d. Mineral fiber and mineral aggregate insulation shall be hot-mopped to the venting medium in a solid mopping of 30 lbs. of asphalt per square. The roofing membrane shall then be laid over the insulation.

Delete this paragraph where insulation is used.

e. If mineral fiber insulation is used for venting in lieu of the venting medium noted above, it shall be spot-mopped to the deck at a rate of 12-16 lbs. of asphalt per square. The roofing membrane shall then be laid onto the insulation.

Delete paragraphs "d", "e", "f" and "g" where insulation is not used.

f. Where used, polyisocyanurate insulation shall be hot-mopped onto the venting medium in a solid mopping of 30# per square of asphalt.

NOTES TO ARCHITECT

A venting base sheet or coated base sheet shall be spot-mopped onto the insulation and the roofing membrane shall then be laid onto the venting sheet.

g. Where used for slope build-up, EPS insulation and facing boards as described under subsection 2.01 F. shall be placed onto the venting medium as described under Sub-section 3.02 B.1.e. The roofing membrane shall then be laid onto the facing material.

4. On steel decks

Delete this paragraph when EPS insulation is not used.

a. Insulation shall be laid so that edges parallel to flutes bear on the deck flange surface. Joints shall not terminate over rib openings.

b. The insulation shall be fastened to the deck using mechanical fasteners as described under Subsection 2.01 J. in the numbers and patterns required for a Factory Mutual approved Class 1, I-90 installation. The roofing membrane shall then be laid onto the insulation. Where polyisocyanurate insulation is used, a venting base sheet or coated base sheet shall be spot-mopped onto the insulation and the roofing membrane shall then be laid onto the venting sheet.

c. Where EPS insulation is used to provide slope build-up, a thermal barrier shall first be fastened to the metal deck using mechanical fasteners as described in Sub-section 2.01 J.. The thermal barrier, insulation and facing boards shall be installed as required so that the total assembly conforms to a Facory Mutual approved Class 1, I-90 installation. The roofing membrane shall be laid onto the facing material.

Delete this paragraph when EPS insulation is not used.

D. Cant Strips

NOTES TO ARCHITECT

1. Install cant strips at the intersections with curbs, walls and parapets. They shall be continuous, installed in lengths as long as possible and set in a heavy mopping of asphalt.

E. Roof and Base Flashings

1. Prior to the application of roof and base flashings, the substrate shall be primed with asphalt primer to ensure proper adhesion of the flashing material.

2. Base flashings shall be secured to the vertical surfaces using appropriate type fasteners, suitable for the substrate condition, through tin caps spaced at 8 inches o.c. along its top edge, unless otherwise shown on the plans.

3. Where a termination bar is called for, it shall be secured to the vertical surface using appropriate type fasteners suitable for the substrate condition through the slotted holes in the bar spaced at 8 inches o.c. Fasteners shall be set in a bead of neoprene flashing cement. A cant of neoprene flashing cement sloped to the outside edge of the bar shall be formed atop the termination bar.

Delete this paragraph where termination bars are not used.

4. See Subsection 3.03 for minimum flashing requirements over metal flanges, edging, etc.

Show detail on plans. Refer to DAGS Std. Detail No. R-3 and R-4a dated 7/91.

5. New roofing which adjoins existing roofing shall be flashed as shown in the plans.

F. Emulsions and Coatings

1. Emulsion surfacing shall be applied by brushing or rolling and shall be thoroughly cured before color or reflective coating is applied. The minimum curing time shall be as recommended by the manufacturer of the

Show detail on plans. Refer to DAGS Std. Detail No. R-16 dated

NOTES TO ARCHITECT

coating, but in any case shall extend until the material does not come off when walked upon, water does not "bead" on its surface and it does not bleed or discolor the color or reflective coating.

9/91.

Delete this paragraph where emulsion and coating finish is not used.

2. Coatings shall be applied in strict accordance with the manufacturer's recommendations and instructions. In addition, they shall be applied in the quantities and rates noted on the testing laboratory's report as required to provide a fire rated assembly.

G. Walk-On Pads

1. Pads shall be cut to size and installed with a compatible rubber based adhesive approved by the roofing system manufacturer.

3.03 INSTALLATION OF ADJOINING WORK

A. All adjoining work (such as vent pipe flashings, roof vents, etc.) shall be as specified or as shown in the plans.

Delete this paragraph when walk-on pads are not used.

B. Wood Blocking: Wood blocking shall be installed where shown on the plans and shall be secured to the deck with appropriate fasteners spaced at maximum 48 inches o.c.

Be sure to call for the furnishing of items of adjoining work in the appropriate specification sections. Delete paragraphs which are not applicable to your project and add paragraphs as required. Describe work in detail and show details on

C. Metal Edging: Metal edging shall be set in a full bed of neoprene flashing cement on top of the modified bitumen interply membrane not including the cap sheet. The edging shall be overlapped (nested not cut) at least 5 inches at joints, with a flexible non-hardening sealant compatible with the neoprene flashing cement and

NOTES TO ARCHITECT

modified bitumen, placed between the two layers of metal in such manner that metal does not touch metal anywhere. The edging flange shall be securely fastened to edge nailing strips using large headed-nails at least 1-1/2 inches long. Nailing shall be 3 inches on-center and staggered on either side of flange centerline. Laps shall be double nailed. The flange shall then be primed and flashed with one strip of the modified bitumen inter-ply sheet 6" wider than the flange width torched-on onto the substrate. The cap sheet shall then be torched-on with the edge 1/4" away from the outside corner of the metal edging. A continuous bead of neoprene flashing cement shall be applied and pressed into this edge. The face flange of the metal edging shall be anchored as shown in the plans.

plans. (e.g. Roof Scupper, Expansion Joint, Equipment Curbs and Mountings, etc.)

Show detail on plans. Refer to DAGS Std. Detail No. R-6b dated 9/91.
Provide closely spaced substantial anchorage of the face flange in high wind areas or areas subject to high wind conditions. Continuous sheet metal clips with closely spaced fasteners or direct nailing of the face flange with closely spaced fasteners having neoprene washers are acceptable. Verify with your Project Coordinator if your project is in this category.

D. Lead Vent Pipe Flashing:

1. Clean off rust from existing vent pipes and extend pipes to a minimum of 6 inches above the finished roofing system.

2. The top and bottom of the lead flashing flange shall be primed and set on top of the completed modified bitumen membrane cap sheet in a full bed of neoprene flashing cement. The flange shall then be flashed with a square piece of the specified cap sheet having dimensions 12 inches more than the pipe flashing flanges on each side torched-on onto the substrate. A hole about 1/8 inch larger than the pipe flashing shall be cut out of the center of the cap sheet flashing to fit around the pipe flashing. A cant of neoprene flashing cement shall be

Delete paragraph "1." for new construction.

Show detail on plans. Refer to DAGS Std. Detail No. R-8 dated 9/91.

NOTES TO ARCHITECT

formed around the base of the pipe flashing after the cap flashing square is in place.

3. Finally, the roofer shall ensure that the lead flashing sleeve is turned down a minimum of one inch into and snugly against the interior surface of the vent pipe. A 1/8 inch mesh screen secured with a stainless steel clamp shall be installed over each vent pipe.

E. Roof Drains:

1. Clean existing locking ring before tightly bolting it to the drain housing to ensure a watertight system.

2. Replace all broken or missing locking rings, bolts and strainers.

3. Install roofing membrane and lead flashing as indicated on the plans.

4. Clean all drainage channels through locking rings thoroughly after reroofing to ensure unimpeded flow of water into the drain.

Delete paragraph 1 and 2 for new construction projects.

Show detail on plans. Refer to DAGS Std. Detail No. R-7b dated 7/91.

F. Roofing Vents:

1. Install roofing vents in locations indicated on the plans.

Show location of roof vents and detail vent on plans. Refer to DAGS Std. Detail No. R-12 dated 9/91 for detail and notes regarding vent locations.

2. Cut hole with diameter equal to that of the vent stack through roofing system, including insulation, to the deck.

3. Prime top and bottom of the vent flange and set on top of the completed modified bitumen roofing membrane cap sheet in a full bed of neoprene flashing cement. Complete flashing installation similar to lead vent pipe

NOTES TO ARCHITECT

flashing.

G. Temporarily remove electrical conduits, mechanical piping and equipment as necessary to clear the roof for installation of new roofing and reinstall upon completion.

H. Wall Counter-Flashing at Curbs and Parapets:

1. Existing reglet to remain: Completely remove existing sealant prior to installation of new work. Fill reglet as required in accordance with the roofing manufacturer's recommendations.

Delete paragraph for new construction projects.

2. Remove existing sheet metal work as necessary to allow for new sheet metal work.

Delete paragraphs "1" through "4" for new construction projects.

3. Existing sheet metal work which is called to be re-used in the new work shall be carefully removed and properly stored.

4. Remove existing cant strips and replace with new.

Show detail of flashing on plans. Refer to DAGS Std. Detail No. R-4 dated 9/91 and R-5 dated 7/91.

5. Sheet Metal Reglet: Reglets shall be installed where shown on the plans.

6. Metal counter-flashing shall be installed, achored and sealed as specified herein, as detailed in the plans or, if a manufactured system is used, as instructed by the manufacturer. Sealant material and application shall be as specified in the SHEET METAL Section.

Be sure to specify appropriate sealant materials (e.g. Polyurethane pr Terpolymer sealants) and proper application procedures (e.g. cleaning and priming of existing surfaces) for sealing of counterflashing in SHEET METAL Section.

Do not install metal reglet on horizontal surfaces of curbs.

NOTES TO ARCHITECT

I. Pitch Pockets: Sheet metal pitch pockets shall be installed around all poles, brackets, pipe supports and other items which rest directly on or are attached to the roof deck. Pitch pocket pans shall have dimensions at least 2 inches larger than the dimensions of the poles, brackets, pipe supports, etc. They shall have flanges not less than 4 inches wide which shall be primed on the top and bottom and set on top of the completed modified bitumen roof membrane cap sheet in a full bed of neoprene flashing cement. The flange shall then be flashed with a strip of the specified roofing cap sheet 12 inches wider than the flange width, lapped full width at corners and torched-on onto the substrate. A cant of neoprene flashing cement shall be applied to the exterior base of the pitch pocket. After the flashing has been installed, the bottom 1/3 depth of the pitch pocket pans shall be filled with neoprene flashing cement, and the balance filled with asphalt. After the asphalt has cooled and settled, the pitch pocket pans shall be topped-off using neoprene flashing cement and their tops shall be sloped to drain to the outside edges. Finally, sheet metal skirt with dimensions adequate to extend at least 1 inch beyond the pan at its widest point and 1/2 inch below its top edge shall be fitted, sealed and clamped (or soldered) onto the poles, brackets, etc.

Show detail on plans. Refer to DAGS Std. Details No. R-9 and R-9a dated 9/91.

J. Sheet Metal Housing: Conduits, pipes, etc. (other than vent pipes) which penetrate the roof shall be routed laterally through sheet metal housings. The housings shall cover the openings in the roof and have flanges at least 4 inches wide. The assemblies shall be emplaced and flashed similar to pitch pockets.

3.04 PROTECTION AND CLEANING

Show detail on plans. Refer to DAGS Std. Detail No. R-11 dated 9/91.

A. Protection

1. Any work or materials damaged during the handling of roofing materials shall be restored to their original (undamaged) condition or replaced.

2. The work of other trades shall not be marred or injured. Asphalt daubed or splashed onto adjoining surfaces shall be removed and the surface or finish restored to its original finish and appearance. Asphalt runs, sags and streaks over sheet metal surfaces shall be carefully removed so as not to scratch those surfaces.

3. Protective coverings shall be installed at all pavement and exposed building walls as necessary to prevent the marring of existing surfaces.

4. Protection shall remain in place for the duration of the roofing work.

B. Cleaning

1. Debris from roofing work shall be removed from the premises and disposed of at the end of each working day and upon completion of the work to the satisfaction of the Engineer. The roof shall be left in good, clean condition.

2. Bitumen, modified and otherwise, shall be removed completely from all surfaces other than the roofing, especially those to which sealants must be bonded and/or metal flashings which are to be painted.

3. Gutters, downspouts, roof drains, etc. shall be cleaned out and all blockages shall be removed prior to acceptance of the project.

END OF SECTION

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NOTES TO ARCHITECT

NOTES TO ARCHITECT

SECTION 07540 - MODIFIED BITUMEN SHEET ROOFING (HOT-MOPPED)

PART I - GENERAL

Add to, delete from or modify this section to fit your project.

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 COORDINATION WITH OTHER SECTIONS

A. Coordinate installation of metal edging, pitch pocket pans, gutters, counterflashing, etc. with SHEET METAL Section.

B. Coordinate installation of vent pipe flashing and roof drains with PLUMBING Section.

C. Coordinate installation of wood strips related to roofing with CONCRETE and CARPENTRY AND RELATED WORK Sections.

Be sure to call for coordination with this section in your SHEET METAL, PLUMBING, CONCRETE and CARPENTRY AND RELATED WORK Sections.

1.03 GENERAL REQUIREMENTS

A. The Contractor shall visit the job site to verify the site conditions and dimensions prior to submitting his bid.

Delete this paragraph for new work.

B. The roofing operations shall be so coordinated with appurtenant work such as sheet metal work that roof surfacing operations once started shall be continuous to completion.

C. The Roofing Contractor shall be an approved applicator of the manufacturer whose roofing system he proposes to apply and his men shall have been instructed by that manufacturer (or their representative or independent roofing auditor/inspector) in the proper application of his system.

D. The Roofing Manufacturer's Representative and their independent roofing auditor/inspector (where applicable) shall be competent, thoroughly trained and experienced in the work and shall be completely familiar with the products, equipment and the specified requirements and methods needed for the proper installation of the roofing membrane and flashings.

NOTES TO ARCHITECT

E. The Contractor, Roofer and the authorized Roofing Manufacturer's Representative and/or their independent roofing auditor/inspector shall attend a pre-construction conference to review preparation and installation procedures for the roofing system and coordinating and scheduling required with related work. They shall also inspect the roof surfaces at the following times:

1. Prior to the start of the roofing installation as noted under Section 3.01 A. where required by the manufacturer to validate his warranty.

2. At the actual start of the roofing application.

3. Once during the roofing application.

4. At job completion.

(Note: It shall be the responsibility of the Contractor to notify the Roofer, Manufacturer's Representative or their independent roofing roofing application for auditor/inspector (where applicable) and the Engineer of his schedule of operations. Parties no unusual penetrations shall be notified at least 5 days in advance to enable their attendance.

Change number to suit magnitude and complexity of your project. A minimum of One inspection is required during the roofing application for roofs <7,000 s.f. with no unusual penetrations and with no A.C. equipment.

1.04 DRAWINGS

A. Should the Manufacturer's warranty requirements necessitate different drawings and details exceeding the requirements of those shown or specified, provide shop drawings and field adjustments at no cost to the State.

1.05 SUBMITTALS

NOTES TO ARCHITECT

A. The contractor shall submit the following to the Engineer:

1. Prior to the start of any work, a signed certificate from the proposed roofing manufacturer showing that the roofer is a trained and authorized applicator of his assemblies.

2. A signed certificate from the proposed roofing manufacturer naming their representative and their independent roofing auditor/inspector (where applicable) and showing that he is authorized to act on and make commitments in their behalf.

3. 5 complete sets of the following information for the roofing system he proposes to use. Submittals shall be marked-up as necessary to clearly identify the item being submitted and its conformance to the requirements of these specifications.

   a. Manufacturer's material product data and Material Safety Data Sheets for the following items:

      1. Insulation.
      2. Insulation Fasteners.
      3. Wood Fiber Board.
      4. Dry Sheet.
      5. Base Sheet.
      6. Combination Base Sheet & Dry Sheet.
      7. Venting Medium.
      8. Modified Bitumen Interply Sheet.
      9. Modified Bitumen Cap Sheet.
      10. Base Flashing System.
      11. Walk-on Pads.
      12. Cant Strip.

Delete references to any and all materials which are not applicable to your job.

NOTES TO ARCHITECT

13. Roofing Vent.
14. Asphalt.
15. Neoprene Flashing Cement.
16. Insulation Adhesive.
17. Emulsions and Coatings.

Plastic cement is not compatible with modified bitumen. Be sure plastic cement is not specified in the FLASHING AND SHEETMETAL section of the specs.

b. Detailed installation drawings and specifications for the proposed roofing system/assembly. The installation drawings shall indicate the layout of insulation and the location and pattern of fasteners.

c. Test report from a qualified testing laboratory indicating that the proposed roofing system has a fire classification rating of either Class A or Class B. The test report shall also indicate the maximum roof slope permitted for the proposed assembly.

Delete reference to insulation where it is not used.

d. Where required, Factory Mutual approval for the proposed roofing system.

All materials except the insulation, emulsion, coatings and the venting medium when it is under insulation and is therefore not an integral part of the roofing membrane shall be as labeled or approved by one manufacturer.

4. Detailed roofing inspection reports by the Manufacturer's representative or their independent roofing auditor/inspector (once during the roof application and one at job completion).

Insert number of inspections as applicable. (See Section 1.03 E.3)

5. Warranties and Guaranties as noted under Section 1.06.

NOTES TO ARCHITECT

1.06 WARRANTIES AND GUARANTIES

A. The Contractor shall furnish to the Engineer the following:

Be sure to require a 2-year guaranty on sheet metal counterflashing and sealing in your SHEET METAL Section.

1. A written guaranty on the roofing membrane system and built-up base flashing for a 2-year period after the Project Acceptance Date. The guaranty shall provide the following at no cost to the State:

   a. Repair of roofing and flashings as necessary to seal leaks which are attributable to faulty materials and/or workmanship;

   b. Repair or replacement of damage to the building and/or its finishes, equipment and/or furniture when occasioned by such leaks; and

   c. Inspection of the roofing and flashings together with the Engineer or his designated representative, on or about the 1st and 2nd anniversaries of the Project Acceptance Date, and repair or replacement of roofing and/or flashing as necessary to correct any deficiencies in workmanship or materials, such as by eliminating blisters exceeding 12" in any dimension or re-adhering open seams.

   Such repair or replacement of roofing and/or flashings shall be done in a manner which will preserve the integrity of the roofing membrane.

2. A 10-year roof membrane system warranty and flashing endorsement from the roofing manufacturer. The warranty shall cover both

NOTES TO ARCHITECT

material and workmanship and shall provide that in the event of failure due to normal weathering and wind conditions during the remainder of the warranty period (the 3rd through 10th years after the Project Acceptance Date), the roofing system manufacturer will make repairs as necessary to maintain the roof in a watertight condition at no cost to the State. The warranty shall also state the manufacturers acceptance and certification that the roof has been installed in accordance with the manufacturer's instructions and that the owners personnel have been properly instructed in its maintenance.

1.07 PRODUCT HANDLING

A. Delivery of Materials: All roofing materials shall be delivered to the site in the original unbroken manufacturer's wrapping material and containers with the original labels thereon intact. If any unlabeled materials are to be used, a properly attested certificate from the manufacturer stating that such materials comply with the requirements of the Contract Documents shall be furnished to the Engineer prior to installation.

B. Storage of Materials at Job Site:

1. Except when placed on roof decks immediately prior to installation, roofing materials shall be stored above the supporting surfaces, such as on pallets.

2. Roll goods, insulation, and any other materials which either absorb or are adversely affected by moisture shall be kept dry. Wet materials and/or materials which appear to have been deteriorated after getting wet shall not be permitted to be used on the job and shall be promptly removed.

Delete the word "insulation" when that material is not used.

NOTES TO ARCHITECT

3. Materials containing solvents shall be stored in a dry, cool area with proper fire and safety precautions.

4. Roll goods shall be stored on end.

5. If stored on other than the ground, all materials shall be distributed so that their resultant weight does not exceed the design live load on the deck (normally 20 lbs. per square foot on roofs and 40 lbs. per square foot on floors).

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

Delete references to any and all materials which are not applicable to your job.

B. General: Each package of modified bitumen roof covering materials shall bear the label of a recognized agency having a service for the inspection of material and finished products during manufacture (e.g., ASTM, UL, etc.).

C. Asphalt: Standard brand complying with A.S.T.M. D312 Types III or IV, or modified roofing asphalt with its softening point (SP), Flash Point (FP), Finished Blowing Temperature (FBT) and Equiviscous Temperature (EVT) clearly marked on each package.

D. Asphalt Primer: Standard brand complying with A.S.T.M. D41.

E. Roof Insulation: Standard brand complying with the following:

Delete this paragraph if insulation is not used.

1. Mineral Fiber Insulation Board complying with ASTM C726.

2. Mineral Aggregate (perlite) Thermal Insulation Board complying with ASTM C728.

Be sure that insulation specified on metal decks will span the flute-to-flute clear span.

NOTES TO ARCHITECT

3. Faced Polyisocynurate Insulation Board complying with Federal Specifications HH-I-1972 (polyurethane not permitted).

Insulation shall have a minimum thermal resistance (R factor) of _____ btu/hr./sq.ft.

Specify thermal resistance when required. If not, delete sentence.

F. Roof insulation for slope build-up: Uniform thickness and tapered insulation of the types in Subsection 2.01 E above. May also be expanded polystyrene (EPS) insulation conforming to ASTM C578, Type I, nominal density of 1.0 lb./cubic foot.

Delete this paragraph if slope build-up is not part of the project scope. Specify thickness if it is critical to detailing.

1. Over non-combustible decks, unless otherwise required by the testing laboratory's report for a fire rated assembly, the EPS insulation shall be faced in the field with a minimum of 1/2" thick perlite insulation board or wood fiberboard. The maximum roof slope where a mineral surfaced cap sheet is provided is 1 inch per foot.

2. Over combustible decks, a thermal barrier board and/or facing board as required by the testing labratory's report for a fire rated system shall be provided over the EPS insulation.

Add Notes on appropriate plan details: "Insulation thickness assumed for plan details is _____ inches. Required changes shall be coordinated if actual thickness is other than as shown."

NOTE: If the Contractor elects to use insulation with a thickness other than that shown on the plans, he shall be responsible to prepare any revised detail drawings and to coordinate the work with other trades as may become necessary because of the thickness change. Any additional costs to implement such a change shall be borne by the Contractor.

NOTES TO ARCHITECT

NOTE: Where the testing laboratory's report permits the use of ESHAVENT venting medium directly over EPS insulation (without a thermal barrier or facing board), the EPS shall have a minimum density of 1.25 lbs. / cubic foot.

G. Roof Insulation Tape: Minimum 6" wide fiberglass roof insulation tape.

H. Wood Fiberboard: Standard brand complying with ASTM C208, asphalt coated on six sides and compatible with the insulation and roofing system as per the manufacturer's recommendations.

Delete when insulation is not used.

Delete when insulation is not used.

I. Cant Strip: Mineral Fiber or Perlite, compatible with the insulation and roofing system. Cants shall be a minimum of 4 inches high with an exposed face of 45 degrees to the plane of the roof.

J. Mechanical Fasteners for Insulation: Manufactured products of the appropriate type and length for the proposed roof deck and insulation installation as recommended by the insulation manufacturer and approved by Factory Mutual as a component of the roofing system.

Delete when insulation is not used.

K. Roof Insulation Adhesive: Adhesive shall be asbestos-free, waterproof (non-reemulsifying) and compatible with the insulation and substrate as recommended by the roof insulation manufacturer. Adhesive shall also be approved by Factory Mutual as a component of the roofing system.

Delete when insulation is not used.

L. Roofing Nails: Galvanized, of the appropriate type and length for the proposed installation as recommended by the roofing membrane manufacturer.

M. Neoprene Flashing Cement: Standard brand, asbestos-free, as recommended by the roof membrane manufacturer.

N. Emulsions and Coatings:

1. Emulsion shall be asbestos free, compatible with the finish coating, and as recommended

NOTES TO ARCHITECT

by the roof membrane and finish coating manufacturer.

Delete this Sub-section when colored or reflective coating is not desired as a finish.

2. Color Coatings shall be as recommended by the roof membrane manufacturer, asbestos-free and approved as part of the proposed fire rated roof membrane assembly by a qualified testing laboratory. Color shall be _____.

Delete when only reflective coating is to be used.

3. Reflective Coating shall be an asbestos-free, asphalt-based fibrated aluminum roof coating, as recommended by the roof membrane manufacturer and approved as part of the fire rated roof membrane assembly by a qualified testing laboratory.

Specify Color.

Delete when only color coating is to be used.

O. Dry Sheet: Rosin-sized paper weighing not less than 4#/100 s.f., unsaturated felt weighing 7-1/2#/100 s.f., or roof sheathing paper weighing approximately 6#/100 s.f.

Delete when deck is other than wood.

P. Base Sheet: Asphalt coated glass fiber base sheet as recommended by the roof membrane manufacturer and complying with ASTM D4601, Type I.

1

Q. Combination Base Sheet/Dry Sheet: Asphalt coated base sheet with laminated kraft paper backing conforming to ASTM D4601 Type I.

Delete when deck is other than wood.

R. Venting Medium

1. Special venting sheets, such as Ventsulation by Johns-Manville, Channel Vent GB Base Sheet by Celotex Corp., Stratavent by GAF Corp. and "ESHAvent" by Malarkey Roofing Company.

Delete when venting medium is not used.

Insul Base by Intec/Permaglas may be used only on top of insulation on an insulated deck with a single layer of insulation.

Use over all decks of concrete, lightweight concrete and nailable concrete fills such as perlite, vermiculite gypsum or cellular

2. Mineral-surfaced cap sheet installed with

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granules down.

concrete.

3. Glass fiber insulation.

S. Modified Bitumen Interply Sheet: Interply sheet shall be manufactured with bitumen modified with styrene-butadiene-styrene (SBS) polymers and reinforced with inorganic fibers. Nominal weight of interply sheet shall be 40# per square.

T. Modified Bitumen Cap Sheet:

1. Cap sheet shall be manufactured with bitumen modified with styrene-butadiene-styrene (SBS) polymers and reinforced with inorganic fibers. Nominal weight of cap sheet shall be 90# per square.

Delete paragraph 2 when smooth surface roof finish is used.

2. Finish surface of cap sheet shall be factory applied fine mineral granules. Color of finish shall be _____.

U. Modified Bitumen Roof & Base Flashing:

Specify Color.

1. Flashing materials shall be modified bitumen interply sheet and cap sheet as noted under subparagraphs 2.01 S and T above.

V. Walk-on Pads: Composed of chopped rubber particles and synthetic binders. Pads shall be cut from rolls nominal .321 inch (8mm) thick x 31.5 inches (80 cm) wide x 32.8 feet (10 m) long. Pads shall be "Trafblock Walk Pad" as manufactured by Siplast or approved equal.

Delete this paragraph when walk-on pads are not used.

Adhesive for pad application shall be compatible rubber based adhesives approved by the roofing membrane manufacturer. Finish surface of the pad shall match the adjacent roof surface.

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W. Roofing Vent: Manufactured plastic assembly at least 6 inches high with minimum 2-inch base diameter vent stack and 10-inch diameter base flange. As an option, the vent assembly may be of copper meeting the above minimum dimensions.

This description is for a 2-way vent. Be sure to modify description if 1-way or solar vent is required.

X. Termination Bar: 1" x 1" x 1/8" thick galvanized steel angle with slotted holes at 8" o.c. or approved equal.

Delete when termination bar is not used.

2.02 MODIFIED BITUMEN ROOFING ASSEMBLIES

A. General Requirements

1. In accordance with the Uniform Building Code, the roof covering assembly shall have a fire classification rating of either Class A or Class B when tested in accordance with U.B.C. Standard No. 32-7 or as otherwise tested and rated as either Class A or B by a qualified testing laboratory (Underwriters Laboratories (UL), Warnock Hersey, Factory Mutual (FM) or approved equal).

2. Roofing materials shall conform to Federal and/or A.S.T.M. specifications as indicated.

Note: Where the roof slope exceeds 1/2" per ft., installation of the roof membrane parallel with the roof slope and/or backnailing of the membrane may be necessary, as recommended by the membrane manufacturer, to prevent slippage. This may necessitate the installation of wood nailers with in-fill insulation on non-combustible decks. Therefore, ensure that you modify your design and specs where/as necessary to address this potential problem.

B. Built-Up Roofing Assemblies

1. Roof insulation as called for in subparagraph 2.01 E. and F. above shall be installed as described herein where shown on the plans.

2. Roofing membrane system shall be composed of a minimum of one layer of a modified bitumen interply sheet topped with a modified bitumen cap sheet as described in Sub-section 2.01 S and T. Both the interply and cap sheet shall be laid into solid moppings of hot asphalt spread at a rate of 25# per 100 square feet.

Delete paragraph 2.02 B.1. when insulation is not used.

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3. Roof and Base Flashings as called for in subparagraph 2.01 U. above shall be installed as described herein where shown on the plans.

   a. Flashings shall be composed of modified bitumen interply sheets and cap sheet in the number of layers as specified or as shown on the drawings. Each layer of flashing shall be laid in a solid mopping of hot asphalt or torched-on (heat welded) in accordance with the manufacturer's recommendations.

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

A. Before the work under this section is started, the Roofer, together with the Manufacturer's Representative or their independent roofing auditor/inpsector (where applicable) and the Contractor shall meet with the Engineer at the job-site to examine all surfaces on which roofing will be placed and all adjoining work, including inserts, which will affect or be affected by the roofing work. All unacceptable areas and/or conditions such as those listed in subparagraph 3.02 A.5 shall be corrected by the contractor and verified and accepted by the Roofer and the Manufacturer's Representative or their independent roofing auditor/inpsector prior to start of the work.

Include other related trades in the inspection group if/as applicable to your job (e.g., the sheet metal subcontractor where there are embedded reglets in parapet walls, etc.)

B. Before the work under this section is started, the Contractor and Engineer shall inspect and record the conditions of the building interior rooms and ceilings. The Contractor shall protect the interior finishes, furniture and equipment against damage.

Delete this paragraph for new construction projects.

3.02 APPLICATION

A. General

1. Workmanship: The Roofer shall have a

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responsible foreman on the job during roofing operations who shall ensure that all work is done in accordance with the plans and specifications.

2. No roofing shall be installed during precipitation and shall not be started in the event there is a possibility of precipitation during application.

3. No roofing shall be started in the absence of the Engineer or his representative. The Contractor shall call the Engineer to give at least one day (24 hours minimum) advance notice of the starting of roofing operations.

4. The application of roofing shall be as specified or as shown in the plans.

5. Absolutely no roofing shall be applied before the deck and the work in connection therewith have met the following conditions:

   a. Wood decks shall be dry (moisture content 19% or less as measured on the Moisture Meter's Wood Scale); smooth; free from loose materials; properly graded to outlets; and swept clean. Knot holes or loose knots over one inch in dia. and cracks over 3/8" wide shall be covered with 24-gauge galvanized sheet metal nailed in place.

   b. Concrete decks shall be cured (minimum 7 days) and dry, smooth, free from loose materials, properly graded to outlets, and swept clean. All sharp projections and lumpy places shall have been removed.

Delete paragraphs for decking which are not applicable to your job.

c. Concrete fill shall be tested for adequate holding power before roofing is started. A fastener of the type specified herein for the fill material used shall be driven and pulled out. No roofing shall commence until a minimum resistance of 50 pounds has been attained.

d. Sheet metal panels for insulated steel decks shall be so secured to supporting framework and to each other, and shall be in such condition, that insulation will bear on each rib and not have to bridge over deck discontinuities.

e. Adjoining work, such as roof drains, metal edging, metal counterflashing, gutters and lead collars for vent pipes shall either be in place, ready for the Roofer to work in, or shall be available for installation by others, as applicable. This work shall be coordinated so that the total roofing system will be watertight.

6. The temperature of the asphalt shall be monitored through the use of either accurate temperature gauges attached to the kettles or separate asphalt thermometers which shall be part of the Roofer's equipment. Asphalt shall be heated to no higher than 50 degrees F below its flashpoint (FP), nor heated and held above its finished blowing temp. (FBT) for more than four hours. It shall also be applied at its equiviscous temperature (EVT) range (EVT +/- 25 degrees F).

7. The elapsed time between the application of hot asphalt on the deck and the laying in of

NOTES TO ARCHITECT

insulation or membrane layers shall be minimized to ensure full bonding between the surfaces being cemented together with the asphalt. It shall be the Roofer's responsibility to modify his operations to accomplish this considering the ambient conditions of weather, temperature, etc. A felt laying machine shall be used if necessary.

8. All layers of roofing shall be laid free of wrinkles, creases or fishmouths. Sheets shall be laid directly behind the asphalt applicator. Sufficient pressure or brooming shall be exerted on the roll during application to ensure prevention of air pockets.

9. Before application of the cap sheet, build-up all "bird-baths" by mopping in place with hot asphalt one (1) or more overlapping layers of interply sheet(s) to provide positive drainage.

For re-roofing projects, show location of bird-baths/ponding areas on plan and address correction.

10. Loose ceramic granules, of matching color with the mineral surfaced cap sheet shall be broadcast over excess bitumen seepage, spillage, etc., while the bitumen is still liquid in order to provide a neat and uniform finish similar to that of the surfacing sheet. Excess bitumen seepage shall be considered bitumen flowing out past the edge of the cap sheet more than 3/8".

Delete this paragraph if smooth surface finish is used.

11. Phased construction (roofing purposely interrupted for a period to permit other

work and trafficking over the membrane) shall not be permitted.

a. The complete roofing membrane, including emulsion surfacing in the case of smooth-surfaced roofing, shall be installed up to the line of termination (but allowing for required lapping) at the end of the day's work.

b. At the end of the day's work, all incomplete roofing shall be protected using a water cut-off. The water cut-off shall consist of coated felt strips set in neoprene flashing cement and lapping both the finished membrane and the roof deck surface in such a manner as to seal all incomplete edges against intrusion of water.

c. Water cut-off shall be removed before continuing installation of the roofing system.

B. Insulation

1. General

a. The application of insulation shall be as specified herein or as shown in the plans unless otherwise stipulated in the specifications and details of the manufacturer of the insulation being used, as submitted to and approved by the Engineer.

Delete this subsection in its entirety if insulation is not used.

b. Units of insulation shall be laid with their long joints perpendicular to the direction of laying of the roofing plies.

c. Units of insulation shall be laid so that

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they touch adjacent units along all sides.

d. Where mineral fiber, mineral aggregate or isocyanurate insulation is applied in more than one layer, depending upon the substrate, the first layer may either be mechanically fastened to the deck or hot-mopped onto a base sheet or venting medium. In either case, every layer thereafter shall be solid-mopped with asphalt.

e. Unless otherwise indicated, where EPS insulation is used, it shall be laid into a solid mopping of hot asphalt that has been allowed to cool to approximately 225 degrees to 250 degrees F. or shall be adhered to the substrate using waterproof (non-reemulsifying) adhesive in accordance with the manufacturer's recommendations.

Delete this paragraph when EPS insulation is not used.

f. If premanufactured, multi-layered EPS insulation is used for building up slopes or crickets, it shall be bonded together with waterproof (non-emulsifying) adhesive covering 100% of the bonded surfaces.

Delete this paragraph when EPS insulation is not used.

g. When insulation joints are not taped, the short joints shall be staggered.

h. When taped, insulation joints may be continuous in both directions. Tape shall be centered on the joint and embedded in hot asphalt applied at a rate of 15 lbs. per square.

i. All joints in EPS insulation shall be tightly butted together. Joints of the field applied facing boards shall be tightly butted together, staggered, offset from the insulation joints below and taped with roof insulation tape. Care shall be taken in applying hot asphalt to the tape so that it does not contact insulation already in place.

Delete this paragraph when EPS insulation is not used.

2. Acceptability
   a. Insulation which shows signs of deterioration (such as reduced resistance to delamination, edge disintegration, etc.) shall not be used.

   b. Insulation which has been installed but is still exposed shall be covered immediately when there is any danger that it will get wet.

   c. Installed insulation which gets wet shall be handled as follows before any roofing is applied over it:

      (1) All insulation shall be completely dried out as determined by a moisture meter.

      (2) Glass fiber insulation which gets waterlogged after installation shall be removed and replaced with dry material.

      (3) The exposed portions of perlite aggregate insulation board shall be broomed lightly to remove any surface "skin" degradation that may have formed due to wetting. Boards that are gouged or broken in the process shall be removed and replaced.

      (4) The location of a joint between perlite aggregate insulation units shall be so marked in the vicinity of the center of the wetted area that an additional roofing vent can be installed directly over it after completion of the roofing membrane.

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d. Insulation units with broken corners or similar defects shall be trimmed and repaired (gap filled with similar material) or discarded.

e. Any EPS insulation which is damaged because it is subjected to excessive heat shall be removed and replaced with properly installed units.

Delete this paragraph when EPS insulation is not used.

C. Installation

1. On wood and plywood decks:

a. Dry sheet shall be lapped 2 inches on sides and ends and sprinkle-nailed to the deck. A coated base sheet with minimum 2-inch side laps and 6-inch end laps shall be laid over the dry sheet and nailed 9 inches o.c. along all laps and 18 inches o.c. and staggered along lines 12 inches in from each edge. Both sheets may be nailed jointly provided their laps are staggered.

In high wind areas and open areas subject to high wind conditions, require nailing of insulation in the number and pattern similar to that required for an FM approved I-90 installation in the outer 4' of building perimeter.
Verify with your Project Coordinator if your project is in this category.

b. If available, a combination dry sheet/base sheet may be used in lieu of the individual plies of dry sheet and base sheet. The combination sheet shall be nailed as described above for the base sheet.

c. The roofing membrane shall be laid onto the coated base or combination base sheet in a solid mopping of hot asphalt.

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d. Mineral fiber and mineral aggregate insulation shall be hot-mopped to the base sheet in a solid mopping of 30 lbs. per square of asphalt. The roofing membrane shall then be laid over the insulation in a solid mopping of asphalt.

Delete paragraph where insulation is used.

Delete paragraph "d", "e" and "f" where insulation is not used.

(1) As an alternative, the insulation may be mechanically attached directly to the deck using screw fasteners in the number and pattern recommended by the roof insulation manufacturer. No dry sheet or coated base sheet will be required when this alternative is used.

e. Where used, polyisocyanurate insulation shall be fastened to the deck as noted in item (1) above.

A venting base sheet or coated base sheet shall be spot mopped onto the insulation and the roofing membrane shall be laid onto the venting sheet in a solid-mopping of hot asphalt.

f. Where EPS insulation is used for slope build-up, barrier boards placed atop the deck and/or facing boards placed atop the EPS insulation as noted under Subsection 2.01 F. shall be provided as necessary to conform to the requirements for a fire rated assembly and installed in accordance with the insulation manufacturer's recommendations . Where barrier boards are provided, provision of the dry sheet and base sheet may be deleted. The roofing membrane shall be laid onto the facing board in a solid-mopping of hot asphalt.

Delete this paragraph where EPS insulation is not used.

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2. On nailable concrete fill decks (perlite, vermiculite, gypsum or cellular concrete).

   a. Venting medium shall be cut into lengths not to exceed 18 ft. and allowed to relax and flatten before laying.

   b. The venting sheets shall then be laid over the deck with side laps equal to the selvage (2 inches if none) and end laps of 4 in. staggered at least 12 in. between adjacent strips.

   c. Finally, the sheets shall be nailed to the deck using mechanical fasteners appropriate to the deck material in the number and pattern recommended by the roof membrane manufacturer. Fasteners shall be located so that they do not coincide with roofing vent locations.

   d. The roofing membrane shall be laid onto the venting medium in a solid mopping of hot asphalt.

   e. Mineral fiber and mineral aggregate insulation shall be hot-mopped to the venting medium in a solid mopping of 30 lbs. of asphalt per square.

Delete this paragraph when insulation is used.

Delete paragraphs "e", "f", "g" and "h" where insulation is not used.

   The roofing membrane shall be laid over the insulation in a solid mopping of hot asphalt.

   f. If mineral fiber insulation is used for venting in lieu of the venting medium noted above, it shall be mechanically fastened to the deck using screw fasteners in the number and pattern recommended by

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the roof insulation manufacturer. Fasteners shall be located so that they do not coincide with roofing vent locations. The roofing membrane shall be laid onto the insulation in a solid-mopping of asphalt.

g. Where used, polyisocyanurate insulation shall be hot-mopped to the venting medium in a solid mopping of 30# per square of asphalt. A venting base sheet or coated base sheet shall be spot-mopped onto the insulation and the roofing membrane shall then be laid onto the venting sheet in a solid-mopping of hot asphalt.

h. Where used for slope build-up, EPS insulation and facing boards as described under Subsection 2.01 F. shall be placed onto the venting medium as described under Sub-section 3.02 B.1.e. The roofing membrane shall then be laid onto the facing material in a solid-mopping of hot asphalt.

Delete this paragraph when EPS insulation is not used.

3. On concrete decks.

a. When the deck is dry enough to receive roofing (see subparagraph 3.02 A.5.b.), it shall be primed with asphalt primer applied at a rate of one gallon per 100 square feet.

b. After being cut and relaxed as described in subparagraph 3.02 C.2. above, the venting sheets shall be spot-mopped to the deck using a minimum of 12 lbs. per square of asphalt.

See Tech Memo No. 47 for reroofing projects. re: Deletion of asphalt primer. Delete paragraph if not applicable for your project.

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The spots shall be approximately 12 inches in diameter, spaced 18 inches o.c. and staggered, and shall be carefully mopped so that no asphalt is dripped between spots. They shall be located so that they do not cover or encroach into roofing vent locations. The venting sheets shall be laid with side laps equal to the selvage (2 inches if none) and end laps of 4 inches staggered at least 12 inches between adjacent strips. Special perforated venting sheets when used shall be installed in accordance with the manufacturer's instructions.

c. The roofing membrane shall be laid onto the venting medium in a solid mopping of hot asphalt.

d. Mineral fiber and mineral aggregate insulation shall be hot-mopped to the venting medium in a solid mopping of 30 lbs. of asphalt per square. The roofing membrane shall be laid over the insulation in a solid mopping of hot asphalt.

Delete this paragraph where insulation is used.

Delete paragraphs "d", "e", "f" and "g" where insulation is not used.

e. If mineral fiber insulation is used for venting in lieu of the venting medium noted above, it shall be spot-mopped to the deck at a rate of 12-16 lbs. of asphalt per square. The roofing membrane shall be laid onto the insulation in a solid-mopping of asphalt.

f. Where used, polyisocyanurate insulation shall be hot-mopped onto the venting medium in a solid mopping of 30# per square of asphalt. A venting base sheet or coated base sheet shall be spot-mopped onto the insulation and the roofing membrane shall then be laid onto the venting sheet in a solid-mopping of hot asphalt.

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g. Where used for slope build-up, EPS insulation and facing boards as described under subsection 2.01 F. shall be placed onto the venting medium as described under Sub-section 3.02.B.1.e. The roofing membrane shall be laid onto the facing material in a solid-mopping of hot asphalt.

Delete this paragraph when EPS insulation is not used.

4. On steel decks

a. Insulation shall be laid so that edges parallel to flutes bear on the deck flange surface. Joints shall not terminate over rib openings .

b. The insulation shall be fastened to the deck using mechanical fasteners as described under Subsection 2.01 J. in the numbers and patterns required for a Factory Mutual approved Class 1, I-90 installation. The roofing membrane shall be laid onto the insulation in a solid mopping of hot asphalt. Where polyisocyanurate insulation is used, a venting base sheet or coated base sheet shall be spot mopped onto the insulation and the roofing membrane shall then be laid onto the venting medium in a solid-mopping of hot asphalt.

c. Where EPS insulation is used to provide slope build-up, a thermal barrier shall first be fastened to the metal deck using mechanical fasteners as described in Subsection 2.01 J. The thermal barrier, insulation and facing boards shall be installed as required so that the total assembly conforms to a Factory Mutual

Delete this paragraph when EPS insulation is not used.

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approved Class 1, I-90 installation. The roofing membrane shall be laid onto the facing material in a solid-mopping of hot asphalt.

D. Cant Strips

1. Install cant strips at the intersections with curbs, walls and parapets. They shall be continuous, installed in lengths as long as possible and set in a heavy mopping of asphalt.

E. Roof and Base Flashings

1. Prior to the application of roof and base flashings, the substrate shall be primed with asphalt primer to ensure proper adhesion of the flashing material.

2. Base flashings shall be secured to the vertical surfaces using appropriate type fasteners, suitable for the substrate condition, through tin caps spaced at 8 inches o.c. along its top edge, unless otherwise shown on the plans.

3. Where a termination bar is called for, it shall be secured to the vertical surface using appropriate type fasteners suitable for the substrate condition through the slotted holes in the bar spaced at 8 inches o.c. Fasteners shall be set in a bead of neoprene flashing cement. A cant of neoprene flashing cement sloped to the outside edge of the bar shall be formed atop the termination bar.

Delete this paragraph where termination bars are not used.

4. See Subsection 3.03 for minimum flashing requirements over metal flanges, edging, etc.

Show detail on plans. Refer to DAGS Std. Detail No. R-3 and R-4a

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5. New roofing which adjoins existing roofing shall be flashed as shown in the plans.

dated 7/91.

F. Emulsions and Coatings

1. Emulsion surfacing shall be applied by brushing or rolling and shall be thoroughly cured before color or reflective coating is applied. The minimum curing time shall be as recommended by the manufacturer of the coating, but in any case shall extend until the material does not come off when walked upon, water does not "bead" on its surface and it does not bleed or discolor the color or reflective coating.

Show detail on plans. Refer to DAGS Std. Detail No. R-16 dated 9/91.

Delete this paragraph where emulsion and coating finish is not used.

2. Coatings finish shall be applied in strict accordance with the manufacturer's recommendations and instructions. In addition, they shall be applied in the quantities and rates noted on the testing laboratory's report as required to provide a fire rated assembly.

G. Walk-On Pads

1. Pads shall be cut to size and installed with a compatible rubber based adhesive approved by the roofing system manufacturer.

3.03 INSTALLATION OF ADJOINING WORK

Delete this paragraph when walk-on pads are not used.

A. All adjoining work (such as vent pipe flashings,

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roof vents, etc.) shall be as specified or as shown in the plans.

Be sure to call for the furnishing of items of adjoining work in the appropriate specification sections.

B. Wood Blocking: Wood Blocking shall be installed where shown on the plans and shall be secured to the deck with appropriate fasteners spaced at maximum 48 inches o.c.

Delete paragraphs which are not applicable to your project and add paragraphs as required. Describe work in detail and show details on plans. (e.g. Roof Scupper, Expansion Joint, Equipment Curbs and Mountings, etc.)

C. Metal Edging: Metal edging shall be set in a full bed of neoprene flashing cement on top of the modified bitumen interply membrane not including the cap sheet. The edging shall be overlapped (nested not cut) at least 5 inches at joints, with a flexible non-hardening sealant compatible with the neoprene flashing cement and asphalt placed between the two layers of metal in such manner that metal does not touch metal anywhere. The edging flange shall be securely fastened to edge nailing strips using large headed-nails at least 1-1/2 inches long. Nailing shall be 3 inches on-center and staggered on either side of flange centerline. Laps shall be double nailed. The flange shall then be primed and flashed with one strip of the modified bitumen inter-ply sheet 6" wider than the flange width set in hot asphalt. The cap sheet shall then be laid in hot asphalt with the edge 1/4" away from the outside corner of the metal edging. A continuous bead of neoprene flashing cement shall be applied and pressed into this edge. The face flange of the metal edging shall be anchored as shown in the plans.

Show detail on plans. Refer to DAGS Std. Detail No. R-6b dated 9/91. Provide closely spaced substantial achorage of the face flange in high wind areas and open areas subject to high wind conditions. Continuous sheet metal clips with closely paced fasteners or direct nailing of the face flange with closely spaced

D. Lead Vent Pipe Flashing:

1. Clean off rust from existing vent pipes and extend pipes to a minimum of 6 inches above the finished roofing system.

fasteners having

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2. The top and bottom of the lead flashing flange shall be primed and set on top of the completed modified bitumen membrane cap sheet in a full bed of neoprene flashing cement. The flange shall then be flashed with a square piece of the specified modified bitumen interply sheet and topped with a square piece of the modified bitumen cap sheet matching the adjacent surfacing. The bottom flashing ply shall have dimensions 6 inches more than the flashing flange on each side and the cap flashing 6 inches more than the ply below it. Both flashing plies shall be set in hot asphalt. A hole about 1/8 inch larger than the pipe flashing shall be cut out of both flashing plies to fit around the pipe flashing. A cant of neopene flashing cement shall be formed around the base of the pipe flashing after the cap flashing square is in place.

   neoprene washers are acceptable. Verify with your Project Coordinator if your project is in this category.

   Delete paragraph "1." for new construction.

   Show detail on plans. Refer to DAGS Std. Detail No. R-8 dated 9/91.

3. Finally, the roofer shall ensure that the lead flashing sleeve is turned down a minimum of one inch into and snugly against the interior surface of the vent pipe. A 1/8 inch mesh screen secured with a stainless steel clamp shall be installed over each vent pipe.

E. Roof Drains:

1. Clean existing locking ring before tightly bolting it to the drain housing to ensure a watertight system.

2. Replace all broken or missing locking rings, bolts and strainers.

   Delete paragraph 1 and 2 for new construction project.

3. Install roofing membrane and lead flashing as indicated on the plans.

4. Clean all drainage channels through locking rings thoroughly after reroofing to ensure unimpeded flow of water into the drain.

   Show detail on plans. Refer to DAGS Std. Detail No. R-7b dated 7/91.

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F. Roofing Vents:

1. Install roofing vents in locations indicated on the plans.

2. Cut hole with diameter equal to that of the vent stack through roofing system, including insulation, to the deck.

3. Prime top and bottom of the vent flange and set on top of the completed modified bitumen roofing membrane cap sheet in a full bed of neoprene flashing cement. Complete flashing installation similar to lead vent pipe flashing.

Show location of roof vents and detail vents on plans. Refer to DAGS Std. Detail No. R-12 dated 9/91 for detail and notes regarding vent locations.

G. Temporarily remove electrical conduits, mechanical piping and equipment as necessary to clear the roof for installation of new roofing and reinstall upon completion.

H. Metal Counter-Flashing at Curbs and Parapets:

Delete paragraph for new construction projects.

1. Existing reglet to remain: Completely remove existing sealant prior to installation of new work. Fill reglet as required in accordance with the roofing manufacturer's recommendations.

Delete paragraphs "1." through "4." for new construction projects.

2. Remove existing sheet metal work as necessary to allow for new sheet metal work.

3. Existing sheet metal work which is called to be re-used in the new work shall be carefully removed and properly stored.

Show detail on plans. Refer to DAGS Std. Details No. R-4 dated 9/91 and R-5 dated 7/91.

4. Remove existing cant strips and replace with new.

5. Sheet Metal Reglet: Reglets shall be installed where shown in the plans.

6. Metal counter-flashing shall be installed, anchored and sealed as specified herein, as detailed in the plans or, if a manufactured system is used, as instructed by the

Be sure to specify appropriate sealant materials (e.g. Polyurethane or Terpolymer sealants) and proper application procedures (e.g.

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manufacturer. Sealant material and application shall be as specified in the SHEET METAL Section.

cleaning & priming of existing surfaces) for sealing of counterflashing in SHEET METAL Section.

Do not install metal reglets on horizontal surfaces of curbs.

I. Pitch Pockets: Sheet metal pitch pockets shall be installed around all poles, brackets, pipe supports and other items which rest directly on or are attached to the roof deck. Pitch pocket pans shall have dimensions at least 2 inches larger than the dimensions of the poles, brackets, pipe supports, etc. They shall have flanges not less than 4 inches wide which shall be primed on the top and bottom and set on top of the completed modified bitumen roof membrane cap sheet in a full bed of neoprene flashing cement. The flange shall then be flashed with a strip of the specified modified bitumen interply sheet topped by a strip of the modified bitumen cap sheet, matching the adjacent surfacing. The flashing strips shall be set in hot asphalt with each strip wider than that below it by at least 6 inches and lapped full width at corners. A cant of neoprene flashing cement shall be applied to the exterior base of the pitch pocket. After the flashing plies have been installed, the bottom 1/3 depth of the pitch pocket pans shall be filled with neoprene flashing cement, and the balance filled with asphalt. After the asphalt has cooled and settled, the pitch pocket pans shall be topped-off using neoprene flashing cement and their tops shall be sloped to drain to the outside edges. Finally, a sheet metal skirt with dimensions adequate to extend at least 1 inch beyond the pan at its widest point and 1/2 inch below its top edge shall be fitted, sealed and clamped (or soldered) onto the poles, brackets, etc.

Show detail on plans. Refer to DAGS Std. Details No. R-9 and R-9a dated 9/91.

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J. Sheet Metal Housing: Conduits, pipes, etc. (other than vent pipes) which penetrate the roof shall be routed laterally through sheet metal housings. The housings shall cover the openings in the roof and have flanges at least 4 inches wide. The assemblies shall be emplaced and flashed similar to pitch pockets.

Show detail on plans. Refer to DAGS Std. Detail No. R-11 dated 9/91.

3.04 PROTECTION AND CLEANING

A. Protection

1. Any work or materials damaged during the handling of roofing materials shall be restored to their original (undamaged) condition or replaced.

2. The work of other trades shall not be marred or injured. Asphalt daubed or splashed onto adjoining surfaces shall be removed and the surface or finish restored to its original finish and appearance. Asphalt runs, sags and streaks over sheet metal surfaces shall be carefully removed so as not to scratch those surfaces.

3. Protective coverings shall be installed at all pavement and exposed building walls as necessary to prevent the marring of existing surfaces.

4. Protection shall remain in place for the duration of the roofing work.

B. Cleaning

1. Debris from roofing work shall be removed from the premises and disposed of at the end of each working day and upon completion of the work to the satisfaction of the Engineer. The roof shall be left in good, clean

condition.

2. Bitumen, modified and otherwise, shall be removed completely from all surfaces other than the roofing, especially those to which sealants must be bonded and/or metal flashings which are to be painted.

3. Gutters, downspouts, roof drains, etc. shall be cleaned out and all blockages shall be removed prior to acceptance of the project.

END OF SECTION

NOTES TO ARCHITECT

These specifications describe the quality of jalousies that the Public Works Division wishes to use for its buildings. It is tailored to the use of aluminum jambs attached to wood mullions and/or jambs. The head and sill shall be of wood, not aluminum.

However, if the project is in an area of known termite infestation, provide individually sectioned full-surround frames (discontinous aluminum head and sill members). This will facilitate replacement by maintenance staff if the window is vandalized or damaged. Verify with your project coordinator if your project is in such a location.

SECTION 08527 - ALUMINUM JALOUSIE WINDOWS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

A. The Contractor shall visit the job site to verify the site conditions and dimensions prior to fabrication.

B. Fabrication and installation of jalousie windows shall be done by skilled and experienced mechanics to the best standard of the trade and in accordance with the approved shop drawings.

1.03 SUBMITTALS

A. Sample Mock-up:

1. A complete sample mock-up of the jalousie window, minimum size of approximately 16" wide x 16" high, together with manufacturer's technical specifications shall be submitted to the Engineer for approval before installation.

2. Reference to a current sample in the Engineer's Office may be made in lieu of submittal of the sample mock-up provided such sample is exactly in accordance with the product to be furnished.

B. Shop Drawings:

1. Shop drawings showing each window condition, installation details and location of operators shall be submitted.

1.04 PRODUCT HANDLING

Provide adequate protection during fabrication, shipment, storage, assembly and erection to prevent damage to the jalousie window assembly and adjacent surfaces.

1.05 DRAWINGS AND SPECIFICATIONS

Should the products of the manufacturer require

NOTES TO ARCHITECT

different drawings, details or other requirements, the Contractor shall provide shopdrawings and field adjustments at no cost to the State.

1.06 GUARANTY

The Contractor shall execute to the State of Hawaii a two-year written guaranty warranting materials and workmanship against mechanical defects not due to improper use, willful damage or neglect and guarantying the free operation of the jalousies under normal Hawaiian weather conditions. Repairs or replacement of defective equipment or parts as may occur within a period of two years from the date of final acceptance of the project shall be made at no cost to the State.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The indicated products of the following manufacturers are acceptable provided they meet the materials and construction specified hereinafter:

Aloha Visulite, Ltd.	"Visualite" 505 w/ metal lever arm housing.
Hawaii Metal Forming Corp.	Series 801 w/ Visualite type lever operator.
International Window Corporation	Series 750
Gemini Window Corp.	Model 14.
Louver Windows Australia Trading	Breezeway

Use of the Breezeway window has been approved by DAGS Central Services on a case-by-case basis (concern is that clips can be vandalized). Verify with DAGS Central Services if it is acceptable for use on

2.02 MATERIALS AND CONSTRUCTION

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all

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materials and equipment incorporated in the project are asbestos-free.

your particular project.

B. Jalousie windows shall be the aluminum "surround" type, jambs only.

Modify this requirement per guidance given under the "Notes to Architect" on page 1.

C. Jalousie window frames: Extruded aluminum sections of 6063-T5 alloy. Frame members shall be not less than 2-1/2" deep and shall be 0.075" thick with an extrusion tolerance acceptable to the trade of plus or minus 0.006". Minimum jamb thickness at the clip attachment shall be 0.10", and jamb shall be one continous vertical piece.

D. Pivot clips: One-piece 5052-H32 aluminum alloy, minimum 0.050" thick, center balanced type. Clips for glass vanes shall be designed so as to permit glass loading from the inside without the use of spring tension expanders or attachers. Clips for wood slats shall be sized to permit the insertion of an 11/16" thick slat without rabbeting. Clips shall be spaced so that vanes or slats will overlap 1/2".

E. Push bar: 6063-T5 aluminum alloy, 5/8" wide x 3/32" thick or 1/2" wide x 1/8" thick.

If special jalousies are used such as for gymnasiums where operators are of different construction, detail such operators completely.

F. Operator lever arm and connecting bar: Heavy duty type, 6061-T6 aluminum alloy other hard tempered aluminum alloy with minimum thickness of 1/8" or having lateral bending resistance equal or greater than that for specified units.

G. Fasteners connecting the operator lever arm to the operator housing/bracket:

Show location of all operators on interior elevations.

1. Where the fastener is supported on both sides of the lever arm by the operator housing/ bracket, the fastener shall be a minimum 3/16" diameter rivet or bolt (with nut).

For jalousie windows located above high shelves, closets or cabinets, the lever operator shall be placed near the head so that it

2. When the fastener is cantilevered off of the operator housing/bracket (supported on only one side), the fastener shall be a minimum

NOTES TO ARCHITECT

1/4" diameter rivet or bolt (with nut).

3. Bolted fasteners shall be mechanically secured such that operation of the lever arm will not loosen them. The use of fastening compounds such as "lock-tite" is not acceptable.

4. Either the operator lever arm or the operator lever arm housing/bracket shall be detachable to allow repair or replacement.

can be reached and operated with a pole. It shall NOT be located immediately above shelves, closets or cabinets where it is difficult to reach and operate.

H. Fasteners connecting the lever arm to the connecting bar and the connecting bar to the push bar: Minimum 3/16" diameter rivets or bolts (with nuts).

I. Fasteners connecting the operator lever arm housing/bracket to the jamb/mullion frame: The operator lever arm housing/bracket, if not integral with the frame shall be secured to it with bolts and nuts with lock washers or lock nuts. Sheet metal screw shall not be used.

J. Operator: Lever type. No more than 10 vanes or slats shall be operated by one lever. Operators located more than 6 feet above the finished floor shall have arms terminated with an eye or knob for operation by a pole. Edges of the eye shall be ground smooth.

K. Breezeway Jalousie Windows: Louver jamb frame to be an extruded channel section, 6063T-5 aluminum alloy.

Delete this paragraph if window has not been approved by DAGS Central Services for your particular project.

1. Blade holding clips shall be injection molded polypropylene stabilized to resist ultra-violet degradation. Color shall be _____.

Indicate color of clips (either black or white) to suit your particular project.

2. Pantograph operator bars shall be manufactured from zinc coated steel.

NOTES TO ARCHITECT

3. Lever handle shall be aluminum with plastic finish pieces on either side of the handle opening. The plastic pieces shall be permanently bonded together with adhesive and the lever shall lock upon closure.

4. Pivot bearings shall be forged from aluminum alloy and coated with grease where in contact with the frame and operator bars.

5. Aluminum finish shall be clear anodized.

L. Rivets shall be of anodized aluminum and bolts shall be of 300 series stainless steel.

M. Poles: Hardened aluminum, having suitable length and stiffness to easily operate th lever, and terminating in either a hook or eye as required to operate the lever. Minimum sizes of poles shall be as follows:

Pole Thickness	Pole I.D.	Wall Thicknes	Remarks
Up to 10 feet	1/2"	0.058"	For "push-pull" use only.
	3/4"	0.114"	Where windows are above cabinets, shelves or closets.
Over 10 feet	1"	0.113"	----------

Pole operators shall be provided where indicated on the plans. A wall hanger shall be provided and installed for each pole.

Show the number and location of poles on the room elevations. Provide poles as follows:

Room Type	No. Poles
Cafetorium	4
Kitchen	2
1-Classroom	1
Ind. Arts	2
Small room (Office)	1
Large room (Conf.)	2 min

Do not specify mohair for weatherstripping.

N. Weather stripping: Extruded plastic vinyl or maximum 7/16" wide strips of sheet stainless steel designed so that a weatherproof closure is attained on the sides of the window opening when vanes or slats are closed.

O. Glass vanes: Vanes shall comply with UBC Section 5405, 4" wide x 7/32" thick with exposed edges

Indicate "clear" or "obscure" on the window schedule. Do not use glass vanes over 3' in

NOTES TO ARCHITECT

weberized or ground smooth. Vanes shall be clear or obscure as called for in the plans.

length.

Delete those vanes / slats which are not applicable to your specific project.

P. **Slats: Slats complying with the following requirements are acceptable:**

Address finishing of wood slats in the PAINTING Section.

1. Wood Slats: 4" wide redwood, clear all heart, kiln dried, vertical grain, with interlocking groove. Slats may consist of uniformly-cut pieces of the specified wood glued together either longitudinally or transversely with waterproof glue, provided they are identified to be painted in the finish schedule. Where transverse joints are provided, they shall be finger jointed. Each end shall be screwed to the pivot clip with two (2) aluminum or stainless steel wood screws. Slat thickness and clip size shall be as shown in the following table:

TABLE - REDWOOD JALOUSIE SLATS

Width of Window	Thickness of Slats	Clip Size	Remarks
Up to 3'-0"	11/16"	11/16"	No end rabbeting of slats permitted.
3'-0" to 4'-0"	1"	3/4" min.	End rabbeting of slats permitted.

2. Vinyl slats: 4" wide x 3/4" thick, extruded PVC, with **interlocking grooves and internal** stiffening ribs. "B" blade design as furnished by RMA Sales Co., Inc., Coastal Windows or approved equal.

NOTES TO ARCHITECT

a. Minimum slat wall thickness: 0.045".

b. Minimum stiffening rib thickness: 0.020".

c. Approximate weight per foot: 5.5 oz. per lineal foot (without internal steel reinforcement).

d. PVC material shall be fire retardant, self-extinguishing and provided with an ultraviolet inhibitor.

e. Slats shall have an integral flexible vinyl weatherstrip at each interlocking groove.

f. Injection molded PVC end caps shall be provided to completely close each end of the slat. The caps shall have tabs which when inserted into the end of the slat will prevent the cap from falling out.

g. Color of the blades shall be _____, extending throughout the PVC material.

Specify color (white or almond) to suit project. Do not specify dark bronze due to fading.

h. Internal steel reinforcement:

(1) Slats longer than 36" but less than 48" in length shall be provided with a minimum of one (1) internal steel reinforcing member fitted between the stiffening ribs nearest the middle of the slat.

(2) Steel reinforcing members shall be electrogalvanized.

(3) Internal steel members shall be of sufficient cross section and thickness such that when the slat is laid flat between two end supports, it shall be able to support a 40 pound weight suspended from its midspan with a maximum deflection of 7/8" (0.875").

i. Each end of the slat shall be secured to the pivot clip with 2 (two) aluminum or stainless steel sheet metal screws. Self-drilling screws are not permitted.

NOTES TO ARCHITECT

3. Aluminum slats:

a. **Nominal** 4" wide, extruded with **interlocking grooves and** stiffening ribs to provide 3/4" equivalent thickness and shaped to permit fastening to clips with two (2) aluminum or stainless-steel sheetmetal screws at each end of the slat. Stiffening ribs creating grooves on the backside of the slat shall be oriented downward so that it will not accumulate dust and debris. **Slats shall be as manufactured by Anodizing Inc. or approved equal.**

b. **As an alternative, slats may be tubular in profile, with an interlocking groove, extruded, with a cross section thickness of 3/4" and typical wall thickness of 0.045". Injection molded PVC end caps shall be provided to completely close each end of the slat. The caps shall have tabs which when inserted into the end of the slat will prevent the cap from falling out.**

Slats shall be fastened to clips with two (2) aluminum or stainless-steel sheetmetal screws at each end of the slat. Slats shall be as manufactured by International Window Corp. or approved equal.

c. **Each slat shall have an extruded vinyl weatherstrip along one edge, within the interlocking groove, to provide weather-tightness.**

d. **Color of slats shall be _____. Aluminum slats having an anodized finish shall be anodized to a minimum thickness**

Indicate slat color to suit project. Delete finish not applicable to your project.

NOTES TO ARCHITECT

of 0.0004". Aluminum slats having a painted finish shall be factory primed and painted in accordance with the manufacturer's standard.

Q. Finish: All aluminum parts, including frame, clips, rivets, lever, operator, push bar, screen frames, etc., shall be "clear" anodized to a minimum thickness of 0.0004".

R. Dissimilar metals: Absolutely no dissimilar metals shall be used except as specifically permitted and spelled out in these plans and specifications.

Do not specify rolled screen frame sections.

S. Screens frames: Heavy-duty, rewireable type, 6063-T5 extruded aluminum alloy, 7 7/16" with a minimum wall thickness of 0.062". Corners shall be assembled using corner reinforcement. Screen frames 4'-6" in height and over shall have a horizontal spacer bar(s) having a similar section as that of the perimeter frame dividing the screen into equal sections. Screens shall be installed to permit quick and easy removal from the jalousie frame. No mutilation of the screen or screen frames will be permitted in mounting the window operator.

Delete paragraph if not applicable to project.

Do not use insect screens for gymnasiums.

T. Screen fabric: 14 x 18 mesh, fiberglass or aluminum alloy with an anodized finish. The mesh shall be held in place with rolled aluminum or vinyl splines as per the manufacturer's recommendation.

U. Screen frame corner reinforcement: Aluminum, of the type recommended by the manufacturer.

V. Screen retaining fasteners: Aluminum, single wing type with stainless steel screws. Fasteners

NOTES TO ARCHITECT

shall be provided near the corners and at a maximum of 18" o.c. around the periphery of the screen frame.

W. Angles, bars, etc.: Anodized aluminum, 6063-T5 alloy.

X. Anchors: As required to suit project conditions and as recommended by the window manufacturer. Stainless steel screws spaced at 18" o.c. shall be used to secure wind frames to concrete or masonry.

PART 3 - EXECUTION

3.01 INSPECTION

The Contractor together with the Engineer shall examine the areas and conditions under which windows are to be installed. Should any condition be found unsuitable, no work shall be done until the unsatisfactory conditions have been corrected and are acceptable to the Installer. Proceeding with work will imply acceptance of the conditions by the Installer.

For jalousie windows located above high shelves, closets or cabinets, the lever operator shall be placed near the head so that it can be reached and operated with a pole. It shall NOT be located immediately above the shelves, closets or cabinets where it is difficult to reach and operate.

3.02 INSTALLATION

A. Jalousie windows shall be installed in accordance with the manufacturer's instructions and recommendations.

B. Frames shall be cut to dimension, smooth, square, even and neat.

C. Window frames shall be shimmed about 1/8" away from concrete or masonry walls. Coat aluminum surfaces in contact with concrete, masonry or dissimilar metals with bituminous paint or a factory recommended separator to prevent galvanic action. Care shall be taken in the application of bituminous paint or separators so that coating is not visible when installation is complete.

D. Slats and vanes shall be cut to exact lengths (not short) to fit snugly into pivot clips. Clips shall not be bent out of alignment to accomodate short slats. Spaces exceeding 1/16" between the end of slat and the clip will be cause for rejection of the slat or vane.

   Holes at the ends of vinyl slats for securement to the pivot clips shall be pre-drilled perpendicular to the slat and cleaned prior to insertion into the pivot clips. Self drilling screws shall not be used.

E. Holes drilled into the push bar for connection of connecting bar shall be drilled accurately.

F. Screen frame corners shall be neatly mitered and assembled using corner reinforcement. Frames shall be square and plumb within the jalousie window.

G. Screen fabric shall be cut to size and installed neatly within the frame smooth and taut, without bulges or waves, held snugly in place with the splines. Excess fabric shall be neatly trimmed off.

H. Splines shall be neatly and uniformly rolled into the screen frame. Vinyl splines shall not be stretched during installation to avoid "shortening" of the the spline upon relaxing.

I. Screen retaining fasteners shall be securely fastened to the base frame and shall hold screen frames firmly in place.

J. Window frames and screen frames shall be notched as required to provide drainage for entrapped moisture.

END OF SECTION

NOTES TO ARCHITECT

SECTION 09310 - CERAMIC TILE

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 COORDINATION WITH OTHER SECTIONS

A. Coordinate installation of waterproof membrane with MEMBRANE WATERPROOFING section.

B. Coordinate installation of backer-rods, sealants and caulking at expansion and control joints with SEALANTS section.

1.03 SUBMITTALS

A. Samples: Samples of various ceramic tiles and marble thresholds shall be submitted to the Engineer for approval and for color and pattern selection. Samples shall be identified as to their grade and manufacturer.

B. Certificates: Before installation of ceramic tile, the Standard Form of Master Grade Certificate signed by the Contractor and Manufacturer stating grade and kind of tile shall be submitted to the Engineer. All packages of tile shall be delivered to the job in sealed cartons bearing grade seals in conformance with U.S. Department of Commerce Simplified Practice Recommendation R61-61.

C. Warranties and Guaranties: Warranty for a min. of 2 years against defects resulting from the use of defective or inferior materials, equipment or workmanship.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

This specification covers ceramic tile applied by conventional mortar setting bed method, not thin-set adhesive nor dry-set mortar methods. The use of this spec. must be tailored to your job.

If this specification is used, coordinate tile details with it. Draw details at threshold, wainscot, gutters, etc.

If threshold is cement or marble, include intended type in the specifications.

Be sure to include LATH AND PLASTER SECTION with appropriate specifications for the following:

Mortar set tile: Portland cement scratch coat on metal lath, or wire mesh (paper-backed), masonry or concrete.

Thin-set tile: Portland cement scratch coat on metal lath, or masonry, or concrete, with addition of brown coat to level and square surface to thickness required by

NOTES TO ARCHITECT

B. Ceramic Wall and Floor Tiles: Standard grade, complying with ANSI A137.1. The contractor shall submit test reports, from an independent laboratory, indicating conformance of the tile to ANSI A137.1 upon request of the Engineer.

Tile Contr.

1. Ceramic wall tile and trims shall be dust-pressed, white non-vitreous body, 4-1/4" x 4-1/4" x 5/16" thick with a slightly beveled modified straight edge and bright glazed finish.

2. Unglazed ceramic floor tile shall be standard quality, dust-pressed, machine made porcelain body tile, minimum 2" x 2" square with a slightly beveled modified straight edge, from price range group 2. Moisture absorption of the tile shall be less than 0.5%. Medleys consisting of not more than 3 colors may be selected.

3. All trim shapes shall be provided as detailed and as required. External corners shall be rounded convex. Internal vertical corners shall be square. Top of wainscot shall be rounded with full (4-1/4") bull nose cap. Base tile shall be 4 inch high, sanitary coved base. Other shapes such as curbs, beads, shoes, round out corners and square in corners, etc., shall be provided to achieve a neat complete installation.

C. Pointing Grout for Ceramic Tile: Commercial Portland Cement Grout, water-resistant, non-shrinking, white or gray as required, complying with ANSI 118.6 - Ceramic Tile Grouts.

D. Cement: Portland Cement conforming to the requirements of ASTM C-150, Type I.

E. Waterproof Admixture: Approved integral waterproof admixture.

F. Sand: Conforming to ASTM C-144.

G. Hydrated Lime: Conforming to ASTM C-206, Type S

or ASTM C-207, Type S.

H. Water: Fresh, clean and drinkable.

I. Reinforcing Wire Mesh: 2 x 2 - 16/16 welded wire fabric, galvanized.

J. Marble Threshold: Domestic Group "A" as classified by Marble Institute of America. Finish sand-rubbed or honed; size as detailed.

PART 3 - EXECUTION

3.01 PREPARATION

A. Before any work is begun, the Ceramic Tile Contractor shall inspect the walls and floors on which tile work is to be applied. Such surface shall be sound, clean, free of oily film, and in proper condition; if not, the Ceramic Tile Contractor should report defective conditions to the Contractor for corrective measures and send a copy of that report to the Engineer. Proceeding with tile work will imply acceptance of the surface by the Ceramic Tile Contractor. Scratch coats or mortar setting beds shall not be applied until necessary grounds, hangers, anchors or other items to receive plumbing fixtures or other fittings of any kind which are to be secured against the tile surface have been installed properly. Coordinate work with other trades as necessary.

3.02 INSTALLATION

A. Ceramic Tile:

1. Installation shall be in accordance with ANSI A108.1 - Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile Installation with Portland Cement Mortar and the "Handbook

for Ceramic Tile Installation" as published by the Tile Council of America.

2. Work shall be carefully laid out in an endeavor to center the tiles, to space them evenly, and to avoid cutting them. If cutting is necessary, all cut ends shall be rubbed smooth and even. Lay out tile on floors and lengthwise on walls so that no tile less than 1/2 size occurs. For height stated in feet and inches, maintain full courses to produce nearest attainable heights without cutting tile. All cutting and drilling shall be done without marring the surfaces and shall be done neatly to fit closely around pipes, fixtures and fittings so that cover plates will overlap cuts.

3. Floor tile shall be laid in a straight joint pattern. Joints in wall tile shall be aligned vertically and horizontally. Staggering of joints through openings will not be permitted.

B. Cement Mortar:

1. Mortar shall be freshly prepared and uniformly mixed in a drum-type batch mixer for at least 3 minutes in the following proportion by volume. No retempering of mortar will be permitted. Mortar that has reached its initial set shall be discarded.

2. For mortar setting bed on floors:

   1 part portland cement
   6 parts damp sand

   Waterproof admixture in accordance with manufacturer's specifications.

3. For mortar setting bed on walls:

   1 part portland cement

NOTES TO ARCHITECT

5 parts	damp sand
l/2 part	hydrated lime

up to

1 part	portland cement
7 parts	damp sand
1 part	hydrated lime

(At showers, omit hydrated lime and add waterproof admixture in accordance with manufacturer's specifications.)

C. Setting Procedures:

1. On floors, apply mortar setting bed not less than 3/4" thick, over an area no greater than can be covered with tile before the initial set. If mortar setting bed is to be applied directly on concrete surface, first saturate the surface with water but do not allow free water to appear on the surface. Embed reinforcing wire mesh in the middle of the setting bed. Screed, tamp and slope the mortar setting bed toward the floor drains at a maximum slope of 1:50 (and/or slope as shown).

   Use a 3/32" to 1/16" thick skim coat of neat portland cement mixed to the consistency of a pasty thick cream to bond tile to the mortar setting bed. Press and beat the tiles into the plastic mortar setting bed until exactly to the required slope or level as fixed by straight edges accurately placed at regular intervals. Joints shall be of uniform width of 1/16" or as determined by the spacers on the tiles.

2. On walls, apply scratch coat mixed in the following proportions by volume:

1 part	portland cement
4 parts	dry sand
or	
5 parts	damp sand
1/2 part	hydrated lime

Delete paragraph (through "of 24 hours".) when Lath and Plaster Section which specifies scratch coat mix and application is included in your job specs.

or

1 part	portland cement
3 parts	dry sand

or

4 parts	damp sand

Dampen hollow concrete block surfaces just before applying the scratch coat. Apply scratch coat plumb and true to a thickness not less than 1/4". Use sufficient pressure to key the coat properly and cross scratch the surface before initial set has taken place. Allow to dry a minimum of 24 hours.

Apply mortar setting bed not more than 3/4" thick on walls after first wetting the surface of the scratch coat evenly but not to the point of saturation. Attach temporary screeds with blobs of mortar to provide a plumb and true surface the proper distance back from the finish wall line. Apply, rod, and float the mortar setting bed over areas no greater than will be covered with tile while the setting bed remains plastic.

Use a 1/32" to 1/16" thick skim coat of neat portland cement mixed to the consistency of a pasty thick cream, to bond tile to the mortar setting bed. Soak tile in water for at least 1/2 hour, press and beat soaked tile into the plastic mortar setting bed to a true plane with uniform joints of 1/16" width or as determined by the spacers on the tiles. Cut through the setting bed horizontaly and vertically at every fourth course.

3. Sound tiles after setting to ensure proper

NOTES TO ARCHITECT

bonding. Hollow sounding tiles shall be replaced.

4. Allow tiles to set a minimum of 48 hours prior to grouting.

D. Thresholds:

1. Marble threshold shall be installed similar to ceramic tile as described hereinbefore where shown on plans. Clean as recommended by the manufacturer.

2. Cement threshold shall be installed where shown on plans and shall be shaped and troweled smooth.

E. Expansion and Control Joints: Install expansion and control joints as detailed on the contract drawings.

Be sure to locate expansion and control joints on the plans and show details.

F. Grouting and Pointing of Joints: Installation shall be in accordance with ANSI A108.10 - Installation of Grout in Tilework. Joints shall be be saturated with water and then grouted with a Commercial Portland Cement Grout mixed with an acrylic waterproofing admixture in accordance with the admixture manufacturer's specifications to a uniform creamy consistency. The grout shall be forced into the joints to the full depth. Use gray color for floors and white for walls. Take special care not to scratch glazed tile during this operation. Remove surplus grout before it has hardened and leave the face of the tile clean. Keep expansion and control joints free of grout.

G. Curing Floors: Apply reinforced kraft paper over floor as soon as pointing or grouting is completed. Lap the paper not less than 6 inches and leave in place for 3 full days.

H. Cleaning: Upon completion of tile work, remove all rubbish, unused material, etc. and give the finished surface a thorough cleaning. Do not use acid solution on glazed tile work. Do not permit traffic on tile floors for 24 hours after laying. Thereafter permit no traffic unless floors are covered with heavy paper. Leave

finished tile work clean and free from cracked, chipped or broken tile. Protect tile work and threshold until acceptance of project.

END OF SECTION

NOTES TO ARCHITECT

This specification covers quarry tile applied by conventional mortar setting bed method, not thin-set adhesive nor dry-set mortar methods. The use of this specification must be tailored to your job.

If this specification is used, coordinate tile details with it. Draw details at threshold, wainscot, gutters, etc.

If threshold is cement or marble, include intended type in the specifications.

Be sure to include LATH AND PLASTER SECTION with appropriate specifications for the following:

Mortar set tile: Portland Cement scratch coat on metal lath, or wire mesh (paper-backed), masonry or concrete.

SECTION 09330 - QUARRY TILE

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00800.

1.02 SUBMITTALS

A. Samples: Samples of various tiles and marble required shall be submitted to the Engineer for approval and for color and pattern selection. Samples shall be identified as to grade and manufacturer.

B. Certificate: Before installation of quarry tile, the Standard Form of Master Grade Certificate signed by the Contractor and Manufacturer stating grade and kind of tile shall be submitted to the Engineer. All packages of tile shall be delivered to the job in sealed cartons bearing grade seals in conformance with U.S. Department of Commerce Simplified Practice Recommendation R61-61.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Quarry Tile:

1. Quarry tile shall be 6" x 6" x 1/2" thick,

In kitchens, use ceramic

NOTES TO ARCHITECT

standard grade, ground 4 sides after firing, with regular smooth surface. Tile shall conform to the U.S. Department of Commerce Simplified Practice Recommendation R61-61 and Fed. Spec. SS-T-308b.

tile in lieu of quarry tile for wainscot.

2. All trim shapes shall be provided as detailed and as required such as cove base, bullnose, etc., to achieve a neat complete installation.

C. Ground for Quarry Tile Floor: Gray epoxy grout complying with formula A Tile Council of America.

D. Sealer: Hillyard Sealer #341, Tera-Seal, or approved equal.

E. Marble Threshold: Domestic Group "A" as classified by Marble Institute of America. Finish sand-rubbed or honed; size as detailed.

F. Cement: Portland Cement conforming to the requirements of ASTM C-150, Type 1.

G. Waterproof Admixture: Approved integral waterproof admixture.

H. Sand: Conforming to ASTM C-144.

I. Hydrated Lime: Conforming to ASTM C-206, Type S or ASTM C-207, Type S.

J. Water: Fresh, clean and drinkable.

K. Reinforcing Wire Mesh: 2 x 2 - 16/16 welded wire fabric.

PART 3 - EXECUTION

3.01 PREPARATION

A. Before any work is begun, the Quarry Tile Contractor shall inspect the walls and floors on which tile work is to be applied. Such surface

shall be sound, clean, free of oily film, and in proper condition; if not, the Quarry Tile Contractor should report defective conditions to the Contractor for corrective measures. Proceeding with tile work will imply acceptance of the surface by the Quarry Tile Contractor. Scratch coats or mortar setting beds shall not be applied until necessary grounds, hangers, anchors or other items to receive plumbing fixtures or other fittings of any kind which are to be secured against the tile surface have been installed properly. Coordinate work with other trades as necessary.

3.02 INSTALLATION

A. Quarry Tile

1. Installation of quarry tile shall be in accordance with ANSI A108.3.

2. Cement Mortar shall be freshly prepared and uniformly mixed in a drum-type batch mixer for at least 3 minutes in the following proportion by volume. No retempering of mortar will be permitted. Mortar that has reached its initial set shall be discarded.

   a. For mortar setting bed on floors:

1 part	portland cement
4 to 5 parts	sand

      Waterproof admixture in accordance with manufacturer's specifications.

3. Setting Procedures:

   a. On floors, apply mortar setting bed not less than 3/4" thick, over an area no greater than can be covered with tile before the initial set. If mortar setting

bed is to be applied directly on concrete surface, first saturate the surface with water but do not allow free water to appear on the surface. Embed reinforcing wire mesh in the middle of the setting bed. Screed, tamp and slope the mortar setting bed toward the floor drains a minimum of 1/8" per foot (and/or slope as shown).

Use a 3/32" to 1/16" thick skim coat of neat portland cement mixed to the consistency of a pasty thick cream to bond tile to the mortar setting bed. Press and beat the sheets of mounted tiles into the plastic mortar setting bed until exactly to the required slope or level as fixed by straight edges accurately placed at regular intervals. Joints shall be of uniform width of 5/16" or as determined by the spacers on the tiles.

B. Threshold:

1. Marble threshold shall be installed similar to quarry tile as described hereinbefore where shown on plans. Clean as recommended by the manufacturer.

2. Cement threshold shall be installed where shown on drawings and shall be shaped and troweled smooth.

C. Grouting and Pointing of Joints: Grout for floor joints shall be gray epoxy complying with formula AAR-2, acid and alkali resistant grout, of the Tile Council of America. Fill joints to the full depth and level with surface of tile in strict accordance with manufacturer's recommendations.

D. Application of Sealers on Quarry Tile Floor:

1. Factory applied wax on the quarry tile shall be thoroughly removed by applying hot water or by other methods recommended by the manufacturer.

2. First apply one coat Hillyard Tera-Seal at the rate of 600 square feet per gallon. Allow to dry.

3. Then apply one coat of Hillyard Sealer #341 at the rate of 1,200 square feet per gallon.

4. Apply the above sealers using lamb's wool, not by brushing or other methods.

E. Cleaning: At completion of work, clean tile surfaces, replace broken tile, do necessary repointing and protect surfaces with heavy paper from damage. Wash floor down with water and mop just before acceptance of project.

END OF SECTION

SECTION 09512 - ACOUSTICAL TILES

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00800.

1.02 COORDINATION WITH OTHER SECTIONS

Coordinate layout of wood furring strips which are specified to be furnished and installed under ROUGH CARPENTRY.

1.03 SUBMITTALS

Samples of the tile and any appurtenances together with 6 sets of the manufacturer's specifications of the tile and of the fastener system shall be submitted to the Engineer for his approval. Tile shall not be ordered or installed without this approval.

NOTES TO ARCHITECT

The use of this specification must be tailored to your job. This specification covers prefabricated nailed-on or stapled-on acoustical tiles only, not suspended systems. Where suspended system is used, modify specifications accordingly.

Be sure to require the coordination of acoustical tile layout with this section in the ROUGH CARPENTRY Section.

Describe and show wood furring in carpentry section and drawings. Strips shall be 1" x 3" softwood (treated) 12" o.c., securely fastened to the concrete surfaces. Fasteners and spacing shall be noted. Layout need not be in a grid, but shall have cross-strip fire blocking not over 8' o.c. Do not overlook perimeter detail. If wood trim is used at the edge, this also is in the CARPENTRY Section. In addition, add a direction that furring surface shall not deviate more than 1/8" in 12" from a plane.

NOTES TO ARCHITECT

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Tiles shall conform to the following:

1. Patterns: a, b, c, d, e, or f.

2. Class: (Fill in number).

3. Light Reflectance Coefficient: 0.75 or greater.

4. Grade: Minimum NRC rance = 0.55 - 0.65 (See plans for area of application.)

5. Size: 12 in. x 12 in. or 12 in. x 24 in. with thickness as required to meet NRC value.

6. Edges: Beveled or square.

7. Jointing: Butted or T & G, depending on manufacturer's recommendations for mounting.

8. Finish: White factory finish.

Specify 25 or 75 as required to meet code requirements. Check U.B.C. Chapter 42.

The use of different NRC (Noise Reduction Coefficient) grade shall be governed as follows:

A. Grades for music rooms and cafetoriums shall be designed by the Acoustic Consultant.

B. For classrooms, see the various NRC ranges shown on the Attachment. Draw the reflected ceiling plan on the drawings to indicate the amount of tile to be installed for the various NRC ranges.

C. For high humidity locations, specify the proper type which is resistant to high humidity. Also, check the NRC range for this particular tile.

NOTES TO ARCHITECT

C. Edge Molding shall be integrally colored white plastic manufactured specifically for acoustical tile edge or wood molding, whichever is detailed on the plans.

Detail and call out edge molding on drawings; coordinate with specs.

D. Fasteners shall be rust-resistant and of the type recommended by the manufacturer for the mounting used except as follows: staples for T & G type tiles shall have minimum shoulder width of 1/2" and leg length sufficient to penetrate at least 1/4" into furring strips.

PART 3 - EXECUTION

3.01 PREPARATION

Surfaces to receive acoustical units shall be dry, level, and free from irregularities. The Acoustical Contractor shall be responsible for the examination and acceptance of all surfaces and conditions affecting the installation of his work. Start of this work shall constitute acceptance of all work conditions. Unsatisfactory conditions shall be reported to the Engineer so that corrective measures can be taken.

3.02 INSTALLATION

A. General: Shall conform to the manufacturer's directions for the tile used and to the layout

Include reflected ceiling plans to cover all conditions as well

NOTES TO ARCHITECT

shown on the plans for the grade of tile to be installed. All doors and windows shall be in place before installation of tiles.

B. Mounting: Nailed or stapled direct to wood stripping as follows:

1. 12 in. x 12 in. butt-jointed tile shall be attached with 3 fasteners along sides bearing on furring strips (6 total per piece). 12 in. x 24 in. pieces shall have fasteners at corners and approximately 6 inches o.c. along furring strips (10 total per piece).

2. T & G tile shall be attached at both ends of transverse tongue and at approximately 6 inches o.c. along tongue bearing on furring strips.

3. Fasteners shot into face of butt-jointed tile shall penetrate no more than 1/4 its thickness. Those installed on T & G tile shall bear firmly against but not penetrate surface of flanges.

as typical mounting details and/or details where tile abuts a vertical surface. Refer to "Recommended Acoustical Treatment" dated May, 2, 1975, by Prof. Iwao Miyake, hereinafter attached.

Acoustical tiles must be fastened to 1 x 3 wood furring strips, not directly to wood decking.

C. Finish Work: Where used, plastic edge molding shall be positively secured to tile edges by stapling, gluing, etc.

3.03 CLEANING AND REJECTION

The Contractor shall exercise all necessary precautions to avoid damaging or soiling the units. All damaged units shall be replaced with new units by the Contractor.

A. Crooked or open joints.

B. Soiled tiles not cleaned to original condition.

C. Fractures, cracks or corner chips.

D. Color variation.

E. Loose or fallen tiles.

NOTES TO ARCHITECT

F. Warped tiles.

END OF SECTION

RECOMMENDED ACOUSTICAL TREATMENT
FOR
TYPICAL STANDARD CLASSROOMS
ACOUSTICAL CONSULTANT: PROF. IWAO MIYAKE
MAY 2, 1975

1. For a standard classroom of 30' x 32' total tile area shall not be less than 540 s.f. for NRC range = .55-.65.

2. Layout may be modified where exposed beams are used, with tile applied to surfaces between beams, generally following perimeter pattern shown. Where

SCHEMATIC REFLECTED CEILING PLAN
Scale: 1/8" = 1'-0"

NOTE: 12" x 12" tile shown schematically only. For dimensions A, B, C and D, see table below for various grades of tile which may be used at Contractor's option.

NRC Range	Dim. A	Dim. B	Dim. C	Dim. D
.65-.75	5'	7'	6'	7'
.60-.70	6'	8'	6'	7'
.55-.65	7'	10'	7'	7'

Acoustical Tile
09512 - Attachment
Revised: 3/80

NOTES TO ARCHITECT

possible, do not cut tiles.

3. Center portion shall not be treated so as to act as reflective surface to carry voices.

4. Tile area shall be increased proportionately for larger size rooms.

5. Tile shall be mechanically mounted directly to wood furring strips at 12" o.c. "shot-pinned" to concrete surfaces, where concrete occurs. Do not use adhesive, because tile falls off in time.

6. Acoustic plaster shall not be used for the following reasons:

   a. Difficulty of sustaining a high standard consistency.

   c. Too easily damaged.

   d. Requires special painting.

   e. Some contain asbestos fibers.

7. Tile contractor shall be given the option to provide tile of different NRC ranges. Therefore, drawn to show this option.

SECTION **09650** - RESILIENT TILE FLOOR

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 **RELATED WORK SPECIFIED ELSEWHERE**

Curing and drying of the concrete floors is covered under Section 03300 - Cast-in-Place Concrete.

1.03 SUBMITTALS

A. Product Data for materials specified.

B. Samples of floor tiles and cove bases shall be submitted for color and/or pattern selection.

C. Manufacturer's cleaning and maintenance data.

1.04 EXTRA MATERIALS

Furnish extra materials as described below, packaged in their original container and identified with labels describing their contents:

A. Furnish one (1) box of each type, color, pattern, class, wearing surface and size of tile installed.

B. Furnish ten (10) lineal feet for each 500 lineal feet or fraction thereof, of each type, color, pattern and size of resilient accessory installed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Vinyl composition tile shall be 12 in. x 12 in. x 1/8" thick, conforming to ASTM F1066, Composition 1 (non-asbestos formulated), Class 2 (through pattern tile), marbleized design with a smooth wearing surface, factory waxed with a minimum light reflectance of 30%.

B. Cove base shall be vinyl or rubber, 4" high,

NOTES TO ARCHITECT

The use of these specifications must be tailored to your job. This specification covers vinyl composition tile only. CAUTION: Do not use tiles containing asbestos in DAGS projects.

Show the following on the drawings:

- **€ Type, location and layout pattern of floor tile.**
- **€ Type, location and details of base, edge strips and transitions between resilient tile and other types of flooring.**

Paragraphs relating to extra materials are intended for CIP projects and should be deleted for the smaller R&M projects.

NOTES TO ARCHITECT

top-set type, 1/8" thick, with a smooth exposed surface and textured bonding surface on its unexposed face. The rubber or vinyl material shall be free from offensive odor and its color shall be uniform throughout the thickness of the base.

C. Adhesives shall be water-resistant type, as recommended by the manufacturer for the specific materials used. Do not use adhesive not intended for its purpose.

D. Edging:

1. Transitions from resilient tile to substrate shall be beveled vinyl strip, one inch wide, same thickness as tile.

2. Transitions from carpet to resilient tile shall be vinyl carpet to tile adaptor.

Delete paragraph if carpet is not included in project.

3. Metal edge strips shall not be used.

E. Patching and leveling compounds shall be latex-modified, portland cement based formulation unless otherwise required by the flooring manufacturer for the applications indicated. Gypsum based compounds shall not be used.

PART 3 - EXECUTION

3.01 DELIVERY AND STORAGE

Materials shall be delivered to the jobsite in original unopened containers marked with grade and manufacturer's brand name. Handle and store materials carefully.

3.02 EXAMINATION

The Installer shall examine substrates where resilient tile flooring will be installed for compliance with the flooring manufacturer's requirements. Installation shall not proceed until unsatisfactory conditions have been corrected. Proceeding with installation will indicate

NOTES TO ARCHITECT

acceptance of the substrate conditions by the Installer.

If underlayment is required over concrete or wood floors, describe where this is to be laid and specify it completely in this subsection. Omit all references to wood subfloor if it is inapplicable to your job. If wood subfloor is used, its preparation such as power sanding and filling of cracks shall be specified under the CARPENTRY SECTION.

3.03 PREPARATION OF SUBFLOORS

A. **General: Comply with the flooring material manufacturer's installation instructions for the preparation of substrates to receive resilient flooring.**

B. **Unless otherwise required by the flooring manufacturer, t**he subfloor shall be broomed, **damp** mopped and scrubbed until it is free from dust, dirt, grease or other foreign material. It shall also be scraped to make the surface smooth and level.

C. **The** concrete subfloor shall be **free of materials that may interfere with adhesive bond and shall be** clean, dry and smooth before tiles are laid. Defects such as ridges, holes, cracks and depressions shall be corrected and filled with patching / leveling compound approved by the manufacturer.

D. Wood subfloor shall be clean, dry, smooth and nailed sound and tight. Defects, such as uneven surfaces, holes, cracks, loose boards shall be corrected.

E. If floor tile is laid on defective subfloors, such tile shall be removed and replaced at the Contractor's expense.

3.04 PROJECT CONDITIONS

A. Flooring materials and the spaces to receive flooring materials shall be conditioned in accordance with the flooring manufacturer's recommendation and instructions.

B. Provide adequate ventilation to remove moisture and fumes from the areas where floor tiles are being installed.

3.05 TESTING

NOTES TO ARCHITECT

Flooring materials shall not be installed over concrete slabs until the slabs have cured and are sufficiently dry.

After cleaning, test concrete slabs for alkalinity, moisture and adhesive bond as recommended by the flooring material manufacturer. Floor tile installation shall not proceed until unsatisfactory conditions have been corrected.

3.06 INSTALLATION OF MATERIALS

A. See Room Finish Schedule for locations and types of flooring required. Flooring and cove base shall continue, respectively, under and behind removable and/or portable cabinets, cases, etc. Flooring shall continue into closets where the floor of the closets and adjacent floor are at the same level. Installation shall not begin until the work of other trades, including painting, has been completed.

B. All work shall be done by experienced tradesmen in strict accordance with the recommended specifications of the respective manufacturer.

Where not contrary to the manufacturer's recommendations, flooring adhesive shall be applied with a notched trowel in a thin and even coat. Tiles shall be laid with tight joints in true alignment both ways. They shall be cut to fit accurately at joining with other materials and at vertical surfaces. The under side of the tiles shall be heated if necessary to obtain satisfactory bond to the subfloor.

C. Tiles shall be laid symmetrically about the center lines of the room in both directions, starting at the center of the room and working toward the wall so that border tiles shall not be less than half the width of the field tiles. Grain shall be reversed in alternate tiles. Vinyl edging shall be installed with contact adhesive at all marginal edges of flooring not stopped by raised thresholds or other vertical surfaces.

D. Cove base shall be applied onto thoroughly-dried walls with cove base adhesive only. Because of the thermoplastic character of vinyl base, care shall be taken not to stretch it during installation since it will shrink and leave a gap at joints. The top and bottom edges shall be in firm contact with the wall and floor. Pre-molded interior and exterior corners shall be used unless otherwise approved by the Engineer. If corners are formed on the job, the wrap around from the corner shall be not less than 12 inches long. Otherwise, the cove base shall be continuous around the corners.

3.07 CLEANING AND PROTECTION

Spots of adhesive shall be removed immediately as work progresses. Floor shall not be washed or waxed until the adhesive has completely set, and in no case until after the minimum length of time recommended by the manufacturer has elapsed. The flooring shall be cleaned with a neutral cleaner as recommended by the manufacturer and then **damp-**mopped with clear water. **Flooding of the floor is not permitted.** When the floor is dry, 2 coats of an approved non-slip wax shall be applied with a clean lambs wool mop. Each coat shall be buffed thoroughly when dry with a weighted rotary electric floor polishing machine. After polishing, the Contractor shall be responsible for protecting the flooring until acceptance of the project.

END OF SECTION

NOTES TO ARCHITECT

The use of these specifications must be tailored to your job. This specification covers vinyl composition tile only. CAUTION: Do not use tiles containing asbestos in DAGS projects.

SECTION 09660 - RESILIENT TILE FLOOR

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 SUBMITTALS

Samples of floor tiles and cove bases shall be submitted to the Engineer for color and/or pattern selection.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

B. Vinyl composition tile shall be 12 in. x 12 in. x 1/8" thick, conforming to ASTM F1066, Composition 1 (non-asbestos formulated), Class 2 (through pattern tile), marbleized design with a smooth wearing surface, factory waxed with a minimum light reflectance of 30%.

C. Cove base shall be vinyl or rubber, 4" high, top-set type, 1/8" thick, with a smooth exposed surface and textured bonding surface on its unexposed face. The rubber or vinyl material shall be free from offensive odor and its color shall be uniform throughout the thickness of the base.

D. Adhesives shall be water-resistant type, as recommended by the manufacturer for the specific materials used. Do not use adhesive not intended for its purpose.

E. Edging shall be beveled vinyl strip, one inch wide, same thickness as tile.

NOTES TO ARCHITECT

PART 3 - EXECUTION

3.01 DELIVERY AND STORAGE

Materials shall be delivered to the jobsite in original unopened containers marked with grade and manufacturer's brand name. Handle and store materials carefully.

3.02 PREPARATION OF SUBFLOORS

A. The subfloor shall be broomed, wet mopped and scrubbed until it is free from dust, dirt, grease or other foreign material. It shall also be scraped to make the surface smooth and level.

B. Concrete subfloor shall be clean, dry and smooth before tiles are laid. Defects such as ridges, holes, and cracks shall be reported to the Engineer so that corrective measures can be taken. Cracks and depressions shall be filled with patching/leveling compounds approved by the flooring manufacturer.

C. Wood subfloor shall be clean, dry, smooth and nailed sound and tight. Defects, such as uneven surfaces, holes, cracks, loose boards shall be reported to the Engineer so that corrective measures can be taken.

D. If floor tile is laid on defective subfloors, such tile shall be removed and replaced at the Contractor's expense.

If underlayment is required over concrete or wood floors, describe where this is to be laid and specify it completely in this subsection. Omit all references to wood subfloor if it is inapplicable to your job. If wood subfloor is used, its preparation such as power sanding and filling of cracks shall be specified under the CARPENTRY SECTION.

3.03 INSTALLATION OF MATERIALS

A. See Room Finish Schedule for locations and types of flooring required. Flooring and cove base shall continue, respectively, under and behind removable and/or portable cabinets, cases, etc.

Flooring shall continue into closets where the floor of the closets and adjacent floor are at the same level. Installation shall not begin until the work of other trades, including painting, has been completed.

B. All work shall be done by experienced tradesmen in strict accordance with recommended specifications of the respective manufacturer. Where not contrary to manufacturer's recommendations, adhesive shall be applied with a notched trowel in a thin and even coat. Tiles shall be laid with tight joints in true alignment both ways. They shall be cut to fit accurately at joining with other materials and at vertical surfaces. The under side of the tiles shall be heated if necessary to obtain satisfactory bond to the subfloor.

C. Tiles shall be laid symmetrically about the center lines of the room in both directions, starting at the center of the room and working toward the wall so that border tiles shall not be less than half the width of the field tiles. Grain shall be reversed in alternate tiles. Vinyl edging shall be installed with contact adhesive at all marginal edges of flooring not stopped by raised thresholds or other vertical surfaces.

D. Cove base shall be applied onto thoroughly-dried walls with cove base adhesive only. Because of the thermoplastic character of vinyl base, care shall be taken not to stretch it during installation since it will shrink and leave a gap at joints. The top and bottom edges shall

be in firm contact with the wall and floor. Pre-molded interior and exterior corners shall be used unless otherwise approved by the Engineer. If corners are formed on the job, the wrap around from the corner shall be not less than 12 inches long. Otherwise, the cove base shall be continuous around the corners.

3.04 CLEANING AND PROTECTION

Spots of adhesive shall be removed immediately as work progresses. Floor shall not be washed or waxed until the adhesive has completely set, and in no case until after the minimum length of time recommended by the manufacturer has elapsed. The flooring shall be cleaned with a neutral cleaner as recommended by the manufacturer and then mopped with clear water. When the floor is dry, 2 coats of an approved non-slip wax shall be applied with a clean lambs wool mop. Each coat shall be buffed thoroughly when dry with a weighted rotary electric floor polishing machine. After polishing, the Contractor shall be responsible for protecting the flooring until acceptance of the project.

END OF SECTION

NOTES TO ARCHITECT

SECTION 09680 - CARPETING (WOVEN W/SEPARATE UNDERLAYMENT)

This specification shall not be used unless softness or "plushness" is an absolute necessity.

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

This specification is for carpet installed with separate underlayment.

1.02 SUBMITTALS

A. Samples:

1. Within **15** calendar days after award of the Contract, the Contractor shall submit to the Engineer 2 samples each (minimum 3 in. x 5 in.) of the pad and carpet he proposes to furnish.

Change "**15** calendar days" to "7 calendar days" for projects consisting only of carpeting.

2. At the same time, he shall also submit to the Engineer one set of carpet samples of the manufacturer's standard colors. The manufacturer, carpet designation, and color designation shall be indicated on the back of each sample. After receiving notification of the color selection, the Contractor shall submit to the Engineer 3 samples of carpet of the selected color(s).

Carpeting is a long lead item. Allow 6 to 8 weeks for ordering and delivery of materials when scheduling the project.

B. Certification:

1. The Contractor shall certify in writing that the carpet as proposed meets or exceeds the requirements of these specifications. He shall also submit the manufacturer's complete specifications covering the construction of the proposed carpet.

2. The contractor shall also submit a written certificate of wood treatment for the tackless strips.

C. Installation Drawings - Layout:

1. Together with the samples in Subsection A above, the Contractor shall submit 5 sets of 1/8" or 1/4" scale floor plans showing the proposed carpet layout of all areas to the Engineer for approval. The drawings shall clearly indicate and accurately locate all side seams and binder edgings. Such seams and binder edgings shall conform to the

requirements in Subsections 3.02D and 3.02F. Wherever possible, the lay of carpets in adjoining areas shall be in the same direction. Completed work shall conform to the approved drawings.

2. After receiving the carpeting but before cutting, the Contractor shall submit 2 sets of the above drawings with all proposed cross seams and piece markings (as called for in Subsection 3.02A below) added to the drawings. No cutting shall be done before the Engineer approves this layout.

1.03 TESTING

After delivery of carpet and pad to the job site, the State's Inspector may require that two 9" square swatches of carpet and one of pad be cut from the materials for testing by the State to assure compliance with this specification. Any carpet and/or pad which the tests show does not meet the specifications shall be rejected, and the removal and replacement of such materials shall be done by the Contractor at his own expense.

1.04 GUARANTY

A written guaranty from the Carpet Laying Contractor and countersigned by the Contractor shall be furnished in 4 copies to the Engineer, covering all materials and workmanship for a period of one year from the written date of acceptance of the facility. The guaranty shall cover the correction by the Contractor of any defects in materials or workmanship which occur during the period of guaranty by the repairing or replacing with new material and/or the restretching of the carpet as necessary, all at no cost to the State of Hawaii.

Delete "and countersigned by the Contractor" in projects consisting entirely of carpeting.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The

NOTES TO ARCHITECT

Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Carpet:

1. Components:

a. Face yarn

1. Minimum 22 oz. per square yard of 100% bulked, continuous filament, second and third generation soil hiding nylon (Antron III, Anso IV, Caltron, Camalon, Zeftron, Spectron, Ultron or approved equal).

The face yarn wt. shown is for medium traffic areas. It should be increased to 28 oz. for heavy traffic areas such as corridors.

2. Construction

a. Woven through the back with loop piles.

b. Pitch: 165 P.O.B.

c. Rows per inch: 7

d. Average pile height: .150"

e. Ply: 4

3. Color and pattern: Carpets shall have a pattern with a multiple color tweedy effect. Color shall be as selected from the manufacturer's standard colors. The Engineer may select any 2 of the colors for any building in which carpet is to be installed.

4. Performance

The following flammability requirements shall be met:

TEST	RESULT
ASTM E648-78 Radiant Panel Test; or	0.22 watts/sq.cm.
ASTM E84-76a "Steiner Tunnel Test"	Flame spread rating of 75 or less

Change to 0.45 watts/sq. cm. for hospitals and health care facilities.

NOTES TO ARCHITECT

C. Carpet Pad: 68 oz. per square yard minimum, 0.20"-0.25" thickness, flat sponge rubber cushion meeting the following flammability requirements:

TEST	RESULT
ASTM E648-78 Radiant Panel Test; or	0.22 watts/sq.cm.
ASTM E84-76a "Steiner Tunnel Test"	Flame spread rating of 75 or less

Change to 0.45 watts/sq. cm. for hospitals and health care facilities.

D. Tackless Strip: As manufactured by Roberts, S. Roth, Taylor Industries, or Kinkead, Type E, 7/32" pins. Wood shall be dip treated using Tribucide II at the immersion times noted in the National Wood Window & Door Assn. Standards, NWWDA IS4.

E. Aluminum Binder Edging: Section No. A-121SF as manufactured by Royal Aluminum, Inc., or Section No. 1414 as manufactured by Roberts. Edging shall have hammered finish.

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

Before work under this section is started, the Carpet Contractor together with the Contractor and the Engineer shall examine all surfaces that are to receive carpet to ensure that they are in the proper condition for same. The Carpet Contractor shall notify the Contractor of unacceptable areas and/or conditions (in terms of potential damage to the carpet) in writing. A copy of such notification shall be sent to the Engineer. All such areas and/or conditions shall be corrected by the Contractor prior to start of the work.

3.02 INSTALLATION

NOTES TO ARCHITECT

Modify, delete and/or add to this subsection as appropriate for your project.

A. Every piece of carpeting delivered to the job shall have been marked to indicate its proper location relative to other pieces in the installation. This information shall be written on the back of each piece in indelible ink. A copy of the invoice, which shall have the manufacturer's name, pattern number(s) and color(s) shall be given to the Engineer upon delivery of the materials to the site.

B. All materials shall be installed by a licensed carpet installer.

C. Floor areas shall be broom cleaned immediately before installation of the pad. Pad shall then be laid smooth and even over the entire area to be carpeted and secured in place with Roberts or equal carpet cement or 3/8" chisel point staples as follows:

   1. Concrete or wood floor: A solid strip of cement shall be applied at all edges of pad. Where pieces of pad join, a 12 inch width of cement shall be applied at the seam and minimum 2 inch wide carpet padding tape used over seam area.

   2. Wood floor (optional): Pad shall be stapled at 3 inches o.c. along edges and at seams and minimum 2-inch wide carpet padding tape used over seam areas.

D. Tackless strip shall be installed adjacent to all vertical surfaces. Rooms 30 ft.-0 inches or greater in either dimension shall have commercial 3-row or pairs of 2-row tackless strips. Binder edging shall be installed wherever carpet abuts other exposed flooring material and at other locations if indicated. Carpet strips and the binder edging shall be nailed to wood floors and concrete floor slabs. Binder edging shall be installed in full lengths with joints permitted only where the length of installation exceeds the manufacturer's stock length and/or at changes in direction.

Mitered joints at metal edgings shall be neatly butted together at direction changes with no open gaps.

E. All the carpet in a given enclosed area shall be matched as closely as possible in color and shade. To achieve this, all the flooring laid in such an area shall be from the same dye lot whenever possible, with pieces laid adjacent to one another in the same order as fabricated.

F. Carpet shall be laid in full lengths wherever possible, cut and fit evenly to all abutting vertical surfaces, extended into any cabinets which do not have raised bottoms and installed under all movable shelving and casework. The number of side seams and cross seams shall be held to a minimum. Carpet shall be aligned so that lines of carpet match as woven, length and width. Filler strips for any location shall be in one piece. Also:

1. Carpet shall be laid so that seams perpendicular to a wall do not occur at door openings in that wall unless otherwise approved by the Engineer.

2. Carpets in corridors less than 12' wide shall have no more than one seam lengthwise to the corridor and a minimum number of seams across the width of the corridor.

G. Carpet shall be prepared for seaming as follows:

1. Carpet edges at all seams shall be trimmed to match the carpet nap. Pile loops which are frayed in cutting shall be trimmed at the top of the primary backing. However, cutting of pile loops shall be kept to a minimum, and any seam which becomes objectionable because excessive trimming is required shall be rejected.

2. A continuous bead of carpet seam adhesive shall be applied along the base of the pile loops adjacent to all cut edges and allowed to dry thoroughly.

H. Seams shall be made using hot melt tape. Materials and installation shall be as follows:

1. Materials: 4 inch wide hot melt tape with minimum 2-1/2" fiberglass and/or rayon transverse reinforcing loops or strands and 9 longitudinal beaded strips of resin adhesive (Vectron 7510, Roberts 50-300 Series, Taylor #621, Orcon CT-11, Silver Triumph or approved equal.)

2. Installation:

   a. Seaming shall be done by experienced carpet layers capable of producing work in keeping with the acceptable standards in the industry.

   b. Carpet shall be so positioned before seaming that abutting edges form a tight seam when pressed down.

   c. Tape shall be laid centered on the seam.

   d. The heating iron shall have thermostatic heat controls and shall be adjusted to a temperature which will not affect the materials in the carpet selected for this installation.

   e. The hot iron shall be drawn over the tape no faster than is necessary to ensure the complete melting of the resin adhesive (maximum 4 feet per minute). The seam shall be closed immediately behind the iron and pressed flat as needed to ensure uniform bonding and a smooth seam.

I. Carpet shall be hooked to pins of tackless strip and stretched uniformly a minimum of 1% in length and width. Lengths over 12 ft. shall be power stretched. Where called for, binder edging shall be clamped down over exposed edges of the carpet.

J. At completion of installation, all dirt and debris shall be cleaned off, all spots shall be removed from the carpet with a proper type of spot remover, and all loose threads shall be snipped from the carpet with a sharp pair of scissors. The entire installation shall be left

clean and in a condition acceptable to the Engineer.

END OF SECTION

NOTES TO ARCHITECT

This specification shall be used in all carpeted facilities except where softness or "plushness" is a must.

This specification is for carpet glued directly to the floor with no pad.

SECTION 09682 - CARPETING (DIRECT GLUE-DOWN)

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 SUBMITTALS

A. Samples:

1. Within **15** calendar days after award of the Contract, the Contractor shall submit to the Engineer 2 samples of the carpet he proposes to furnish. Minimum sample size shall be 3 in. x 5 in.

Change "**15** calendar days" to "7 calendar days" for projects consisting only of carpeting.

2. At the same time, he shall also submit to the Engineer one set of carpet samples of the manufacturer's standard colors. The manufacturer, carpet designation, and color designation shall be indicated on the back of each sample. After receiving notification of the color selection, the Contractor shall submit to the Engineer 3 samples of carpet of the selected color(s).

Carpeting is a long lead item. Allow 6 to 8 weeks for ordering and delivery of materials when scheduling the project.

B. Certification: The Contractor shall certify in writing that the carpet as proposed meets or exceeds the requirements of these specifications. He shall also submit the manufacturer's complete specifications covering the construction of the proposed carpet.

C. Installation Drawings - Layout:

1. Together with the samples in Subsection A. above, the Contractor shall submit 5 sets of 1/8" or 1/4" scale floor plans showing the proposed carpet layout of all areas to the Engineer for approval. The drawings shall clearly indicate and accurately locate all side seams and edge guards. Such seams and edge guards shall conform to the requirements in Subsection 3.02 E. Wherever possible, the lay of carpets in adjoining areas shall be in the same direction. Completed work shall conform to approved drawings.

NOTES TO ARCHITECT

2. After receiving the carpeting but before cutting, the Contractor shall submit 2 sets of the above drawings with all proposed cross seams and piece markings (as called for in Subsection 3.02 A. below) added to the drawings. No cutting shall be done before the Engineer approves this layout.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Carpets:

1. Components:

a. Face yarn:

Minimum 22 oz. per square yard of 100% bulked, continuous filament, second and third generation soil hiding nylon (Antron III, Anso, Caltron, Camalon, Zeftron, Spectron, Ultron or approved equal).

The face yarn wts. shown are for medium traffic areas. The figures should be increased for heavy traffic areas such as corridors to 28 oz./sq. yd.

b. Primary backing: Polypropylene.

c. Secondary backing: Unitary back.

2. Construction:

a. Tufted with textured or level loop piles.

b. Gauge: 1/8" or 1/10"

c. Pile height: 0.150" minimum

d. Tuft density: Minimum 60 tufts per square inch

3. Color and Pattern: Carpets shall have a pattern with a multiple color tweedy effect. Color shall be as selected from the

manufacturer's standard colors. The Engineer may select any 2 of the colors for any building in which carpet is to be installed.

4. Performance:

   a. Tuft bind shall be 20 pounds minimum.

   b. The following flammability requirement shall be met:

TEST	RESULT	
ASTM D2859-76 Methenamine Pill Test (DOC FF1-70); or	Resistant to Flammability (both faces)	Delete ASTM D2859-76 for hospital and health care facilities.
ASTM E648-78 Radiant Panel Test; or	0.22 watts per sq. cm.	
ASTM E84-76a"Steiner Tunnel Test"	Flame Spread Rating of 75 or less	

C. Adhesive

Adhesive shall be white latex base, permanent type.

D. Edge Guards: Vinyl or rubber as manufactured by Johnson Rubber Co., Mercer Plastics Co. and Textile Rubber Co.; or aluminum edging as manufactured by Royal Aluminum, Inc. or Roberts.

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

Before work under this section is started, the Carpet Contractor, together with the Contractor and the Inspector, shall examine all surfaces that are

Modify, delete and/or add to this subsection as appropriate for your

to receive carpet to insure that they are in the proper condition for same. The Carpet Contractor shall notify the Contractor of unacceptable areas and/or conditions (in terms of potential damage to the carpet) in writing. A copy of such notification shall be sent to the Engineer. All such areas and/or conditions shall be corrected by the Contractor prior to start of the work.

project.

3.02 INSTALLATION

A. Every piece of carpet delivered to the job shall have been marked to indicate its proper location relative to other pieces in the installation. This information shall be written on the back of each piece in indelible ink. Also, a copy of the invoice, which shall have the manufacturer's name, pattern number(s) and color(s) shall be given to the Inspector upon delivery of the materials to the site.

B. All materials shall be installed by a licensed carpet installer.

C. Floor areas shall be cleaned thoroughly to remove all materials which could affect the adhesion of the carpet to the floor.

D. Carpet in an enclosed area shall be matched as closely as possible in color and shade. To achieve this, all the flooring laid in such an area shall be from the same dye lot whenever possible, with pieces laid adjacent to one another in the same order as fabricated.

E. Carpet shall be laid in full lengths wherever possible. It shall be cut to fit snugly (with slight compression rather than loose) against all vertical surfaces and shall be installed in those cabinets which do not have raised bottoms as well as under movable shelving and casework. The number of seams and cross seams shall be held to a minimum. Carpet shall be aligned so that lines of carpet match as woven, length and width. Filler strips for any loca tion shall be

in one piece.

1. Carpet shall be laid so that seams perpendicular to a wall do not occur at door openings in that wall unless otherwise approved by the Engineer.

2. Carpets in corridors less than 12 ft. wide shall have no more than one seam lengthwise to the corridor and a minimum number of seams across the width of the corridor.

F. Carpet shall be prepared for laying as follows:

Carpet edges at all seams shall be trimmed to match the carpet nap. Pile loops which are frayed in cutting shall be trimmed at the top of the primary backing. However, cutting of pile loops shall be kept to a minimum, and any seam which becomes objectionable because excessive trimming is required shall be rejected.

G. The surface of the floor to receive carpeting shall be primed if/as necessary to insure positive bonding of the adhesive to the substrate.

H. Carpeting shall be laid smoothly into a uniformly applied layer of adhesive. Carpet edges shall be tucked neatly against all abutting vertical surfaces and edge guard.

I. At completion ofinstallation, all dirt and debris shall be cleaned off, all spots shall be removed from the carpet with a proper type of spot remover, and all loose threads shall be snipped from the carpet with a sharp pair of scissors. The entire installation shall be left clean and in a condition acceptable to the Engineer.

END OF SECTION

NOTES TO ARCHITECT

NOTES TO ARCHITECT

This specification shall be used where softness is a requirement in schools.

This specification is for carpet with an integral foam back which is glued directly to the floor.

SECTION 09683 - CARPETING (GLUE-DOWN WITH INTEGRAL FOAM BACK

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 SUBMITTALS

A. Samples:

1. Within **15** calendar days after award of the contract, the Contractor shall submit to the Engineer 2 samples of the carpet he proposes to furnish. Minimum sample size shall be 3 in. x 5 in.

Change "**15** calendar days" to "7 calendar days" for projects consisting only of carpeting.

2. At the same time, he shall also submit to the Engineer one set of carpet samples of the manufacturer's standard colors. The manufacturer, carpet designation, and color designation shall be indicated on the back of each sample. After receiving notification of the color selection, the Contractor shall submit to the Engineer 3 samples of carpet of the selected color(s).

Carpeting is a long lead item. Allow 6 to 8 weeks for ordering and delivery of materials when scheduling the project.

B. Certification: The Contractor shall certify in writing that the carpet as proposed meets or exceeds the requirements of these specifications. He shall also submit the manufacturer's complete specifications covering the construction of the proposed carpet.

C. Installation Drawings - Layout:

1. Together with the samples in Subsection A. above, the Contractor shall submit 5 sets of 1/8" or 1/4" scale floor plans showing the proposed carpet layout of all areas to the Engineer for approval. The drawings shall clearly indicate and accurately locate all side seams and edge guards. Such seams and edge guards shall conform to the requirements in Subsection 3.02 E. Wherever possible, the lay of carpets in adjoining areas shall be in the same direction. Completed work shall conform to approved drawings.

NOTES TO ARCHITECT

2. After receiving the carpeting but before cutting, the Contractor shall submit 2 sets of the above drawings with all proposed cross seams and piece markings (as called for in Subsection 3.02 A. below) added to the drawings. No cutting shall be done before the Engineer approves this layout.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free.

B. Carpets

1. Components

a. Face yarn

Minimum 22 oz. per square yard of 100% bulked, continuous filament, second and third generation soil hiding nylon (Antron III, Anso IV, Caltron, Camalon, Ultron or approved equal).

The face yarn wts. shown are for medium traffic areas. The figures should be increased for heavy traffic areas such as corridors to 28 oz./sq. yd.

b. Primary backing: Polypropylene

c. Secondary backing: Enhancer III plus

2. Construction

a. Tufted loop piles

b. Gauge: 1/8" maximum, 1/10" minimum

c. Average pile height: 0.150" minimum

d. Tuft density: Minimum 64 tufts per square

NOTES TO ARCHITECT

inch

3. Color and Pattern: Carpets shall have a pattern with a multiple color tweedy effect. Color shall be as selected from the manufacturer's standard colors. The Engineer may select any 2 of the colors for any building in which carpet is to be installed.

4. Performance

a. Tuft bind shall be 20 pounds minimum.

b. The following flammability requirement shall be met:

TEST	RESULT
ASTM E648-78 Radiant Panel Test	0.22 watts per sq. cm.

Change to 0.45 watts/sq. cm. for hospital and health care facilities.

C. Adhesive

Adhesive shall be white latex base, permanent type.

D. Edge Guards: Vinyl or rubber as manufactured by Johnson Rubber Co., Mercer Plastics Co. and Textile Rubber Co.; or aluminum edging with hammered finish as manufactured by Royal Aluminum, Inc. or Roberts.

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

Before work under this section is started, the Carpet Contractor, together with the Contractor and the Inspector, shall examine all surfaces that are to receive carpet to insure that they are in the proper condition for same. The Carpet Contractor

Modify, delete and/or add to this subsection as appropriate for your project.

shall notify the Contractor of unacceptable areas and/or conditions (in terms of potential damage to the carpet) in writing. A copy of such notification shall be sent to the Engineer. All such areas and/or conditions shall be corrected by the Contractor prior to start of the work.

3.02 INSTALLATION

A. Every piece of carpet delivered to the job shall have been marked to indicate its proper location relative to other pieces in the installation. This information shall be written on the back of each piece in indelible ink. Also, a copy of the invoice, which shall have the manufacturer's name, pattern number(s) and color(s) shall be given to the Inspector upon delivery of the materials to the site.

B. All materials shall be installed by a licensed carpet installer.

C. Floor areas shall be cleaned thoroughly to remove all materials which could affect the adhesion of the carpet to the floor.

D. Carpet in an enclosed area shall be matched as closely as possible in color and shade. To achieve this, all the flooring laid in such an area shall be from the same dye lot whenever possible, with pieces laid adjacent to one another in the same order as fabricated.

E. Carpet shall be laid in full lengths wherever possible. It shall be cut to fit snugly (with slight compression rather than loose) against all vertical surfaces and shall be installed in those cabinets which do not have raised bottoms as well as under movable shelving and casework. The number of seams and cross seams shall be held to a minimum. Carpet shall be aligned so that lines of carpet match as woven, length and width. Filler strips for any location shall be in one piece.

NOTES TO ARCHITECT

1. Carpet shall be laid so that seams perpendicular to a wall do not occur at door openings in that wall unless otherwise approved by the Engineer.

2. Carpets in corridors less than 12 ft. wide shall have no more than one seam lengthwise to the corridor and a minimum number of seams across the width of the corridor.

F. Carpet shall be prepared for laying as follows:

Carpet edges at all seams shall be trimmed to match the carpet nap. Pile loops which are frayed in cutting shall be trimmed at the top of the primary backing. However, cutting of pile loops shall be kept to a minimum, and any seam which becomes objectionable because excessive trimming is required shall be rejected.

G. The surface of the floor to receive carpeting shall be primed if/as necessary to insure positive bonding of the adhesive to the substrate.

H. Carpeting shall be laid smoothly into a uniformly applied layer of adhesive. Carpet edges shall be tucked neatly against all abutting vertical surfaces and edge guard.

I. At completion of installation, all dirt and debris shall be cleaned off, all spots shall be removed from the carpet with a proper type of spot remover, and all loose threads shall be snipped from the carpet with a sharp pair of scissors. The entire installation shall be left clean and in a condition acceptable to the Engineer.

END OF SECTION

01SECTION 09901 - REPAINTING (EXTERIOR AND INTERIOR)

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

A. Inspection and Approvals: The Contractor shall obtain written approval from the Engineer upon completion of each phase of work (phases of work are: surface preparation and spot prime, prime, first finish coat, second finish coat) before proceeding into the next phase or work. The Contractor shall give the Engineer one day (24 hours minimum) advance notice of completion of any phase of work for a work area when he deviates from the previously-submitted work schedule noted under Section 1.03 C. The Contractor shall provide necessary access to areas to be inspected.

Failure to obtain approval of any phase of work for a work area may result in redoing the operation at no cost to the State.

B. Right of Rejection: The Engineer shall have the right to reject all work which is not in compliance with the plans and specifications. Rejected work shall be redone at no cost to the State.

In addition, the Engineer shall have the right to require the immediate removal of any paint applicator who demonstrates negligence, lack of competence or repeated non-compliance with the contract requirements.

1.03 SUBMITTALS

A. Schedule of Finishes

1. 4 sets of the proposed painting finish schedule shall be submitted to the Engineer for approval. The schedule shall indicate the **spread rate** at which the proposed paint / coating will be applied to achieve the final dry film thickness indicated on the Schedule

NOTES TO ARCHITECT

This specification covers repainting work only. The requirements noted herein should be modified to address the painting of new work where included in your project.

Note:
1) Guidance regarding the use of airless spraying should be included in new CIP projects and CIP renovation projects.
2) Airless spraying restrictions noted herein should not be applied to new 1st increment projects.
3) Per Cen.Svc. request, airless spraying shall not be used for R&M and R&A projects at this time. The specification shall be modified as necessary to require application by brush and roller.

When special paints and/or coatings having objectionable odors are specified (e.g. epoxy paints), they shall be applied after business hours or special ventilation shall be provided to ensure these odors do not adversely affect the occupants of the building. The design consultant shall be responsible for the identification of these paints and for the inclusion of the necessary precautions in their design.

of Finishes under Section 2.02.

NOTES TO ARCHITECT

Modify the "phases of work" to conform to the number of coats selected for your project.

(See the following page for additional "Notes" regarding failure of existing paint.)

B. Color Samples

1. 3 sets of each color finish sample shall be submitted to the Engineer for approval.

2. After the color finish sample has been approved, one set of color finish samples painted onto 8-1/2" x 11" cardboard shall be submitted to the Engineer. The cardboard shall be divided into 4 horizontal strips and painted as follows:

   a. Prime 3 strips starting from the bottom.

   b. 1st coat bottom 2 strips.

   c. 2nd coat bottom strip.

Where the existing paint finish has failed (e.g. blistering, peeling, efflorescence, etc.), determine the cause of the failure (e.g. water infiltration, lack of waterproofing, paint incompatibility, etc.) and address its correction to ensure proper paint adhesion.

Show areas of paint failure on the drawings.

Modify paragraph **B.2** as necessary based on the number of coats required. (See "Notes to Architect" under Sub-Section 1.06 D.)

C. Schedule of Operations: Before work on the project is commenced, 4 complete sets of a work schedule showing his sequence of opertions and dates shall be submitted by the Contractor to the Engineer.

D. Certifications: 4 copies of asbestos-free, lead-free, zinc-chromate-free, strontium-chromate-free, cadmium-free and mercury-free paint certificates shall be submitted to the Engineer. Should the Contractor require additional copies for distribution to his suppliers and sub-contractors, he shall include these additional copies along with his submittal.

E. Manufacturer's Product Data Sheets: 4 copies of the Manufacturer's Product Data Sheets for the primers, paints, coatings, solvents, sealing and patching materials, sealants and caulking shall be submitted to the Engineer. Data sheets shall indicate thinning and mixing instructions, required film thickness (mil) and application

Paragraph **D**, **F**, and **G** includes guidance noted in Technical Memorandum

NOTES TO ARCHITECT

instructions. Should the Contractor require additional copies for distribution to his suppliers and sub-contractors, he shall include these additional copies along with his submittal.

#77 dated Rev. Oct. 20, 1992.

F. Manufacturer's Material Safety Data Sheets: 4 copies of the Manufacturer's Material Safety Data Sheets for coatings, solvents, and other hazardous materials shall be submitted to the Engineer. Should the Contractor require additional copies for distribution to his suppliers and sub-contractors, he shall include these additional copies along with his submittal.

G. Receipt of Delivery: 3 copies of the receipt signed by the user's representative, attesting to delivery of extra paint as required under Sub-Section 3.03 C - Extra Paint shall be submitted to the Engineer.

Delete this paragraph for other than school and University projects. See also Sub-Section 3.03 C. Note: This incorporates guidance noted under Technical Memorandum #77 dated Rev. Oct. 20, 1992.

H. Standards: 3 copies of the Surface Preparation Standards referenced under Section 3.01 Surface Preparation.

I. Comprehensive Spray Plan: Where the Contractor proposes to employ airless spraying, a Comprehensive Spray Plan including the following information shall be submitted to the Engineer for approval:

1. Documentation that the individual spray applicator(s) on the project have completed an approved "Spray Applicator Certification Program".

2. The overspray protection methods proposed.

3. The spray application instructions and recommendations of the paint manufacturer he proposes to use.

4. Proposed scheduling of existing air-conditioning and ventilation equipment shut-

Delete this paragraph where the building is not centrally air-

down and/or covering of existing air intake, return and diffuser grilles.

conditioned.

J. Certificate of Public Liability and Property Damage Insurance

1.04 ANALYZING AND TESTING

All paints **and their applied thickness** shall be subject to **testing** whenever the Engineer deems necessary to determine conformation to the requirements of these specifications. **Should testing by a laboratory be required, the laboratory shall be selected by the State and the cost of testing shall be borne by the Contractor. However, should test results show that the paint is in compliance with this specifications, the cost will be borne by the State.**

All rejected material shall be removed from the job site immediately. Surfaces painted with the rejected material shall be redone at no additional cost to the State.

Where the required paint thickness is deficient, the affected surface(s) shall be recoated as necessary to provide the required paint thickness at no additional cost to the State.

1.05 QUALITY ASSURANCE

Where the Contractor proposes to employ airless spraying, the applicator(s) shall have completed an approved "Spray Applicator Certification Program" conducted by the Painting Industry of Hawaii.

As a minimum, the certification shall include material and equipment selection, use and maintenance, hands-on application and safety training.

1.06 GUARANTY

A. The Contractor shall guarantee that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship performed by the

Contractor. Such guarantee shall continue for a period of 2 years from the date of project acceptance during which period the Contractor shall remedy at his own expense any such failure to conform or any such defect.

B. The State shall notify the Contractor in writing within a reasonable time after discovery of any failure or defect.

C. Should the Contractor fail to remedy any failure or defect described in Paragraph A above within 10 working days after receipt of notice thereof, the State shall have the right to repair or otherwise remedy such failure or damage at the Contractor's expense.

1.07 SPECIAL REQUIREMENTS

A. Codes: The Contractor shall comply with the State OSHL (Occupational Safety and Health Law) and all pollution control regulations of the State Department of Health.

B. Protection

1. Persons

a. The Contractor shall take all necessary precautions to protect public pedestrians including tenants from injury.

b. The Contractor shall provided, erect and maintain safety barricades around scaffolds, hoists and wherever Contractor's operations create hazardous conditions in order to properly protect the public and tenants.

2. Completed Work: The Contractor shall provide all necessary protection for wet paint surfaces.

3. Protective Covering **and Enclosures**: The Contractor shall provide and install protective covering over furniture, equipment, floor and other areas that are not scheduled for treatment. Protective covering shall be clean sanitary drop cloth or plastic sheets. Paint applied to surfaces not scheduled for treatment shall be completely removed and surfaces shall be returned to their original condition.

   Where paint application will be performed by use of airless spraying, the Contractor shall ensure that protective enclosures are erected to prevent the escape of overspray from the work area.

4. Safeguarding of Property: The Contractor shall take whatever steps may be necessary to safeguard his work and also the property of the State and other individuals in the vicinity of his work area during the execution of this Contract. He shall be responsible for and make good on any and all damages and for losses to work or property caused by his or his employee's negligence. **Where the damaged property cannot be cleaned and restored to its original condition (i.e. prior to being damaged) it shall be replaced with a new product of equal quality. No proration or use of "used" products will be permitted.**

   a. The Contractor shall assume that cars will not be temporarily relocated from parking areas during spray painting work.

   b. Paint overspray shall not carry more than 5 l.f. beyond the building eave line nor within 10 l.f. of pedestrians or property and surfaces not scheduled to be painted.

   Spray painting shall immediately cease when overspray carries beyond these specified limits and will not continue until protective barriers are erected to properly contain the overspray and damages

NOTES TO ARCHITECT

caused by the overspray have been corrected.

c. The Contractor shall be assessed $300.00 for each incidence of property or personal damage caused by overspray until such time that a satisfactory settlement has been agreed upon by the damaged party and corrective action has been completed. All corrective action shall be settled within 24 hours from the time the damage is discovered.

Should the Contractor fail to take corrective action in a timely and expeditious manner, the Engineer shall contact the Contractor's Insurance company to seek resolution on the matter.

5. Fire Safety: The Contractor shall direct his employees not to smoke in the vicinity and exercise precautions against fire at all times. Waste rags, plastic (polyester sheets), empty cans, etc. shall be removed from the site at the end of each day.

C. Storage Area for Materials: No paint material, empty cans, paint brushes and rollers may be stored in the building(s). They shall be stored in separate storage facilities away from the building(s).

The Contractor may furnish a job site storage facility. Such facility shall comply with the requirements of the local Fire Department. The storage area shall be kept clean and the facility shall be locked when not in use or when no visual supervision is possible.

D. Sequence of Operations: The sequence of operations shall divide the surfaces into work areas and present a schedule for:

1. Surface preparation and spot prime.

2. Prime coat.

3. First finish coat.

4. Second finish coat.

Modify the number of coats required based on the condition of the existing painted surface e.g.:
€ Full priming of the surface is not necessary if the existing paint surface is tight, not chalky and is to be repainted with a paint of similar type and color.
€ For interior surfaces to be repainted in similar color, only one finish coat is required.

Note: Compatibility between the new and existing paint is essential. **It is the consultant's responsibility to verify the type of existing paint. If unknown, an appropriate oil-based primer shall be specified.**
Note: This amends and includes guidance noted in Technical Memorandum

NOTES TO ARCHITECT

Minimum interior work area shall be the complete inside surfaces of one room. Minimum exterior work area shall be one side of a single story building or one side of one story on multiple story buildings.

#22 dated 8/11/75.

Select applicable items. Complete by indicating the number of buildings and building designations.

1.08 AREAS (SURFACES/STRUCTURES) TO BE PAINTED

A. Structures:

1. _____ buildings, Building _____, _____, _____, _____, complete interior and exterior surfaces.

2. _____ complete walkways.

3. _____ flag poles.

4. Miscellaneous.

Show the full extent of repainting work on the drawings.

B. Surfaces to be Painted:

1. Interior: All existing interior painted surfaces shall be painted unless otherwise indicated on the plans and/or specifically deleted in these specifications.

Add reference to new surfaces if applicable to your project.

Interior surfaces to be painted shall be those surfaces not exposed to weather in an area enclose by 4 walls.

Also, a surface shall be considered an interior surface and painted as such whenever the color is that of the existing interior color.

Select applicable items. Add other items to suit field conditions.

Extent of treatment for special items is as follows:

a. Ceiling - as indicated on plans.

b. Closets and cabinets with doors - interior surfaces shall not be treated unless

NOTES TO ARCHITECT

specifically noted.

c. Doors (including closet) - both faces, top and side edges. Cabinet doors - both faces and all edges.

d. Wood vanes of jalousies - refer to exterior work.

e. All movable furniture such as portable bookshelves, cubicles and cabinets shall not be painted.

2. Exterior: All existing exterior painted surfaces shall be painted unless otherwise indicated on the plans and/or specifically deleted in these specifications.

Exterior surfaces to be painted shall be any surface exposed to weather in an area not enclosed by 4 walls and a roof. Also, a surface shall be considered and painted as an exterior surface whenever the color is that of the existing exterior color.

Select applicable items. Add other items to suit field conditions.

The extent of treatment for special items is as follows:

a. Wood vanes of jalousies - all surfaces inside and outside.

b. Exterior doors - both faces, top, bottom and side edges.

c. Concrete soffits - bottom and edges.

d. Concrete stairs - soffit and both sides and edges of concrete railing.

e. Grille work or mesh - both sides and inside openings.

f. G.I. pipes and conduits, electric boxes, exhaust ducts, fan housing and similar

Field verify items which will require removal and

NOTES TO ARCHITECT

appurtenances **- exposed surfaces.**

modify spec as needed.
Note:
1) The DAGS Project Coordinator shall advise the user that items such as pictures, charts, etc. should be removed and reinstalled by the teachers or maintenance staff.
2) The DAGS Project Coordinator shall keep the user apprised on the status and scheduling of the project, including cancellation, should it occur. In the event of cancellation, this will save the user from going through the trouble of packing and fustration when the project is not done.

1.09 **OTHER INCIDENTAL WORK TO BE PERFORMED BY CONTRACTOR**

A. Interior

1. Unless otherwise specified, the Contractor is responsible for moving about all furniture and equipment to provide himself with sufficient working space.

   The Contractor shall protect these items and make good any damage to them at no cost to the State. After the painting of the room is completed, the Contractor shall replace all furniture and equipment to their original locations.

2. The Contractor shall carefully remove **and neatly store away or properly protect in-place curtains, blinds and _____. Removed items shall be reinstalled at the completion of the work.**

3. All items on shelving and in cabinets to be painted will be removed by the user personnel prior to painting work.

B. Shrubbery and plants shall be trimmed six inches back from surfaces to be painted and protected from damage.

Include additional items to suit field conditions. Delete if not required.

C. Areas Inaccessible to Normal Painting: The Contractor shall:

   a. Remove and reinstall expanded mesh security screens.

Where security screens are present, verify the method by which they are attached to the building and indicate in the specifications. If they are to be removed and reinstalled, address the type of fasteners required.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lead Prohibition: All paints shall be lead-free.

B. Mercury Prohibition: All paint shall be mercury-free.

Paragraph G.:
Add "Mameco International, Inc.,

C. Chromate Prohibition: All paint shall be free of zinc-chromate and/or strontium-chromate.

D. Cadmium Prohibition: All paint shall be cadmium-free.

E. Material shall be equal in quality to that specified under the Schedule of finishes and any given finish shall be as labeled by one manufacturer.

F. All materials shall be delivered to the job site in undamaged original containers bearing the manufacturer's label and shall be stored in such a manner as to prevent damage. All rejected materials shall be removed from the job site immediately.

G. Paints shall be as manufactured by Ace, Benjamin Moore, Cabot's, Carboline, Dupont, Dutch Boy, **Fine Line Paint Corp., ICI Ameritone, ICI Decratrend, ICI Devoe, ICI Dulux, ICI Fuller-O'Brien, ICI Glidden, ICI Sinclair**, Martin Senour, Olympic Stain, Pervo, Pittsburg, Porter Intl., Pratt & Lambert, Rust-Oleum, Sherwin-Williams, Smiland (Styletone), Spectra-Tone, Thoro Systems, Tnemec, United Paint and Coatings or approved equal.

H. Thinning of paint shall be done using material recommendedby the manufacturer. Mix proprietary products according to manufacturer's printed specifications. Compound thinner, mineral oil, kerosene, refined linseed oil, or gasoline shall not be used for thinning.

I. Except for metal primers all paint shall contain the maximum amount of mildewcide per gallon of paint permitted by the mildewcide manufacturer without adversely affecting the quality of the paint.

J. The supplier shall submit a signed certificate indicating the amounts of mildewcide added by both the paint manufacturer and the paint

NOTES TO ARCHITECT

Sonneborn Building Products and VIP Waterproofing Coatings" when waterproof coatings are specified.

Finish Schedule: Provide a Color and Finish Schedule as part of the Bidding Documents. Colors selected should not require unnecessary maintenance to present a clean appearance. The colors selected shall also be agreeable with DAGS and the User Agency. Refer to guidance noted in Technical Memorandum #44 dated March 22, 1993. Gloss or Semi-Gloss finish paints shall be used for interior and exterior work. Flat finish paints shall not be used unless approved by DAGS Central Services Division. To facilitate matching, hardwood surfaces shall be stained before receiving a clear finish. Note: This amemds and includes guidance noted in Technical Memorandum #22 dated August 25, 1975.

(see following page for additional notes)

In addition, unless required for a particular application, oil-based paints should not be specified, [oil-based paints tend to discolor (i.e. yellow) over time and creates

supplier.

2.02 SCHEDULE OF FINISHES

A. The Schedule of Finishes is made for the convenience of the Contractor and indicates the types and quality of finishes to be applied to the surfaces.

B. Any existing painted surfaces not specifically noted in the finish schedule shall be finished to match adjoining work.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. General

1. High Pressure Water Washing

a. High pressure water washing may be used in lieu of brush washing to remove loose paint material, chalking, dirt, and debris from exterior surfaces to be painted. It shall be performed by skilled mechanics experienced in the use and operation of the sprayer equipment.

b. High pressure water washing does not replace proper preparatory work such as sanding of the substrate prior to painting. Surface contaminants and loose paint material remaining after the surface has been pressure washed shall be removed by other means as necessary to properly prepare the surface.

c. The pressure rating of the sprayer equipment in addition to the nozzle type and size shall be of the proper type to clean the surface without damaging the substrate. Any damage shall be repaired and/or restored to its original condition at no cost to the State.

d. Proper precautions shall be taken to prevent over-spray and water infiltration into the building through doors, windows, vents, louvers and other building openings. Water and debris entering the

NOTES TO ARCHITECT

adhesion problems on re-painting projects]. Saponification (reaction between the oil & alkaline conditions) is also a potential problem.

For projects on the Big Island, refer to Tech Memo #104 dated 12/31/97 regarding the provision of alkali resistant primers and #112 dated 08/20/96 regarding roof paints.

Indicate the required dry mil thickness of the specified paint on the schedule.

Surface Prep (Wood, Plaster, Concrete, Masonry, Metal & Others): Modify the surface preparation methods noted as necessary to suit your specific project conditions and to address health and environmental concerns (e.g. Existing lead based paint surfaces, substrates containing asbestos, etc.). Modifications shall ensure that the proper precautions are taken in addition to ensuring proper paint adhesion is attained. Refer to guidance noted in Technical Memorandum #87 dated July 12, 1993.

(continued on next page)

NOTES TO ARCHITECT

building shall be cleaned-up immediately and any damaged area resulting therefrom shall be repaired and/or restored to its original condition at no cost to the State.

Where existing acoustical tiles are to be repainted, their condition shall be carefully checked to ensure that its surface will support/accept being repainted. Sometimes the material's surface delaminates upon paint application.

e. In removing mildew, high pressure water washing shall only be used to wash the surface after is has first been sterilized with a treatment solution specified under Section 3.01 B. below.

2. Mildew Removal

Show areas of mildew on the building elevations and reflected ceiling plan.

Remove all mildew and sterilize the surface to be painted using one of the following methods:

Delete this section where not applicable.

Apply a treatment solution composed of the following ingredients and in the noted proportions to the affected surface using a sponge or low-pressure sprayer:

2/3 cup TSP (Trisodium Phosphate)
1 quart household bleach
3 quarts warm water

Note: Household bleach shall not be mixed with ammonia or any detergents or cleaners containing ammonia as this will create a poisonous gas.

Scrub the surface as necessary to completely remove the mildew.

or,

Apply a commercial mildew treatment solution such as Purex, Jomax Remover or equal in strict accordance with the manufacturer's recommendations and instructions.

Following treatment, the surface shall be cleaned with potable water and allowed to thoroughly dry before priming, painting or the applying of sealing and caulking compounds.

Make a field check of existing door/jamb conditions. Where the

3. Cracks and openings found at joints and where different materials abut each other (e.g CMU

NOTES TO ARCHITECT

/ concrete, CMU or concrete / wood, etc.) shall be sealed with a caulking compound compatible with the substrate and primer/paint. The caulking shall be applied and allowed to set in accordance with the manufacturer's recommendations and instructions.

space between the door and jamb is tight or if there are signs of binding or surface-to-surface contact, call for sanding of the door edge (wood doors) or adjustment of the door and/or frame (metal doors) to eliminate touching of newly painted surfaces.

B. Wood to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish. High pressure water washing as described in Section 3.01 A.1. above may be used for exterior surfaces.

Delete where not applicable.

3. Remove all mildew as noted in Section 3.01 A.2. above.

4. Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where the paint has been removed, sand the edges of scarred areas to a smooth feathered edge.

5. Wash all surfaces with a solution of T.S.P. (trisodium phosphate) and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair the bond of, or bleed through the new paint finish. After washing, rinse the surface with potable water and allow to thoroughly dry.

   Rinsing may be performed by high pressure water washing as noted in Section 3.01 A.1. above for exterior surfaces. However, any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

6. After cleaning and/or washing of the surface with water, the wood shall not be primed,

NOTES TO ARCHITECT

painted or sealed unless it has been allowed to thoroughly dry for a minimum of 24 hours and until the moisture content of the wood is less than 15% when measured with an electronic moisture meter.

7. Fill holes (nail, tack, staple, etc.), cracks, open joints and other imperfections with appropriate compound and allow to set (door and trim included). Seal and caulk all openings which will permit the entrance of water. Sealing and caulking compounds shall be compatible with the substrate and primer/paint and shall be applied and allowed to set in accordance with the manufacturer's recommendations and instructions.

8. Spot prime areas where bare wood or fill material is exposed with the specified primer and feather out onto adjacent paint.

Modify and amend the surface preparation requirements for Plaster, Concrete and Masonry as necessary to address efflorescence.

C. Plaster (Smooth and Sand Finish) to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish. High pressure water washing as described in Section 3.01 A.1. above may be used for exterior surfaces.

Delete where not applicable.

Delete where not applicable.

3. Remove all mildew as noted in Section 3.01 A.2. above.

4. Smooth plaster finish: Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where the paint has been removed, sand the edges of scarred areas to a smooth feathered edge.

5. Wash all surfaces with a solution of T.S.P. and water or other appropriate solution to

remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair the bond of, or bleed through the new paint finish. After washing, rinse potable water and allow to thoroughly dry for a minimum of 24 hours.

Rinsing may be performed by high pressure water washing as noted in Section 3.01 A.1. above for exterior surfaces. However, any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

6. Scarred plaster areas shall be patched with spackling compound or taping system. Fill holes, cracks, open joints and damaged areas with vinyl base spackle or plaster patch. Apply texture, if required, to match existing textured surfaces.

7. Spot prime areas where plaster, fill or patch material is exposed with the specified primer and feather out onto adjacent paint.

D. Concrete (Smooth Finish) to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish. High pressure water washing as described in Section 3.01 A.1. above may be used for exterior surfaces.

Delete where not applicable.

3. Remove all mildew as noted in Section 3.01 A.2. above.

4. Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where paint has been removed, sand the edges of scarred areas to a smooth feathered edge.

5. Wash all surfaces with a solution of T.S.P. and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair the bond of, or bleed through the new paint finish. After washing, rinse potable water and allow to thoroughly dry for a minimum of 24 hours.

   Rinsing may be performed by high pressure water washing as noted in Section 3.01 A.1. above for exterior surfaces. However, any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

6. Seal all cracks hairline to 1/8" in width with concrete patching compound. All cracks over 1/8" in width shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

7. All holes 1/4" in diameter or greater shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

8. Spot prime areas where bare concrete, seal or

patch material is exposed with the specified primer and feather out onto adjacent paint.

E. Masonry Block to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish. **High pressure water washing as described in Section 3.01 A.1. above may be used for exterior surfaces provided cracks and openings have been sealed to prevent water infiltration.**

Delete where not applicable.

3. Remove all mildew as noted in Section 3.01 A.2. above.

4. Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where paint has been removed, sand the edges of scarred areas to a smooth feathered edge.

5. Wash all surfaces with a solution of T.S.P. and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair bond of, or bleed through the new paint finish. After washing, rinse potable water and allow to thoroughly dry for a minimum of 24 hours.

   Any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

6. Seal all cracks hairline to 1/8" in width with concrete patching compound. All cracks over 1/8" in width shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

NOTES TO ARCHITECT

7. All holes 1/4" in diameter or greater shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

8. Spot prime areas where bare masonry, seal or patch material is exposed with the specified primer and feather out onto adjacent paint.

F. Ferrous Metal and Galvanized Metal

Delete where not applicable.

1. Remove from surfaces to be repainted all foreign matter such as tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky paint finish to an existing tight and firm finish.

If existing work is badly rusted and its removal would destroy it or compromise its integrity, call for its removal and replacement.

3. **Remove all mildew as noted in Section 3.01 A.2. above.**

4. Remove all rust, loose mill scale and loose and blistering paint by power tool chipping, de-scaling, sanding, wire brushing and grinding down to bare metal (only tightly adhering surface rust, mill scale and paint which cannot be removed with a dull putty knife remaining) in accordance with Steel Structures Painting Council (SSPC) Standard SP3. Care shall be taken so that the surface in not burnished during cleaning.

Specify specific surface prep. stds. such as those established by the Steel Structures Painting Council (SSPC) or the National Assoc. of Corrosion Engineers (NACE) where necessary to address specific project conditions and ensure proper paint adhesion. Require submittal of the referenced standard for use by the Inspector in checking acceptability of the surface prep.

5. Where the existing finish remains clean, tight and firm, prepare the surface by sanding. Where paint has been removed, sand scarred areas to a smooth feathered edge.

6. Completely wipe all surfaces with mineral spirits or other appropriate solution as required to remove accumulated film of wax,

NOTES TO ARCHITECT

oil, grease, smoke, dust, dirt, chalky or other foreign matter which would impair the bond of, or bleed through the new **paint** finish.

7. Allow the surfaces to thoroughly dry and immediately spot prime bare metal areas with the specified primer and feather out onto adjacent paint.

For new CMU work, include back-rolling of paint that has been spray-applied to the surface to ensure full coverage into holes and crevices.

3.02 PAINT APPLICATION

A. General

1. All work shall be done in a workmanlike manner by skilled and experienced mechanics and shall conform to the best painting practices.

2. All materials shall be applied in strict accordance with the manufacturer's specifications, including spread rates, and the finished surfaces shall be free from runs, sags, drops, ridges, waves, laps, streaks, brush marks and variations in color, texture and finish (glossy or dull). The coverage shall be complete and each coat shall be so applied as to produce a film of uniform thickness.

   No paint, varnish or enamel shall be applied until the preceeding coat is thoroughly dry and approved.

3. No exterior painting of unprotected surfaces shall be done in rainy, damp weather. Coats shall be applied only to surfaces that are thoroughly dry and only under such combination of humidity and temperature that will ensure proper paint application.

Provide color schedule.

Program Bells shall be painted "Battleship Gray". Fire Bells shall be painted "Fire Engine

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4. Any mixing shall be done outside the building.

Red".

B. Colors: Each coat shall be tinted a different shade from the preceding coat. Colors shall be in accordance with the following schedule:

3.03 MISCELLANEOUS

A. Installation of Removed Items: After completion of final paint coat, removed items shall be reinstalled.

B. Clean-up

1. During the progress of the work, all debris, empty crates, waste, drippings, etc. shall be removed by the Contractor and the grounds about the areas to be painted shall be left clean and orderly at the end of each work day.

2. Upon completion of the work, staging, scaffolding, containers and all other debris shall be removed from the site. All paint, shellac, oil, or stains splashed or spilled upon adjacent surfaces not requiring treatment (hardware, fixture, floor, glass) shall be removed and the entire job left clean and acceptable.

3. Work to correct damage caused by overspray and punchlist items shall be performed during non-school or non-business hours if the work

Delete this paragraph for other than school or

NOTES TO ARCHITECT

University projects.

will inconvenience the building occupants. Where necessary for access during non-school or non-busines hours, the Contactor shall pay for custodial staff to gain entry and to secure the building.

C. Extra Paint

The Contractor shall provide extra paint in each of the different colors of exterior and interior paint used for walls, wainscot, eaves and ceiling to the school upon completion of the project. The paint shall be in unopened one gallon cans and shall be in the quantities listed below:

1. Paint used over large areas, such as the exterior of the building and in several classrooms - 5 gallons of each color.

2. Paint used in single room areas and in small areas, such as bathrooms and doors - 1 gallon of each color.

END OF SECTION

SECTION 09910 - REPAINTING (EXTERIOR)

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

A. Inspection and Approvals: The Contractor shall obtain written approval from the Engineer upon completion of each phase of work (phases of work are: surface preparation and spot prime, prime, first finish coat, second finish coat) before proceeding into the next phase or work. The Contractor shall give the Engineer one day (24 hours minimum) advance notice of completion of any phase of work for a work area when he deviates from the previously-submitted work schedule noted under Section 1.03 C. The Contractor shall provide necessary access to areas to be inspected.

Failure to obtain approval of any phase of work for a work area may result in redoing the operation at no cost to the State.

B. Right of Rejection: The Engineer shall have the right to reject all work which is not in compliance with the plans and specifications. Rejected work shall be redone at no cost to the State.

In addition, the Engineer shall have the right to require the immediate removal of any paint applicator who demonstrates negligence, lack of competence or repeated non-compliance with the contract requirements.

1.03 SUBMITTALS

A. Schedule of Finishes

1. 4 sets of the proposed painting finish schedule shall be submitted to the Engineer for approval. The schedule shall indicate the **spread rate** at which the proposed paint / coating will be applied to achieve the final dry film thickness indicated on the Schedule

NOTES TO ARCHITECT

This specification covers repainting work only. The requirements noted herein should be modified to address the painting of new work where included in your project.

Note:
1) Guidance regarding the use of airless spraying should be included in new CIP projects and CIP renovation projects.
2) Airless spraying restrictions noted herein should not be applied to new 1st increment projects.
3) Per Cen.Svc. request, airless spraying shall not be used for R&M and R&A projects at this time. The specification shall be modified as necessary to require application by brush and roller.

When special paints and/or coatings having objectionable odors are specified (e.g. epoxy paints), they shall be applied after business hours or special ventilation shall be provided to ensure these odors do not adversely affect the occupants of the building. The design consultant shall be responsible for the identification of these paints and for the inclusion of the necessary precautions in their design.

of Finishes under Section 2.02.

B. Color Samples

1. 3 sets of each color finish sample shall be submitted to the Engineer for approval.

2. After the color finish sample has been approved, one set of color finish samples painted onto 8-1/2" x 11" cardboard shall be submitted to the Engineer. The cardboard shall be divided into 4 horizontal strips and painted as follows:

   a. Prime 3 strips starting from the bottom.

   b. 1st coat bottom 2 strips.

   c. 2nd coat bottom strip.

C. Schedule of Operations: Before work on the project is commenced, 4 complete sets of a work schedule showing his sequence of opertions and dates shall be submitted by the Contractor to the Engineer.

D. Certifications: 4 copies of asbestos-free, lead-free, zinc-chromate-free, strontium-chromate-free, cadmium-free and mercury-free paint certificates shall be submitted to the Engineer. Should the Contractor require additional copies for distribution to his suppliers and sub-contractors, he shall include these additional copies along with his submittal.

E. Manufacturer's Product Data Sheets: 4 copies of the Manufacturer's Product Data Sheets for the primers, paints, coatings, solvents, sealing and patching materials, sealants and caulking shall be submitted to the Engineer. Data sheets shall indicate thinning and mixing instructions, required film thickness (mil) and application

NOTES TO ARCHITECT

Modify the "phases of work" to conform to the number of coats selected for your project.

(See the following page for additional "Notes" regarding failure of existing paint.)

Where the existing paint finish has failed (e.g. blistering, peeling, efflorescence, etc.), determine the cause of the failure (e.g. water infiltration, lack of waterproofing, paint incompatibility, etc.) and address its correction to ensure proper paint adhesion.

Show areas of paint failure on the drawings.

Modify paragraph **B.2** as necessary based on the number of coats required. (See "Notes to Architect" under Sub-Section 1.0**7** D.)

Paragraph **D**, **F**, and **G** includes guidance noted in Technical Memorandum

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instructions. Should the Contractor require additional copies for distribution to his suppliers and sub-contractors, he shall include these additional copies along with his submittal.

#77 dated Rev. Oct. 20, 1992.

F. Manufacturer's Material Safety Data Sheets: 4 copies of the Manufacturer's Material Safety Data Sheets for coatings, solvents, and other hazardous materials shall be submitted to the Engineer. Should the Contractor require additional copies for distribution to his suppliers and sub-contractors, he shall include these additional copies along with his submittal.

Delete this paragraph for other than school and University projects. See also Sub-Section 3.03 C. Note: This incorporates guidance noted under Technical Memorandum #77 dated Rev. Oct. 20, 1992.

G. Receipt of Delivery: 3 copies of the receipt signed by the user's representative, attesting to delivery of extra paint as required under Sub-Section 3.03 C - Extra Paint shall be submitted to the Engineer.

H. Standards: 3 copies of the Surface Preparation Standards referenced under Section 3.01 Surface Preparation.

I. Comprehensive Spray Plan: Where the Contractor proposes to employ airless spraying, a Comprehensive Spray Plan including the following information shall be submitted to the Engineer for approval:

1. Documentation that the individual spray applicator(s) on the project have completed an approved "Spray Applicator Certification Program".

2. The overspray protection methods proposed.

3. The spray application instructions and recommendations of the paint manufacturer he proposes to use.

Delete this paragraph where the building is not centrally air-conditioned.

4. Proposed scheduling of existing air-conditioning and ventilation equipment shut-

down and/or covering of existing air intake, return and diffuser grilles.

J. Certificate of Public Liability and Property Damage Insurance

1.04 ANALYZING AND TESTING

All paints **and their applied thickness** shall be subject to **testing** whenever the Engineer deems necessary to determine conformation to the requirements of these specifications. **Should testing by a laboratory be required, the laboratory shall be selected by the State and the cost of testing shall be borne by the Contractor. However, should test results show that the paint is in compliance with this specifications, the cost will be borne by the State.**

All rejected material shall be removed from the job site immediately. Surfaces painted with the rejected material shall be redone at no additional cost to the State.

Where the required paint thickness is deficient, the affected surface(s) shall be recoated as necessary to provide the required paint thickness at no additional cost to the State.

1.05 QUALITY ASSURANCE

Where the Contractor proposes to employ airless spraying, the applicator(s) shall have completed an approved "Spray Applicator Certification Program" conducted by the Painting Industry of Hawaii.

As a minimum, the certification shall include material and equipment selection, use and maintenance, hands-on application and safety training.

1.06 GUARANTY

A. The Contractor shall guarantee that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship performed by the

Contractor. Such guarantee shall continue for a period of 2 years from the date of project acceptance during which period the Contractor shall remedy at his own expense any such failure to conform or any such defect.

B. The State shall notify the Contractor in writing within a reasonable time after discovery of any failure or defect.

C. Should the Contractor fail to remedy any failure or defect described in Paragraph A above within 10 working days after receipt of notice thereof, the State shall have the right to repair or otherwise remedy such failure or damage at the Contractor's expense.

1.07 SPECIAL REQUIREMENTS

A. Codes: The Contractor shall comply with the State OSHL (Occupational Safety and Health Law) and all pollution control regulations of the State Department of Health.

B. Protection

1. Persons

a. The Contractor shall take all necessary precautions to protect public pedestrians including tenants from injury.

b. The Contractor shall provided, erect and maintain safety barricades around scaffolds, hoists and wherever Contractor's operations create hazardous conditions in order to properly protect the public and tenants.

2. Completed Work: The Contractor shall provide all necessary protection for wet paint surfaces.

3. Protective Covering **and Enclosures**: The Contractor shall provide and install protective covering over furniture, equipment, floor and other areas that are not scheduled for treatment. Protective covering shall be clean sanitary drop cloth or plastic sheets. Paint applied to surfaces not scheduled for treatment shall be completely removed and surfaces shall be returned to their original condition.

   Where paint application will be performed by use of airless spraying, the Contractor shall ensure that protective enclosures are erected to prevent the escape of overspray from the work area.

4. Safeguarding of Property: The Contractor shall take whatever steps may be necessary to safeguard his work and also the property of the State and other individuals in the vicinity of his work area during the execution of this Contract. He shall be responsible for and make good on any and all damages and for losses to work or property caused by his or his employee's negligence. **Where the damaged property cannot be cleaned and restored to its original condition (i.e. prior to being damaged) it shall be replaced with a new product of equal quality. No proration or use of "used" products will be permitted.**

   a. The Contractor shall assume that cars will not be temporarily relocated from parking areas during spray painting work.

   b. Paint overspray shall not carry more than 5 l.f. beyond the building eave line nor within 10 l.f. of pedestrians or property and surfaces not scheduled to be painted.

   Spray painting shall immediately cease when overspray carries beyond these specified limits and will not continue until protective barriers are erected to properly contain the overspray and damages

NOTES TO ARCHITECT

caused by the overspray have been corrected.

c. The Contractor shall be assessed $300.00 for each incidence of property or personal damage caused by overspray until such time that a satisfactory settlement has been agreed upon by the damaged party and corrective action has been completed. All corrective action shall be settled within 24 hours from the time the damage is discovered.

Should the Contractor fail to take corrective action in a timely and expeditious manner, the Engineer shall contact the Contractor's Insurance company to seek resolution on the matter.

5. Fire Safety: The Contractor shall direct his employees not to smoke in the vicinity and exercise precautions against fire at all times. Waste rags, plastic (polyester sheets), empty cans, etc. shall be removed from the site at the end of each day.

C. Storage Area for Materials: No paint material, empty cans, paint brushes and rollers may be stored in the building(s). They shall be stored in separate storage facilities away from the building(s).

The Contractor may furnish a job site storage facility. Such facility shall comply with the requirements of the local Fire Department. The storage area shall be kept clean and the facility shall be locked when not in use or when no visual supervision is possible.

D. Sequence of Operations: The sequence of operations shall divide the surfaces into work areas and present a schedule for:

1. Surface preparation and spot prime.

2. Prime coat.

3. First finish coat.

4. Second finish coat.

Modify the number of coats required based on the condition of the existing painted surface e.g.:
€ Full priming of the surface is not necessary if the existing paint surface is tight, not chalky and is to be repainted with a paint of similar type and color.

Note: Compatibility between the new and existing paint is essential. **It is the consultant's responsibility to verify the type of existing paint. If unknown, an appropriate oil-based primer shall be specified.**
Note: This amends and includes guidance noted in Technical Memorandum #22 dated 8/11/75.

NOTES TO ARCHITECT

Minimum work area shall be one side of a single story building or one side of one story on multiple story buildings.

Select applicable items. Complete by indicating the number of buildings and building designations.

1.08 AREAS (SURFACES/STRUCTURES) TO BE PAINTED

A. Structures:

1. _____ buildings, Building _____, _____, _____, _____, complete exterior surfaces.

2. _____ complete walkways.

3. _____ flag poles.

4. Miscellaneous.

Show the full extent of repainting work on the drawings.

Add reference to new surfaces if applicable to your project.

B. Surfaces to be Painted: All existing exterior painted surfaces shall be painted unless otherwise indicated on the plans and/or specifically deleted in these specifications.

Exterior surfaces to be painted shall be **any** surface exposed to weather in an area not enclosed by 4 walls and a roof. Also, a surface shall be considered **and painted** as an exterior surface whenever the color is that of the existing exterior color.

Select applicable items. Add other items to suit field conditions.

The extent of treatment for special items is as follows:

1. Wood vanes of jalousies - all surfaces inside and outside.

2. Exterior doors - both faces, top, bottom and side edges.

3. Concrete soffits - bottom and edges.

4. Concrete stairs - soffit and both sides and edges of concrete railing.

5. Grille work or mesh - both sides and inside openings.

6. G.I. pipes and conduits, electric boxes, exhaust ducts, fan housing and similar appurtenances **- exposed surfaces.**

1.09 **OTHER INCIDENTAL WORK TO BE PERFORMED BY CONTRACTOR**

A. Shrubbery and plants shall be trimmed six inches back from surfaces to be painted and protected from damage.

B. Areas Inaccessible to Normal Painting: The Contractor shall:

a. Remove and reinstall expanded mesh security screens.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lead Prohibition: All paints shall be lead-free.

B. Mercury Prohibition: All paint shall be mercury-free.

C. Chromate Prohibition: All paint shall be free of zinc-chromate and/or strontium-chromate.

D. Cadmium Prohibition: All paint shall be cadmium-free.

E. Material shall be equal in quality to that specified under the Schedule of finishes and any given finish shall be as labeled by one manufacturer.

F. All materials shall be delivered to the job site in undamaged original containers bearing the manufacturer's label and shall be stored in such a manner as to prevent damage. All rejected materials shall be removed from the job site immediately.

NOTES TO ARCHITECT

Field verify items which will require removal and modify spec as needed.
Note:
1) The DAGS Project Coordinator shall advise the user that items such as pictures, charts, etc. should be removed and reinstalled by the teachers or maintenance staff.
(Cont. on next page.)

2) The DAGS Project Coordinator shall keep the user apprised on the status and scheduling of the project, including cancellation, should it occur. In the event of cancellation, this will save the user from going through the trouble of packing and fustration when the project is not done.

Paragraph 1.09 B.:
Include additional items to suit field conditions. Delete if not required.

Where security screens are present, verify the method by which they are attached to the building and indicate in the specifications. If they are to be removed and reinstalled, address the type of fasteners required.

Paragraph G.:
Add "Mameco International, Inc., Sonneborn Building

G. Paints shall be as manufactured by Ace, Benjamin Moore, Cabot's, Carboline, Dupont, Dutch Boy, **Fine Line Paint Corp., ICI Ameritone, ICI Decratrend, ICI Devoe, ICI Dulux, ICI Fuller-O'Brien, ICI Glidden, ICI Sinclair**, Martin Senour, Olympic Stain, Pervo, Pittsburg, Porter Intl., Pratt & Lambert, Rust-Oleum, Sherwin-Williams, Smiland (Styletone), Spectra-Tone, Thoro Systems, Tnemec, United Paint and Coatings or approved equal.

H. Thinning of paint shall be done using material recommendedby the manufacturer. Mix proprietary products according to manufacturer's printed specifications. Compound thinner, mineral oil, kerosene, refined linseed oil, or gasoline shall not be used for thinning.

I. Except for metal primers all paint shall contain the maximum amount of mildewcide per gallon of paint permitted by the mildewcide manufacturer without adversely affecting the quality of the paint.

J. The supplier shall submit a signed certificate indicating the amounts of mildewcide added by both the paint manufacturer and the paint supplier.

2.02 SCHEDULE OF FINISHES

A. The Schedule of Finishes is made for the convenience of the Contractor and indicates the types and quality of finishes to be applied to the surfaces.

B. Any existing painted surfaces not specifically noted in the finish schedule shall be finished to match adjoining work.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. General

NOTES TO ARCHITECT

Products and VIP Waterproofing Coatings" when waterproof coatings are specified.

Finish Schedule: Provide a Color and Finish Schedule as part of the Bidding Documents. Colors selected should not require unnecessary maintenance to present a clean appearance. The colors selected shall also be agreeable with DAGS and the User Agency. Refer to guidance noted in Technical Memorandum #44 dated March 22, 1993. Gloss or Semi-Gloss finish paints shall be used for interior and exterior work.
(Cont. on next page.)

Flat finish paints shall not be used unless approved by DAGS Central Services Division. To facilitate matching, hardwood surfaces shall be stained before receiving a clear finish. Note: This amemds and includes guidance noted in Technical Memorandum #22 dated August 25, 1975. **In addition, unless required for a particular application, oil-based paints should not be specified, [oil-based paints tend to discolor (i.e. yellow) over time and creates adhesion problems on re-painting projects]. Saponification (reaction**

1. High Pressure Water Washing

   a. High pressure water washing may be used in lieu of brush washing to remove loose paint material, chalking, dirt, and debris from exterior surfaces to be painted. It shall be performed by skilled mechanics experienced in the use and operation of the sprayer equipment.

   b. High pressure water washing does not replace proper preparatory work such as sanding of the substrate prior to painting. Surface contaminants and loose paint material remaining after the surface has been pressure washed shall be removed by other means as necessary to properly prepare the surface.

   c. The pressure rating of the sprayer equipment in addition to the nozzle type and size shall be of the proper type to clean the surface without damaging the substrate. Any damage shall be repaired and/or restored to its original condition at no cost to the State.

   d. Proper precautions shall be taken to prevent over-spray and water infiltration into the building through doors, windows, vents, louvers and other building openings. Water and debris entering the building shall be cleaned-up immediately and any damaged area resulting therefrom shall be repaired and/or restored to its original condition at no cost to the State.

   e. In removing mildew, high pressure water washing shall only be used to wash the surface after is has first been sterilized with a treatment solution specified under Section 3.01 B. below.

2. Mildew Removal

NOTES TO ARCHITECT

between the oil & alkaline conditions) is also a potential problem.

For projects on the Big Island, refer to Tech Memo #104 dated 12/31/97 regarding the provision of alkali resistant primers and #112 dated 08/20/96 regarding roof paints.
Indicate the required dry mil thickness of the specified paint on the schedule.

Surface Prep (Wood, Plaster, Concrete, Masonry, Metal & Others): Modify the surface preparation methods noted as necessary to suit your specific project conditions and to address health and environmental concerns (e.g. Existing lead based paint surfaces, substrates containing asbestos, etc.).
(continued on next page)

Modifications shall ensure that the proper precautions are taken in addition to ensuring proper paint adhesion is attained. Refer to guidance noted in Technical Memorandum #87 dated July 12, 1993.

Where existing acoustical tiles are to be repainted, their condition shall be

NOTES TO ARCHITECT

Remove all mildew and sterilize the surface to be painted using one of the following methods:

Apply a treatment solution composed of the following ingredients and in the noted proportions to the affected surface using a sponge or low-pressure sprayer:

2/3 cup TSP (Trisodium Phosphate)
1 quart household bleach
3 quarts warm water

Note: Household bleach shall not be mixed with ammonia or any detergents or cleaners containing ammonia as this will create a poisonous gas.

Scrub the surface as necessary to completely remove the mildew.

or,

Apply a commercial mildew treatment solution such as Purex, Jomax Remover or equal in strict accordance with the manufacturer's recommendations and instructions.

Following treatment, the surface shall be cleaned with potable water and allowed to thoroughly dry before priming, painting or the applying of sealing and caulking compounds.

carefully checked to ensure that its surface will support/accept being repainted. Sometimes the material's surface delaminates upon paint application.

Show areas of mildew on the building elevations and reflected ceiling plan.

Delete this section where not applicable.

3. **Cracks and openings found at joints and where different materials abut each other (e.g CMU / concrete, CMU or concrete / wood, etc.) shall be sealed with a caulking compound compatible with the substrate and primer/paint. The caulking shall be applied and allowed to set in accordance with the manufacturer's recommendations and instructions.**

Make a field check of existing door/jamb conditions. Where the space between the door and jamb is tight or if there are signs of binding or surface-to-surface contact, call for sanding of the door edge (wood doors) or adjustment of the door and/or frame (metal doors) to eliminate touching of newly painted surfaces.

B. Wood to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

NOTES TO ARCHITECT

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish. High pressure water washing as described in Section 3.01 A.1. above may be used for exterior surfaces.

Delete where not applicable.

3. Remove all mildew as noted in Section 3.01 A.2. above.

4. Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where the paint has been removed, sand the edges of scarred areas to a smooth feathered edge.

5. Wash all surfaces with a solution of T.S.P. (trisodium phosphate) and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair the bond of, or bleed through the new paint finish. After washing, rinse the surface with potable water and allow to thoroughly dry.

   Rinsing may be performed by high pressure water washing as noted in Section 3.01 A.1. above for exterior surfaces. However, any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

6. After cleaning and/or washing of the surface with water, the wood shall not be primed, painted or sealed unless it has been allowed to thoroughly dry for a minimum of 24 hours and until the moisture content of the wood is less than 15% when measured with an electronic moisture meter.

7. Fill holes (nail, tack, staple, etc.), cracks, open joints and other imperfections with appropriate compound and allow to set (door and trim included). Seal and caulk all openings which will permit the entrance of water. Sealing and caulking compounds shall be compatible with the substrate and primer/paint and shall be applied and allowed to set in accordance with the manufacturer's

NOTES TO ARCHITECT

recommendations and instructions.

8. Spot prime areas where bare wood or fill material is exposed with the specified primer and feather out onto adjacent paint.

Modify and amend the surface preparation requirements for Plaster, Concrete and Masonry as necessary to address efflorescence.

C. Plaster (Smooth and Sand Finish) to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

Delete where not applicable.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish. High pressure water washing as described in Section 3.01 A.1. above may be used for exterior surfaces.

Delete where not applicable.

3. Remove all mildew as noted in Section 3.01 A.2. above.

4. **Smooth plaster finish: Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where the paint has been removed, sand the edges of scarred areas to a smooth feathered edge.**

5. Wash all surfaces with a solution of T.S.P. and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair the bond of, or bleed through the new paint finish. After washing, rinse potable water and allow to thoroughly dry for a minimum of 24 hours.

   Rinsing may be performed by high pressure water washing as noted in Section 3.01 A.1. above for exterior surfaces. However, any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

6. Scarred plaster areas shall be patched with

spackling compound or taping system. Fill holes, cracks, open joints and damaged areas with vinyl base spackle or plaster patch. Apply texture, if required, to match existing textured surfaces.

7. Spot prime areas where plaster, fill or patch material is exposed with the specified primer and feather out onto adjacent paint.

D. Concrete **(Smooth Finish)** to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

Delete where not applicable.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish. High pressure water washing as described in Section 3.01 A.1. above may be used for exterior surfaces.

3. Remove all mildew as noted in Section 3.01 A.2. above.

4. Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where paint has been removed, sand the edges of scarred areas to a smooth feathered edge.

5. Wash all surfaces with a solution of T.S.P. and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair the bond of, or bleed through the new paint finish. After washing, rinse potable water and allow

to thoroughly dry for a minimum of 24 hours.

Rinsing may be performed by high pressure water washing as noted in Section 3.01 A.1. above for exterior surfaces. However, any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

6. Seal all cracks hairline to 1/8" in width with concrete patching compound. All cracks over 1/8" in width shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

7. All holes 1/4" in diameter or greater shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

8. Spot prime areas where bare concrete, seal or patch material is exposed with the specified primer and feather out onto adjacent paint.

E. Masonry Block to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

Delete where not applicable.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish. **High pressure water washing as described in Section 3.01 A.1. above may be used for exterior surfaces provided cracks and openings have been sealed to prevent**

water infiltration.

3. Remove all mildew as noted in Section 3.01 A.2. above.

4. Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where paint has been removed, sand the edges of scarred areas to a smooth feathered edge.

5. Wash all surfaces with a solution of T.S.P. and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair bond of, or bleed through the new paint finish. After washing, rinse potable water and allow to thoroughly dry for a minimum of 24 hours.

   Any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

6. Seal all cracks hairline to 1/8" in width with concrete patching compound. All cracks over 1/8" in width shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

7. All holes 1/4" in diameter or greater shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's

NOTES TO ARCHITECT

recommendations and instructions.

8. Spot prime areas where bare masonry, seal or patch material is exposed with the specified primer and feather out onto adjacent paint.

Delete where not applicable.

F. Ferrous Metal and Galvanized Metal

1. Remove from surfaces to be repainted all foreign matter such as tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky paint finish to an existing tight and firm finish.

If existing work is badly rusted and its removal would destroy it or compromise its integrity, call for its removal and replacement.

3. **Remove all mildew as noted in Section 3.01 A.2. above.**

4. Remove all rust, loose mill scale and loose and blistering paint by power tool chipping, de-scaling, sanding, wire brushing and grinding down to bare metal (only tightly adhering surface rust, mill scale and paint which cannot be removed with a dull putty knife remaining) in accordance with Steel Structures Painting Council (SSPC) Standard SP3. Care shall be taken so that the surface in not burnished during cleaning.

Specify specific surface prep. stds. such as those established by the Steel Structures Painting Council (SSPC) or the National Assoc. of Corrosion Engineers (NACE) where necessary to address specific project conditions and ensure proper paint adhesion. Require submittal of the referenced standard for use by the Inspector in checking acceptability of the surface prep.

5. Where the existing finish remains clean, tight and firm, prepare the surface by sanding. Where paint has been removed, sand scarred areas to a smooth feathered edge.

6. Completely wipe all surfaces with mineral spirits or other appropriate solution as required to remove accumulated film of wax, oil, grease, smoke, dust, dirt, chalky or other foreign matter which would impair the bond of, or bleed through the new **paint** finish.

For new CMU work, include back-rolling of

7. Allow the surfaces to thoroughly dry and immediately spot prime bare metal areas with the specified primer and feather out onto adjacent paint.

NOTES TO ARCHITECT

paint that has been spray-applied to the surface to ensure full coverage into holes and crevices.

3.02 PAINT APPLICATION

A. General

1. All work shall be done in a workmanlike manner by skilled and experienced mechanics and shall conform to the best painting practices.

2. All materials shall be applied in strict accordance with the manufacturer's specifications, including spread rates, and the finished surfaces shall be free from runs, sags, drops, ridges, waves, laps, streaks, brush marks and variations in color, texture and finish (glossy or dull). The coverage shall be complete and each coat shall be so applied as to produce a film of uniform thickness.

   No paint, varnish or enamel shall be applied until the preceeding coat is thoroughly dry and approved.

3. No exterior painting of unprotected surfaces shall be done in rainy, damp weather. Coats shall be applied only to surfaces that are thoroughly dry and only under such combination of humidity and temperature that will ensure proper paint application.

4. Any mixing shall be done outside the building.

Provide color schedule.

Program Bells shall be painted "Battleship Gray". Fire Bells shall be painted "Fire Engine Red".

B. Colors: Each coat shall be tinted a different shade from the preceding coat. Colors shall be in accordance with the following schedule:

3.03 MISCELLANEOUS

A. Installation of Removed Items: After completion of final paint coat, removed items shall be reinstalled.

B. Clean-up

NOTES TO ARCHITECT

1. During the progress of the work, all debris, empty crates, waste, drippings, etc. shall be removed by the Contractor and the grounds about the areas to be painted shall be left clean and orderly at the end of each work day.

2. Upon completion of the work, staging, scaffolding, containers and all other debris shall be removed from the site. All paint, shellac, oil, or stains splashed or spilled upon adjacent surfaces not requiring treatment (hardware, fixture, floor, glass) shall be removed and the entire job left clean and acceptable.

3. **Work to correct damage caused by overspray and punchlist items shall be performed during non-school or non-business hours if the work will inconvenience the building occupants. Where necessary for access during non-school or non-busines hours, the Contactor shall pay for custodial staff to gain entry and to secure the building.**

Delete this paragraph for other than school or University projects.

C. Extra Paint

The Contractor shall provide extra paint in each of the different colors of exterior and interior paint used for walls, wainscot, eaves and ceiling to the school upon completion of the project. The paint shall be in unopened one gallon cans and shall be in the quantities listed below:

1. Paint used over large areas, such as the exterior of the building and in several classrooms - 5 gallons of each color.

2. Paint used in single room areas and in small areas, such as bathrooms and doors - 1 gallon of each color.

NOTES TO ARCHITECT

END OF SECTION

SECTION 09920 - REPAINTING (INTERIOR)

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

A. Inspection and Approvals: The Contractor shall obtain written approval from the Engineer upon completion of each phase of work (phases of work are: surface preparation and spot prime, prime, first finish coat, second finish coat) before proceeding into the next phase or work. The Contractor shall give the Engineer one day (24 hours minimum) advance notice of completion of any phase of work for a work area when he deviates from the previously-submitted work schedule noted under Section 1.03 C. The Contractor shall provide necessary access to areas to be inspected.

Failure to obtain approval of any phase of work for a work area may result in redoing the operation at no cost to the State.

B. Right of Rejection: The Engineer shall have the right to reject all work which is not in compliance with the plans and specifications. Rejected work shall be redone at no cost to the State.

In addition, the Engineer shall have the right to require the immediate removal of any paint applicator who demonstrates negligence, lack of competence or repeated non-compliance with the contract requirements.

1.03 SUBMITTALS

A. Schedule of Finishes

1. 4 sets of the proposed painting finish schedule shall be submitted to the Engineer for approval. The schedule shall indicate the **spread rate** at which the proposed paint / coating will be applied to achieve the final dry film thickness indicated on the Schedule

NOTES TO ARCHITECT

This specification covers repainting work only. The requirements noted herein should be modified to address the painting of new work where included in your project.

Note:
1) Guidance regarding the use of airless spraying should be included in new CIP projects and CIP renovation projects.
2) Airless spraying restrictions noted herein should not be applied to new 1st increment projects.
3) Per Cen.Svc. request, airless spraying shall not be used for R&M and R&A projects at this time. The specification shall be modified as necessary to require application by brush and roller.

When special paints and/or coatings having objectionable odors are specified (e.g. epoxy paints), they shall be applied after business hours or special ventilation shall be provided to ensure these odors do not adversely affect the occupants of the building. The design consultant shall be responsible for the identification of these paints and for the inclusion of the necessary precautions in their design.

of Finishes under Section 2.02.

NOTES TO ARCHITECT

Modify the "phases of work" to conform to the number of coats selected for your project.

(See the following page for additional "Notes" regarding failure of existing paint.)

B. Color Samples

1. 3 sets of each color finish sample shall be submitted to the Engineer for approval.

2. After the color finish sample has been approved, one set of color finish samples painted onto 8-1/2" x 11" cardboard shall be submitted to the Engineer. The cardboard shall be divided into 4 horizontal strips and painted as follows:

   a. Prime 3 strips starting from the bottom.

   b. 1st coat bottom 2 strips.

   c. 2nd coat bottom strip.

Where the existing paint finish has failed (e.g. blistering, peeling, efflorescence, etc.), determine the cause of the failure (e.g. water infiltration, lack of waterproofing, paint incompatibility, etc.) and address its correction to ensure proper paint adhesion.

Show areas of paint failure on the drawings.

Modify paragraph **B.2** as necessary based on the number of coats required. (See "Notes to Architect" under Sub-Section 1.0**7** D.)

C. Schedule of Operations: Before work on the project is commenced, 4 complete sets of a work schedule showing his sequence of opertions and dates shall be submitted by the Contractor to the Engineer.

D. Certifications: 4 copies of asbestos-free, lead-free, zinc-chromate-free, strontium-chromate-free, cadmium-free and mercury-free paint certificates shall be submitted to the Engineer. Should the Contractor require additional copies for distribution to his suppliers and sub-contractors, he shall include these additional copies along with his submittal.

E. Manufacturer's Product Data Sheets: 4 copies of the Manufacturer's Product Data Sheets for the primers, paints, coatings, solvents, sealing and patching materials, sealants and caulking shall be submitted to the Engineer. Data sheets shall indicate thinning and mixing instructions, required film thickness (mil) and application

Paragraph **D**, **F**, and **G** includes guidance noted

NOTES TO ARCHITECT

instructions. Should the Contractor require additional copies for distribution to his suppliers and sub-contractors, he shall include these additional copies along with his submittal.

in Technical Memorandum #77 dated Rev. Oct. 20, 1992.

F. Manufacturer's Material Safety Data Sheets: 4 copies of the Manufacturer's Material Safety Data Sheets for coatings, solvents, and other hazardous materials shall be submitted to the Engineer. Should the Contractor require additional copies for distribution to his suppliers and sub-contractors, he shall include these additional copies along with his submittal.

Delete this paragraph for other than school and University projects. See also Sub-Section 3.03 C. Note: This incorporates guidance noted under Technical Memorandum #77 dated Rev. Oct. 20, 1992.

G. Receipt of Delivery: 3 copies of the receipt signed by the user's representative, attesting to delivery of extra paint as required under Sub-Section 3.03 C - Extra Paint shall be submitted to the Engineer.

H. Standards: 3 copies of the Surface Preparation Standards referenced under Section 3.01 Surface Preparation.

I. Comprehensive Spray Plan: Where the Contractor proposes to employ airless spraying, a Comprehensive Spray Plan including the following information shall be submitted to the Engineer for approval:

1. Documentation that the individual spray applicator(s) on the project have completed an approved "Spray Applicator Certification Program".

2. The overspray protection methods proposed.

3. The spray application instructions and recommendations of the paint manufacturer he proposes to use.

Delete this paragraph where the building is not centrally air-conditioned.

4. Proposed scheduling of existing air-conditioning and ventilation equipment shut-

down and/or covering of existing air intake, return and diffuser grilles.

J. Certificate of Public Liability and Property Damage Insurance

1.04 ANALYZING AND TESTING

All paints **and their applied thickness** shall be subject to **testing** whenever the Engineer deems necessary to determine conformation to the requirements of these specifications. **Should testing by a laboratory be required, the laboratory shall be selected by the State and the cost of testing shall be borne by the Contractor. However, should test results show that the paint is in compliance with this specifications, the cost will be borne by the State.**

All rejected material shall be removed from the job site immediately. Surfaces painted with the rejected material shall be redone at no additional cost to the State.

Where the required paint thickness is deficient, the affected surface(s) shall be recoated as necessary to provide the required paint thickness at no additional cost to the State.

1.05 QUALITY ASSURANCE

Where the Contractor proposes to employ airless spraying, the applicator(s) shall have completed an approved "Spray Applicator Certification Program" conducted by the Painting Industry of Hawaii.

As a minimum, the certification shall include material and equipment selection, use and maintenance, hands-on application and safety training.

1.06 GUARANTY

A. The Contractor shall guarantee that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship performed by the

Contractor. Such guarantee shall continue for a period of 2 years from the date of project acceptance during which period the Contractor shall remedy at his own expense any such failure to conform or any such defect.

B. The State shall notify the Contractor in writing within a reasonable time after discovery of any failure or defect.

C. Should the Contractor fail to remedy any failure or defect described in Paragraph A above within 10 working days after receipt of notice thereof, the State shall have the right to repair or otherwise remedy such failure or damage at the Contractor's expense.

1.07 SPECIAL REQUIREMENTS

A. Codes: The Contractor shall comply with the State OSHL (Occupational Safety and Health Law) and all pollution control regulations of the State Department of Health.

B. Protection

1. Persons

a. The Contractor shall take all necessary precautions to protect public pedestrians including tenants from injury.

b. The Contractor shall provided, erect and maintain safety barricades around scaffolds, hoists and wherever Contractor's operations create hazardous conditions in order to properly protect the public and tenants.

2. Completed Work: The Contractor shall provide all necessary protection for wet paint surfaces.

3. Protective Covering **and Enclosures**: The Contractor shall provide and install protective covering over furniture, equipment, floor and other areas that are not scheduled for treatment. Protective covering shall be clean sanitary drop cloth or plastic sheets. Paint applied to surfaces not scheduled for treatment shall be completely removed and surfaces shall be returned to their original condition.

   Where paint application will be performed by use of airless spraying, the Contractor shall ensure that protective enclosures are erected to prevent the escape of overspray from the work area.

4. Safeguarding of Property: The Contractor shall take whatever steps may be necessary to safeguard his work and also the property of the State and other individuals in the vicinity of his work area during the execution of this Contract. He shall be responsible for and make good on any and all damages and for losses to work or property caused by his or his employee's negligence. **Where the damaged property cannot be cleaned and restored to its original condition (i.e. prior to being damaged) it shall be replaced with a new product of equal quality. No proration or use of "used" products will be permitted.**

   a. The Contractor shall assume that cars will not be temporarily relocated from parking areas during spray painting work.

   b. Paint overspray shall not carry more than 5 l.f. beyond the building eave line nor within 10 l.f. of pedestrians or property and surfaces not scheduled to be painted.

   Spray painting shall immediately cease when overspray carries beyond these specified limits and will not continue until protective barriers are erected to properly contain the overspray and damages

NOTES TO ARCHITECT

caused by the overspray have been corrected.

c. The Contractor shall be assessed $300.00 for each incidence of property or personal damage caused by overspray until such time that a satisfactory settlement has been agreed upon by the damaged party and corrective action has been completed. All corrective action shall be settled within 24 hours from the time the damage is discovered.

Should the Contractor fail to take corrective action in a timely and expeditious manner, the Engineer shall contact the Contractor's Insurance company to seek resolution on the matter.

5. Fire Safety: The Contractor shall direct his employees not to smoke in the vicinity and exercise precautions against fire at all times. Waste rags, plastic (polyester sheets), empty cans, etc. shall be removed from the site at the end of each day.

C. Storage Area for Materials: No paint material, empty cans, paint brushes and rollers may be stored in the building(s). They shall be stored in separate storage facilities away from the building(s).

The Contractor may furnish a job site storage facility. Such facility shall comply with the requirements of the local Fire Department. The storage area shall be kept clean and the facility shall be locked when not in use or when no visual supervision is possible.

D. Sequence of Operations: The sequence of operations shall divide the surfaces into work areas and present a schedule for:

1. Surface preparation and spot prime.

2. Prime coat.

3. First finish coat.

4. Second finish coat.

Modify the number of coats required based on the condition of the existing painted surface e.g.:
€ Full priming of the surface is not necessary if the existing paint surface is tight, not chalky and is to be repainted with a paint of similar type and color.
€ For interior surfaces to be repainted in similar color, only one finish coat is required.

Note: Compatibility between the new and existing paint is essential. **It is the consultant's responsibility to verify the type of existing paint. If unknown, an appropriate oil-based primer shall be specified.**
Note: This amends and includes guidance noted

NOTES TO ARCHITECT

Minimum work area shall be the complete inside surfaces of one room.

in Technical Memorandum #22 dated 8/11/75.

Select applicable items. Complete by indicating the number of buildings and building designations.

1.08 AREAS (SURFACES/STRUCTURES) TO BE PAINTED

A. Structures:

1. _____ buildings, Building _____, _____, _____, _____, complete interior surfaces.

2. Miscellaneous.

Show the full extent of repainting work on the drawings.

B. Surfaces to be Painted: All existing interior painted surfaces shall be painted unless otherwise indicated on the plans and/or specifically deleted in these specifications.

Add reference to new surfaces if applicable to your project.

Interior surfaces to be painted shall be those surfaces not exposed to weather in an area enclose by 4 walls.

Also, a surface shall be considered an interior surface and painted as such whenever the color is that of the existing interior color.

Select applicable items. Add other items to suit field conditions.

Extent of treatment for special items is as follows:

1. Ceiling - as indicated on plans.

2. Closets and cabinets with doors - interior surfaces shall not be treated unless specifically noted.

3. Doors (including closet) - both faces, top and side edges. Cabinet doors - both faces and all edges.

4. Wood vanes of jalousies - refer to exterior work.

NOTES TO ARCHITECT

5. All movable furniture such as portable bookshelves, cubicles and cabinets shall not be painted.

1.09 **OTHER INCIDENTAL WORK TO BE PERFORMED BY CONTRACTOR**

A. Interior

1. Unless otherwise specified, the Contractor is responsible for moving about all furniture and equipment to provide himself with sufficient working space.

   The Contractor shall protect these items and make good any damage to them at no cost to the State. After the painting of the room is completed, the Contractor shall replace all furniture and equipment to their original locations.

Field verify items which will require removal and modify spec as needed.
Note:
1) The DAGS Project Coordinator shall advise the user that items such as pictures, charts, etc. should be removed and reinstalled by the teachers or maintenance staff.
2) The DAGS Project Coordinator shall keep the user apprised on the status and scheduling of the project, including cancellation, should it occur. In the event of cancellation, this will save the user from going through the trouble of packing and fustration when the project is not done.

2. The Contractor shall carefully remove **and neatly store away or properly protect in-place curtains, blinds and _____. Removed items shall be reinstalled at the completion of the work.**

3. All items on shelving and in cabinets to be painted will be removed by the user personnel prior to painting work.

B. Areas Inaccessible to Normal Painting: The Contractor shall:

Paragraph 1.09 B.:
Include additional items to suit field conditions. Delete if not required.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lead Prohibition: All paints shall be lead-free.

B. Mercury Prohibition: All paint shall be mercury-free.

C. Chromate Prohibition: All paint shall be free of zinc-chromate and/or strontium-chromate.

D. Cadmium Prohibition: All paint shall be cadmium-free.

NOTES TO ARCHITECT

E. Material shall be equal in quality to that specified under the Schedule of finishes and any given finish shall be as labeled by one manufacturer.

F. All materials shall be delivered to the job site in undamaged original containers bearing the manufacturer's label and shall be stored in such a manner as to prevent damage. All rejected materials shall be removed from the job site immediately.

Add "Mameco International, Inc., Sonneborn Building Products and VIP Waterproofing Coatings" when waterproof coatings are specified.

G. Paints shall be as manufactured by Ace, Benjamin Moore, Cabot's, Carboline, Dupont, Dutch Boy, **Fine Line Paint Corp., ICI Ameritone, ICI Decratrend, ICI Devoe, ICI Dulux, ICI Fuller-O'Brien, ICI Glidden, ICI Sinclair**, Martin Senour, Olympic Stain, Pervo, Pittsburg, Porter Intl., Pratt & Lambert, Rust-Oleum, Sherwin-Williams, Smiland (Styletone), Spectra-Tone, Thoro Systems, Tnemec, United Paint and Coatings or approved equal.

H. Thinning of paint shall be done using material recommendedby the manufacturer. Mix proprietary products according to manufacturer's printed specifications. Compound thinner, mineral oil, kerosene, refined linseed oil, or gasoline shall not be used for thinning.

Finish Schedule: Provide a Color and Finish Schedule as part of the Bidding Documents. Colors selected should not require unnecessary maintenance to present a clean appearance. The colors selected shall also be agreeable with DAGS and the User Agency. Refer to guidance noted in Technical Memorandum #44 dated March 22, 1993. Gloss or Semi-Gloss finish paints shall be used for interior and exterior work. Flat finish paints shall not be used unless approved by DAGS Central Services

I. Except for metal primers all paint shall contain the maximum amount of mildewcide per gallon of paint permitted by the mildewcide manufacturer without adversely affecting the quality of the paint.

J. The supplier shall submit a signed certificate indicating the amounts of mildewcide added by both the paint manufacturer and the paint supplier.

2.02 SCHEDULE OF FINISHES

A. The Schedule of Finishes is made for the convenience of the Contractor and indicates the types and quality of finishes to be applied to the surfaces.

B. Any existing painted surfaces not specifically

noted in the finish schedule shall be finished to match adjoining work.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. General

1. Mildew Removal

Remove all mildew and sterilize the surface to be painted using one of the following methods:

Apply a treatment solution composed of the following ingredients and in the noted proportions to the affected surface using a sponge or low-pressure sprayer:

2/3 cup TSP (Trisodium Phosphate)
1 quart household bleach
3 quarts warm water

Scrub the surface as necessary to completely remove the mildew.

Note: Household bleach shall not be mixed with ammonia or any detergents or cleaners containing ammonia as this will create a poisonous gas.

or,

Apply a commercial mildew treatment solution such as Purex, Jomax Remover or equal in strict accordance with the manufacturer's recommendations and instructions.

Following treatment, the surface shall be cleaned with potable water and allowed to thoroughly dry before priming, painting or the applying of sealing and caulking compounds.

3. Cracks and openings found at joints and where different materials abut each other (e.g CMU

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Division. To facilitate matching, hardwood surfaces shall be stained before receiving a clear finish. Note: This amemds and includes guidance noted in Technical Memorandum #22 dated August 25, 1975.

In addition, unless required for a particular application, oil-based paints should not be specified, [oil-based paints tend to discolor (i.e. yellow) over time and creates adhesion problems on re-painting projects]. Saponification (reaction between the oil & alkaline conditions) is also a potential problem.

For projects on the Big Island, refer to Tech Memo #104 dated 12/31/97 regarding the provision of alkali resistant primers and #112 dated 08/20/96 regarding roof paints.

Indicate the required dry mil thickness of the specified paint on the schedule.

Surface Prep (Wood, Plaster, Concrete, Masonry, Metal & Others): Modify the surface preparation methods noted as necessary to suit your specific project conditions and to address health and environmental concerns

NOTES TO ARCHITECT

/ concrete, CMU or concrete / wood, etc.) shall be sealed with a caulking compound compatible with the substrate and primer/paint. The caulking shall be applied and allowed to set in accordance with the manufacturer's recommendations and instructions.

(e.g. Existing lead based paint surfaces, substrates containing asbestos, etc.). Modifications shall ensure that the proper precautions are taken in addition to ensuring proper paint adhesion is attained. Refer to guidance noted in Technical Memorandum #87 dated July 12, 1993.

B. Wood to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish.

Where existing acoustical tiles are to be repainted, their condition shall be carefully checked to ensure that its surface will support/accept being repainted. Sometimes the material's surface delaminates upon paint application.

3. Remove all mildew as noted in Section 3.01 A.1. above.

Show areas of mildew on the building elevations and reflected ceiling plan.

4. Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where the paint has been removed, sand the edges of scarred areas to a smooth feathered edge.

5. Wash all surfaces with a solution of T.S.P. (trisodium phosphate) and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair the bond of, or bleed through the new paint finish. After washing, rinse the surface with potable water and allow to thoroughly dry.

   Any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

Delete paragraph B.3 where not applicable.

Make a field check of existing door/jamb conditions. Where the space between the door and jamb is tight or if there are signs of binding or surface-to-surface contact, call for sanding of the door edge (wood doors) or adjustment of the door and/or frame (metal doors) to eliminate touching of newly painted surfaces.

6. After cleaning and/or washing of the surface with water, the wood shall not be primed, painted or sealed unless it has been allowed to thoroughly dry for a minimum of 24 hours and until the moisture content of the wood is less than 15% when measured with an electronic moisture meter.

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7. Fill holes (nail, tack, staple, etc.), cracks, open joints and other imperfections with appropriate compound and allow to set (door and trim included). Seal and caulk all openings which will permit the entrance of water. Sealing and caulking compounds shall be compatible with the substrate and primer/paint and shall be applied and allowed to set in accordance with the manufacturer's recommendations and instructions.

8. Spot prime areas where bare wood or fill material is exposed with the specified primer and feather out onto adjacent paint.

Modify and amend the surface preparation requirements for Plaster, Concrete and Masonry as necessary to address efflorescence.

C. Plaster (Smooth and Sand Finish) to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish.

Delete where not applicable.

3. Remove all mildew as noted in Section 3.01 A.1. above.

Delete where not applicable.

4. **Smooth plaster finish: Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where the paint has been removed, sand the edges of scarred areas to a smooth feathered edge.**

5. Wash all surfaces with a solution of T.S.P. and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair the bond of, or bleed through the new paint finish. After washing, rinse potable water and allow to thoroughly dry for a minimum of 24 hours.

   Any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

6. Scarred plaster areas shall be patched with spackling compound or taping system. Fill holes, cracks, open joints and damaged areas

NOTES TO ARCHITECT

with vinyl base spackle or plaster patch. Apply texture, if required, to match existing textured surfaces.

7. Spot prime areas where plaster, fill or patch material is exposed with the specified primer and feather out onto adjacent paint.

D. Concrete **(Smooth Finish)** to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish.

Delete where not applicable.

3. Remove all mildew as noted in Section 3.01 A.1. above.

4. Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where paint has been removed, sand the edges of scarred areas to a smooth feathered edge.

5. Wash all surfaces with a solution of T.S.P. and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair the bond of, or bleed through the new paint finish. After washing, rinse potable water and allow to thoroughly dry for a minimum of 24 hours.

   Any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

6. Seal all cracks hairline to 1/8" in width with concrete patching compound. All cracks over 1/8" in width shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

NOTES TO ARCHITECT

7. All holes 1/4" in diameter or greater shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

8. Spot prime areas where bare concrete, seal or patch material is exposed with the specified primer and feather out onto adjacent paint.

E. Masonry Block to be Repainted

1. Remove from surfaces to be repainted all foreign matter such as nails, screws, staples, tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky finish to an existing tight and firm finish.

Delete where not applicable.

3. Remove all mildew as noted in Section 3.01 A.1. above.

4. Where the existing finish remains tight and firm, prepare the surface by lightly sanding. Where paint has been removed, sand the edges of scarred areas to a smooth feathered edge.

5. Wash all surfaces with a solution of T.S.P. and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair bond of, or bleed through the new paint finish. After washing, rinse potable water and allow to thoroughly dry for a minimum of 24 hours.

   Any lifting of the paint or scarring caused by this rinsing operation shall be resanded to a feathered edge.

NOTES TO ARCHITECT

6. Seal all cracks hairline to 1/8" in width with concrete patching compound. All cracks over 1/8" in width shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

7. All holes 1/4" in diameter or greater shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with the manufacturer's recommendations and instructions.

8. Spot prime areas where bare masonry, seal or patch material is exposed with the specified primer and feather out onto adjacent paint.

F. Ferrous Metal and Galvanized Metal

1. Remove from surfaces to be repainted all foreign matter such as tape and gum.

2. Remove all loose, blistered, scaled, crazed or chalky paint finish to an existing tight and firm finish.

3. **Remove all mildew as noted in Section 3.01 A.1. above.**

Delete where not applicable.

4. Remove all rust, loose mill scale and loose and blistering paint by power tool chipping, de-scaling, sanding, wire brushing and grinding down to bare metal (only tightly adhering surface rust, mill scale and paint which cannot be removed with a dull putty knife remaining) in accordance with Steel Structures Painting Council (SSPC) Standard SP3. Care shall be taken so that the surface

If existing work is badly rusted and its removal would destroy it or compromise its integrity, call for its removal and replacement.

Specify specific surface prep. stds. such as those established by the

NOTES TO ARCHITECT

in not burnished during cleaning.

5. Where the existing finish remains clean, tight and firm, prepare the surface by sanding. Where paint has been removed, sand scarred areas to a smooth feathered edge.

6. Completely wipe all surfaces with mineral spirits or other appropriate solution as required to remove accumulated film of wax, oil, grease, smoke, dust, dirt, chalky or other foreign matter which would impair the bond of, or bleed through the new **paint** finish.

Steel Structures Painting Council (SSPC) or the National Assoc. of Corrosion Engineers (NACE) where necessary to address specific project conditions and ensure proper paint adhesion. Require submittal of the referenced standard for use by the Inspector in checking acceptability of the surface prep.

7. Allow the surfaces to thoroughly dry and immediately spot prime bare metal areas with the specified primer and feather out onto adjacent paint.

For new CMU work, include back-rolling of paint that has been spray-applied to the surface to ensure full coverage into holes and crevices.

3.02 PAINT APPLICATION

A. General

1. All work shall be done in a workmanlike manner by skilled and experienced mechanics and shall conform to the best painting practices.

2. All materials shall be applied in strict accordance with the manufacturer's specifications, including spread rates, and the finished surfaces shall be free from runs, sags, drops, ridges, waves, laps, streaks, brush marks and variations in color, texture and finish (glossy or dull). The coverage shall be complete and each coat shall be so applied as to produce a film of uniform thickness.

   No paint, varnish or enamel shall be applied until the preceeding coat is thoroughly dry and approved.

3. Coats shall be applied only to surfaces that are thoroughly dry and only under such combination of humidity and temperature that will ensure proper paint application.

4. Any mixing shall be done outside the building.

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B. Colors: Each coat shall be tinted a different shade from the preceding coat. Colors shall be in accordance with the following schedule:

Provide color schedule.

Program Bells shall be painted "Battleship Gray". Fire Bells shall be painted "Fire Engine Red".

3.03 MISCELLANEOUS

A. Installation of Removed Items: After completion of final paint coat, removed items shall be reinstalled.

B. Clean-up

1. During the progress of the work, all debris, empty crates, waste, drippings, etc. shall be removed by the Contractor and the grounds about the areas to be painted shall be left clean and orderly at the end of each work day.

2. Upon completion of the work, staging, scaffolding, containers and all other debris shall be removed from the site. All paint, shellac, oil, or stains splashed or spilled upon adjacent surfaces not requiring treatment (hardware, fixture, floor, glass) shall be removed and the entire job left clean and acceptable.

3. Work to correct damage caused by overspray and punchlist items shall be performed during non-school or non-business hours if the work will inconvenience the building occupants. Where necessary for access during non-school or non-busines hours, the Contactor shall pay for custodial staff to gain entry and to secure the building.

C. Extra Paint

Delete this paragraph

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for other than school or University projects.

The Contractor shall provide extra paint in each of the different colors of exterior and interior paint used for walls, wainscot, eaves and ceiling to the school upon completion of the project. The paint shall be in unopened one gallon cans and shall be in the quantities listed below:

1. Paint used over large areas, such as the exterior of the building and in several classrooms - 5 gallons of each color.

2. Paint used in single room areas and in small areas, such as bathrooms and doors - 1 gallon of each color.

END OF SECTION

NOTES TO ARCHITECT

DIVISION 10 - SPECIALITIES

SECTION 10100 - CHALKBOARDS AND TACKBOARDS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 SUBMITTALS

Submit six sets of the following within 15 days after Notice to Proceed, for approval by Engineer.

A. Shop Drawings and Product Data:

1. Shop drawings with construction and installation details.

2. Manufacturer's brochures with specifications and installation instruction.

B. Material Samples and Samples for Color Selection:

1. Manufacturer's samples of facing material for color and material selection.

1.03 ORDERING

Because these are long lead items, tackboards, chalkboards and all accessories shall be ordered within ten (10) days after approval of shop drawings, materials and color samples.

1.04 QUALITY ASSURANCE

A. Manufacturer's Standard of Quality:

1. To establish type and standard of quality, the specified product is manufactured by Claridge Products and Equipment, Inc.

1.05 PRODUCT HANDLING

Materials shall be delivered and stored with adequate protection against damage.

NOTES TO ARCHITECT

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of the following manufacturers or approved equal are acceptable provided they meet the materials, construction and the standard of quality specified.

1. Claridge Products and Equipment.

2. Gotham Educational Equipment Co.

3. Carolina Chalkboard Co.

4. Nelson-Adams Co.

5. Bes-Tile Mfg. Co.

6. Lemco Corp.

7. Greensteel, Inc.

8. Chatfield-Clarke Co.

2.02 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Chalkboard: 1/4" thick treated tempered hardboard with baked-on writing surface of resinous compound or enamel. Writing surface shall be washable.

C. Map and Display Rails: Approximately 1" wide, extruded aluminum with 1/4" thick cork insert. Mount rail over the full length of chalkboards only.

D. Map Hooks: Aluminum map hooks with spring clip to slide on map rail. Provide one (1) hook for each three (3) feet of map rail, with a minimum four hooks per rail.

Do not use porcelain enamel MATERIALS steel chalkboard. Also, do not use aluminum perimeter trims and chalk-rails, which shall be of hardwood.

NOTES TO ARCHITECT

E. Flagholder: Aluminum, one per classroom in elementary school only.

F. H-Bar: Aluminum joint extrusion, with exposed surface in color matching that of chalkboard.

G. Tackboard: 1/4" thick resilient cork composition with vinyl fabric face with washable surface.

Do not use tackboard with burlap backing exposed, as the backing is stamped with the manufacturer's name in indelible ink.

H. Finish and Color: Chalkboard and tackboard finish and color shall be selected from manufacturer's standard color range, consisting of minimum 5 different available colors for each chalkboard and tackboard.

PART 3 - EXECUTION

3.01 INSPECTION

A. The installer shall examine the areas and conditions under which chalk and tackboards are to be installed. Should any condition be found unsuitable, no work shall be done until the unsatisfactory conditions have been corrected and are acceptable to the installer. Proceeding with work will imply acceptance of the conditions by the installer.

3.02 INSTALLATION

A. Installation of moistureproofing, furring strips, fiberboard backing, wood trims and chalkrails is specified under Carpentry Section.

Be sure to specify moistureproofing, furring strips, fiberboard backing, etc. in the Carpentry Section.

B. Chalkboard and tackboards shall be installed in strict accordance with the manufacturer's instructions for gluing onto fiberboard backing.

C. Chalkboards shall be installed in single lengths up to 12'. Longer boards shall be divided into 2 equal lengths. Joining shall be done in accordance with manufacturer's standards. Tackboards shall be installed in single lengths.

D. Surfaces shall be absolutely flat without any

buckling, bending, sagging or looseness.

E. Chalkboards shall be carefully washed with hot, soapy water and rinsed. After it has dried, the writing surface shall be completely chalked with good quality chalk, then erased with a clean chalkboard eraser.

END OF SECTION

NOTES TO ARCHITECT

SECTION 10161 - LAMINATED PLASTIC, SOLID PLASTIC AND PHENOLIC PLASTIC TOILET PARTITIONS AND URINAL SCREENS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 WORK DESCRIPTION

Work under this section shall include but not be limited to the following:

Floor and wall anchored laminated plastic, solid plastic and phenolic laminated plastic toilet compartment doors and partitions and urinal screens.

Specify toilet paper holders under "Toilet Accessories" in Specialties Section. Specify folded-paper type for schools. Handicap Accessible stalls shall be provided with roll-type dispensers.

1.03 COORDINATION WITH OTHER SECTIONS

Coordinate the installation of doors and partitions with grab bars, toilet tissue dispensers, sanitary napkin disposal receptacles, etc. noted under Section 10800 - TOILET AND BATH ACCESSORIES.

1.04 REFERENCES

The publications listed below form a part of this specification:

A. Americans with Disabilities Act (ADA) Accessibility Guidelines, 36 C.R.F. Pt. 1191.

B. Children's Design Guidelines prepared by the State of Hawaii Architectural Access Committee.

C. National Electrical Manufacturers Association Standards LD 3.1 - Performance, Application, Fabrication, and Installation of High-Pressure Decorative Laminates.

D. American Society for Testing and Materials (ASTM) E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

Delete either paragraph "A" or "B" if it does not apply to your project. Also amend paragraph 1.05 B below.

1.05 GENERAL REQUIREMENTS

A. The contractor shall visit the job site to

Delete for new projects.

NOTES TO ARCHITECT

verify the site conditions and dimensions prior to submitting his bid.

B. Toilet compartments which are accessible to the physically handicapped shall be in conformance with the criteria noted in the Americans with Disabilities Act (ADA) Accessibility Guidelines and the Children's Design Guidelines.

1.06 SUBMITTALS

The contractor shall submit the following to the Engineer:

A. 4 sets of laminated plastic, solid plastic or phenolic plastic samples for color selection.

B. 3 sets of the proposed (selected) manufacturer's current brochures, specifications and shop drawings showing construction and installation details. Drawings shall indicate the elevations of partitions/screens, hardware, fittings, mounting brackets, proposed method of anchoring, and other related items and installation details.

C. Manufacturer's certificate attesting that his materials meet or exceed the specified requirements.

1.07 PRODUCT HANDLING

A. Materials shall be delivered to the job-site in their original sealed containers bearing the name of the manufacturer and brand designation.

B. Items shall be delivered and stored in a manner that ensures they will be protected against damage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The products of the following manufacturers are acceptable provided they meet the materials and construction specified and are installed as specified hereinafter:

1. Ampco Products Inc.

Delete manufacturers and partition types which are not applicable to your project.

Laminated plastic partitions shall be used

		NOTES TO ARCHITECT
	(Laminated Plastic & Phenolic Plastic)	only in Elementary Schools and within Staff Toilets. (Note: Ensure plywood core is provided under shop dwg. submittal.) Solid Plastic and Phenolic Plastic may also be used. Solid Plastic & Phenolic Plastic partitions shall be used in Intermediate and High Schools.
2.	Accurate Partitions Corp. (Laminated Plastic & Phenolic Plastic)	
3.	Bobrick Washroom Equipment, Inc. (Phenolic Plastic)	
4.	Capitol Partitions, Inc. (Phenolic Plastic & Solid Plastic)	
5.	Columbia Partitions, Inc. (Phenolic Plastic)	
6.	Comtec Industries, Inc. (**Solid** Plastic)	Add'n of Comtec, Ind. Inc incorporates guidance noted under Tech Memo #98 dated May 16, 1994.
7.	DesignRite Partitions (Phenolic Plastic)	
8.	Flush Metal Partition Corp. (Laminated Plastic & Phenolic Plastic)	
9.	Gamco (Phenolic Plastic)	
10.	General Partitions Manufacturing Corp. (Phenolic Plastic)	
11.	Global Steel Products Corp. (Laminated Plastic & Phenolic Plastic)	
12.	Knickerbocker Case Corp., Inc. (Laminated Plastic & Phenolic Plastic	
13.	Pioneer Plastics Corporation (Phenolic Plastic)	
14.	Metpar Steel Products Corp. (Phenolic Plastic)	
15.	Sanymetal Products Co. (Phenolic Plastic)	
16.	Weis / Robart Partitions, Inc.	

NOTES TO ARCHITECT

(Phenolic Plastic)

B. The products of other manufacturers are acceptable provided they meet or exceed the material and construction requirements specified hereinafter and are prequalified.

Delete those partition types which do not apply to your job. See para. 2.01 Notes to Architect above regarding selection of partition types.

2.02 MATERIALS AND CONSTRUCTION

A. General: Compartments shall be of the type and size specified and as shown on the plans.

B. Laminated Plastic Doors, Partitions, Stiles and Pilasters:

Detail type of partition and show dimensions on plans. (Ceiling-hung type shall not be used.)

1. Shall consist of min. 0.050" thick laminated plastic bonded under pressure to all surfaces and edges of a core of exterior A-B grade plywood in accordance with NEMA standards.

2. Plastic Laminate shall have a Class A or B Flame Spread Rating and a maximum Smoke Developed Rating of 450 in conformance with ASTM E 84.

3. Moisture and fungus resistant, thermo-setting adhesives shall be used. Contact cements shall not be permitted.

4. Joints in the plastic laminate shall be carefully sealed to ensure watertightness.

C. Solid Plastic Doors, Partitions, Stiles and Pilasters:

1. Shall be fabricated from polymer resins formed under high pressure into a single component section which is waterproof and non-absorbent. The color shall extend from the surface through the entire thickness of the panel.

2. The exposed finish surfaces shall be self-lubricating; smooth; waterproof; non-absorbent; stain, chemical and graffiti resistant.

3. Solid plastic shall have a Class A or B Flame Spread Rating and a maximum Smoke Developed Rating of 450 in conformance with ASTM E 84.

4. Edges shall be machined to a radius of 1/16" min. and shall be free of saw marks.

D. Phenolic Plastic Doors, Partitions, Stiles and Pilasters:

1. Shall be fabricated with a solid phenolic core of multiple resin-impregnated kraft paper sheets with a matte finish melamine surface fused under high temerature and pressure.

2. The exposed finish surfaces shall be self-lubricating; smooth; waterproof; non-absorbent; stain, chemical and graffiti resistant.

3. Phenolic Plastic shall have a Class A or B Flame Spread Rating and a maximum Smoke Developed Rating of 450 in conformance with ASTM E 84.

4. Edges shall be machined smoothed with 1/16" radius corners.

E. Doors:

1. Laminated plastic doors shall be a minimum of 7/8" thick.

2. As an alternative, doors may be of solid plastic a minimum of 1" thick or phenolic plastic a minimum of 3/4" thick.

3. Unless otherwise noted on the drawings, a minimum clear door opening width of 32" shall be provided at the door leading to a handicap

accessible toilet stall. This clear width shall be measured between the edge of the door bumper/keeper and the face of the door when opened 90 degrees.

F. Partitions, Stiles and Pilasters:

1. Laminated plastic partitions shall be a minimum of 7/8" thick. Stiles and pilasters shall be a minimum of 1-1/4" thick unless supplied with a steel reinforced core.

2. Pilasters and stiles for overhead-braced compartments shall have adjustable floor anchors with leveling devices, studs, and locking nuts to firmly secure pilasters and stiles to the floor.

3. As an alternative, partitions, stiles and pilasters may be of solid plastic a minimum of 1" thick or phenolic plastic having partitions a minimum of 1/2" thick and stiles and pilasters a minimum of 3/4" thick.

4. Partitions to which grab bars are fastened, along with their respective brackets and connectors, shall be capable of supporting the imposed loads noted in the UFAS.

G. Headrails:

1. Headrails for overhead-braced compartments shall be of anodized, extruded aluminum alloy with end-caps, of anti-grip design or as standard with the manufacturer; or solid wood core surfaced with plastic laminate and having minimum cross-sectional dimensions of 1-1/4 in. x 2 in.

H. Urinal Screens:

Delete when urinal screens are not

NOTES TO ARCHITECT

1. Shall be of the types and sizes shown on plans.

provided.

2. Laminated plastic screens shall be a minimum of 7/8" thick.

3. As an alternative, screens may be of solid plastic a minimum of 1" thick or phenolic plastic a miminum of 3/4" thick for wall-hung installations. Where screens are supported on two sides, solid plastic screens shall be a minimum of 1" thick and phenolic plastic a minimum of 1/2" thick.

I. Hardware and Fittings:

1. Doors, partitions, pilasters and screens shall be furnished with the necessary hardware and fittings to provide a complete installation. They shall be pre-cut to facilitate erection and minimize field errors.

Refer to Technical Memorandum #63 regarding the provision of continuous heavy duty brackets and hinges at Intermediate and High Schools where partitions will be subject to high abuse.

2. Materials: Hardware and fittings shall be either satin-finish stainless steel, anodized extruded aluminum or chrome plated brass. Non-ferrous alloys such as Zamac castings shall not be used.

3. Door hinges: Either spring or cam-action type and adjustable to hold the door open about 12 inches in a pre-set position. All parts shall be non-rusting such as stainless steel pintles; nylon or delrin cams; nylon, delrin or self-lubricating bronze bushings; and housings of anodized extruded aluminum alloy or satin-finish stainless steel.

4. Latches: The latch shall be of a shape which is easy to grasp with one hand and which does not require tight grasping, tight pinching or twisting of the wrist to operate and shall be operable by a person on the outside in the event of an emergency. Mechanisms such as slide bolts with a projecting handle on the inside of the stall which can be opened by a person on the outside reaching over the door with a stick are acceptable.

5. Door Pulls: Handicap accessible toilet stall doors shall be furnished with a grab bar/door pull, 18" long, mounted horizontally on the inside face of the door adjacent to the hinge to facilitate closing of the door upon entry.

6. Coat Hook/Door Bumper: Furnish one each per door.

7. Shoe: All pilasters and stiles shall have a 3 inch high minimum trim cover or shoe of Type 302 or 304 stainless steel, chrome plated brass or anodized extruded aluminum at the floor.

8. Hardware mounting heights: The highest part of any handle, pull, grab bar, latch or operating mechanism shall be at 36 inches max. above the finished floor.

9. Fasteners: Hardware and fittings shall be fastened with theft-resistant one-way stainless steel or chrome plated brass through-bolts or machine screws in factory installed steel inserts.

PART 3 - EXECUTION

3.01 INSPECTION

The Installer together with the Contractor and Engineer shall examine the areas and conditions under which toilet stall doors, partitions, stiles/pilasters and screens are to be installed. Should any condition be found unsuitable, no work shall be performed until the unsatisfactory conditions have been corrected and are acceptable to the Installer. Proceeding with the work will imply acceptance of the conditions by the Installer.

3.02 INSTALLATION

A. Compartments and urinal screens shall be erected

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in strict accordance with the manufacturer's instructions.

B. All parts shall be securely screwed and/or bolted tight, well-anchored to the wall, true to line, level and plumb, with doors and hardware placed at the proper heights and in proper operating condition.

C. The following uniform clearances shall be provided:

1. 1/2" max. between the stiles/pilasters and partitions.

2. 1" max. between stiles/pilasters/partitions and walls.

3. 3/16" max. between stiles/pilasters and doors.

Indicate the clearances required below doors and partitions on the drawings.

D. Anchorage to concrete or to masonry at grouted cells shall be bolts with lead or steel expansion shields. Anchorage to masonry at ungrouted cells or to gypsum board walls shall be with toggle bolts.

Indicate blocking / nailers as required at stud walls on the drawings.

3.03 PROTECTION AND CLEANING

A. Protect the work of other trades against damage, injury or soiling.

B. After istallation, clean exposed surfaces with cleaners recommended and approved by the manufacturer and protect from damage.

C. Adjust hardware and lubricate moving parts as nessessary to ensure smooth operation.

D. Repair and restore adjacent surfaces that are marred or damaged as a result of the installation of toilet partitions and urinal screens to their original condition. Leave

adjacent surfaces in a neat and clean condition.

END OF SECTION

NOTES TO ARCHITECT

This specification supercedes guidance noted under Tech Memo No. 55 dated June 28, 1990. Note: Galvanized expanded metal mesh screens shall no be specified.

SECTION 10240 - ALUMINUM SECURITY SCREENS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

A. Provide and install aluminum security screens complete with frames and angle clips as specified herein.

B. Provide and install stainless steel anchors, bolts, expansion shields, and other fasteners as detailed and/or required for the complete installation of work under this section.

C. Security screens shall be removable for maintenance work.

1.03 COORDINATION

Before commencing with the work, the Contractor shall examine the surfaces and conditions under which security screens are to be installed and shall report all discrepancies and/or defective conditions to the Engineer so that corrective measures can be taken.

Fabrication of the aluminum security screen work shall not commence until these discrepancies and/or defective conditions are corrected, or unless otherwise approved by the Engineer.

1.04 QUALITY ASSURANCE

A. Qualifications of the Manufacturer: Use products produced by manufacturers regularly engaged in the manufacture of aluminum security screens and with a history of successful production.

B. Qualifications of the Installer: The Installer shall be thoroughly trained in the fabrication and installation of the security screens.

1.05 SUBMITTALS

NOTES TO ARCHITECT

A. Shop Drawings and Product Data:

1. Six (6) complete sets of installation drawings showing the complete arrangement of screens and details in accordance with the contract drawings.

   The shop drawings shall include reference to the sheet and detail on the contract drawings they depict.

2. Six (6) complete sets of the manufacturer's product data showing compliance with the specified requirements.

B. Mock-up Sample: One (1) 12" x 12" mock-up sample consisting of the perimeter extruded frame, mullion, screen mesh, angle clip and fasteners.

   Reference to a current sample in the Engineer's Office may be made in lieu of submittal of the sample mock-up provided such sample is exactly in accordance with the product to be furnished.

C. Certificates: A signed certificate from the proposed manufacturer showing that the Installer has been trained in the fabrication and installation of the security screens.

D. Fabrication of the screens shall not commence until all submittals have been approved by the Engineer.

1.06 DRAWINGS AND SPECIFICATIONS

Should the products of other manufacturer's require different drawings, details or other requirements, provide the necessary adjustments at no additional cost to the State.

Show security screen details on the drawings. If necessary, contact the local manufacturer's representative for product data and details.

1.07 PRODUCT HANDLING

A. The Contractor shall execute the necessary precautions to properly protect the security screens and its finish against damage during assembly, transport, storage and installation.

Mfr./Rep.:
Emtek Products, Inc.:
RMA Sales Co., Inc.

Ullrich Aluminum Co.:

NOTES TO ARCHITECT

B. The Contractor shall execute the necessary precautions to properly protect surrounding surfaces and parts of the building(s) against damage. Any work or materials damaged as a result of the work performed under this section shall be immediately repaired or restored to its original undamaged condition or replaced with new to the satisfaction of the Engineer at no additional cost to the State.

Diamond Welding Inc.

Details shall clearly show the building and window constrution (e.g. beams, column, window frame, window sill, etc.) relative to the screen location.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The products of the following manufacturers or approved equal are acceptable provided they meet the materials, construction and standard of quality specified herein:

1. Emtek Products, Inc.; Amplimesh No. 103 Pattern.

2. Ullrich Aluminum Company; Securamesh "007" Aluminum Grille Specification.

Add this screen mesh detail on the drawings:

(Refer to hard copy of the Guide Specs)

On individual building retrofit projects where there are existing aluminum security screens, if necessary, revise the mesh dimension to match the existing screen.

2.02 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

B. Aluminum Security Screen Mesh: Aluminum security screen mesh shall be manufactured from 6063-T5 or 6063-T4 aluminum alloy and temper.

1. Minimum Extrusion Section Width: 0.228" (5.8 mm)

Head, jamb and sill conditions should be carefully checked and detailed to ensure that the angle clip legs are of sufficient length to properly secure the screen. Where angle clips are secured to concrete beams, columns and sills, locate the fastener a sufficient distance away from the

NOTES TO ARCHITECT

2. Minimum Extrusion Section Height: 0.276" (7.0 mm)

3. Maximum Opening Dimension: 2.875" (73.025 mm) perpendicular to the direction of extrusion.

edge of the concrete face to prevent spalling.

C. Aluminum Extruded Framing: Aluminum framing shall be manufactured from 6063-T5 or 6063-T4 aluminum alloy and temper of the sizes and shapes as detailed in the contract drawings or as recommended by the aluminum security screen manufacturer.

For large openings, provide aluminum channels to properly support and stiffen the screen in accordance with the manufacturer's recommendations.

D. Screen Frame Corner Reinforcement: Aluminum, of the type and size recommended by the aluminum security screen manufacturer.

E. Aluminum Angle Clips: 1-1/2 inch wide x 1/8 inch thick. The length of the angle legs shall be as indicated on the contract drawings.

F. Spacers: 5/8" diameter round anodized aluminum. PVC spacers shall not be used.

G. Anchor Bolts, Screws, Nuts & Washers: Stainless steel, Type 304 alloy of the sizes and types recommended by the aluminum security screen manufacturer. Fasteners shall be tamper-resistant type where specified. Use of plastic or lead shields will not be permitted.

Indicate on the details the type, diameter and length of fastener to suit the specific substrate condition.

H. Pop-Rivets: Pop-rivets shall be 1/8 inch diameter anodized aluminum as recommended by the aluminum security screen manufacturer.

I. Touch-up Paint: L-4485 AN-A-KOTE, dark bronze color or equivalent coating as recommended by the aluminum security screen manufacturer.

J. Finish:

1. The aluminum security screen shall be free of major scratches and other surface blemishes.

2. All exposed security screen mesh, frame and clip angle surfaces shall be provided with a bronze anodized finish of minimum 0.0007 inch (17.58 microns) thickness.

3. Cut ends, punched or drilled holes, fasteners used to connect bronze anodized parts and minor scratches shall be touch-up painted to match the bronze anodized finish.

PART 3 - EXECUTION

3.01 INSPECTION

Prior to fabrication of the security screens, the Installer shall examine the areas and conditions under which they are to be installed. The required measurements shall be accurately taken to ensure proper fit of the screens. Should any condition be found unsuitable, fabrication of the screens shall not commence until the unsatisfactory condition(s) have been corrected and are acceptable to the Installer. Proceeding with the work will imply acceptance of the conditions by the Installer.

3.02 FABRICATION AND WORKMANSHIP

A. Fittings and Shop Assembly: Insofar as possible, fit and shop-assemble the work complete and ready for erection and installation in accordance with the approved shop drawings and trade standards.

B. Accuracy of the work: Fabricate and erect the work square, plumb, straight and true. All cuts shall be accurate for the minimum joint gap.

C. Holes: Drill or punch holes required for bolted or pop-rivet connections and for the attachment of work of other trades. Burned holes are not acceptable.

D. Cut ends and holes shall be free of burrs.

E. The security screen mesh opening size specified under sub-section 2.02. B.3. and the orientation of the security screen mesh within the frame shall be maintained at each opening unless otherwise approved in writing by the Engineer.

F. The security screen mesh shall be oriented within the frame so that the direction of the extrusion is in the vertical position. Also, where the screen mesh is connected to the frame and mullions, the mesh opening adjacent to the frame/mullion shall be at least one-half of the opening size noted under Subsection 2.02 B.3.

G. The corners of the aluminum extrusion frames shall be neatly mitered and assembled using corner reinforcement. The security screen mesh shall be securely fastened to the extruded framing with pop-rivets spaced at a maximum of 6 inches on-center. Welding of the screens and frames is not acceptable.

H. Where provided, vertical "H" section splice bars/mullions shall be located so that they are aligned with the window mullions.

I. Concealed fasteners shall be used to secure the security screen/frame assembly to the supporting angle clips. The angle clips shall be oriented so that the leg in contact with the building is not exposed (located behind the security screen). This leg shall also have slotted holes to permit for field adjustment of the screens.

3.02 INSTALLATION AND ERECTION

A. Installation: The aluminum security screens shall be installed and erected in their proper location/opening, plumb and true, and securely anchored to the substrate in accordance with the manufacturer's installation details, instructions and recommendations.

Fasteners securing the clip angle to the

NOTES TO ARCHITECT

substrate and other fasteners which are exposed or accessible to vandalism shall be the tamper-resistant type. (Note: One-way non-removable fasteners are not permitted.)

B. The security screens shall be independent of the window assemblies which they protect.

1. Security screens shall be positioned so that they do not interfere with the proper operation of the window.

2. Attachment of the security screen/frame to the existing window frames is not permitted.

C. Replacement: Aluminum security screen sections which are damaged during fabrication, storage, transport or installation shall be immediately removed from the site and replaced with new sections matching the existing.

Delete the word "existing" where not applicable.

D. Protection from Entrapped Water: Provide for the drainage of water entrapped within the screen framing system.

E. Dissimilar Materials: Where aluminum surfaces come in contact with dissimilar materials, coat contact surfaces with primer and a heavy coat of bituminous paint of minimum 15 mils dry film thickness or a separator as recommended by the security screen manufacturer. Care shall be taken so that the protective coating is not visible when the assembly is completed.

3.03 CLEAN-UP

Upon completion of the installation, the security screens shall be cleaned and all dirt and debris shall be removed from the site. Care shall be taken so as not to damage surrounding areas, surfaces and parts of the building(s). The entire installation shall be left clean and in a condition acceptable to the Engineer.

END OF SECTION

NOTES TO ARCHITECT

NOTES TO ARCHITECT

SECTION 10617 - MOVABLE PARTITIONS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00800.

1.02 SUBMITTALS

A. Within 15 days after notice to proceed and before fabrication, 6 sets of shop drawings, samples and manufacturer's literature shall be submitted to the Engineer for approval. Materials shall be ordered immediately after approval, as this is a long lead item.

B. The contract drawing details are intended only as a guide to the installation and operation of the partition. If modifications are necessary for the partition being proposed, the complete installation details must be shall be responsible to insure that any necessary building modifications are planned for and made.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Partitions shall be as outlined above and may be as produced by the following listed manufacturers or an approved equal:

1. Modernfold - "Acousti-Seal" Model 904 and 906.

Update model numbers if/as necessary.

2. Hough Manufacturing Corp. - "Hufcor" Series 8330 or 8430 with lateral support at the floor for each panel.

3. Advanced Equipment Corp. - Type 2MS with lateral support at the floor for each panel.

B. Contractor shall refer to the Special Provisions for approval of any proposed alternate substitution.

2.02 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Operable partitions shall be as follows:

1. Single movable panels or hinged in pairs.

2. Single parting or bi-parting as shown on the plans.

3. End stacked, side or center as shown on the plans.

C. Partitions shall have not less than an STC rating of 43 when tested in accordance with ASTM E90; or an NSSEA acoustical rating of Class F.

D. Panels, both individually and severally, shall have positive lateral stability when positioned for use as provided by floor guides, telescoping seals, or other such system.

E. Panels shall have a steel facing of not less than 22 gauge minimum. The finish may be baked enamel or, at the option of the manufacturer, be faced with vinyl fabric weighing not less than 29 oz. per 54" wide lineal yard.

F. Partitions shall include all hardware, hangers, floor tracks where standard with the manufacturer, jambs, anchors and guides; and shall include provision for adjustments necessary for a satisfactory installation.

G. Chalkboard and tackboard as indicated on the elevations shall be included and shall be as standard with the door manufacturer. Include all necessary trim to make fixed installation. Mounting shall be as recommended by the manufacturer.

PART 3 - EXECUTION

NOTES TO ARCHITECT

3.01 INSTALLATION

The operable partitions shall be neatly fitted to building conditions, erected in a rigid and substantial manner, straight and plumb with horizontal lines level.

3.02 CLEAN UP

All cartons and rubbish shall be removed and work left broom clean. Minor blemishes and defects shall be touched up.

END OF SECTION

NOTES TO ARCHITECT

SECTION 10670 - STORAGE SHELVING

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00800.

1.02 SUBMITTALS

6 sets of complete shop drawings, manufacturer's literature and color samples shall be submitted to the Engineer within 15 days after award of Contract for approval before any work is fabricated. Because this is a long lead item, ordering shall be made immediately after such approval.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Metal Bookshelving (Bracket Type):

Specify this type for Library Reading Rooms and Stack Rooms. Do not use for Storerooms.

1. General: Metal bookstacks shall be single face or double face, free-standing bracket type. Sheet steel shall be cold-rolled furniture stock, gauges as hereinafter specified. Assembly screws shall be oval-head Phillips type and cadmium-plated.

2. Upright Columns shall be one-piece or two-piece channel shapes with stiffened flanges not less than 2 in. x 2 in. in cross dimensions, of 16-gauge material, with not less than 8 right angle bends. Each upright shall have 2 rows of perforated slots on opposite sides spaced not more than 1/2" apart horizontally. Slots shall be one inch o.c. vertically. Columns shall be spaced 36 inches o.c. and of height shown on the plans.

3. Base Brackets shall extend in one piece, on both sides of the double-face units, to the opposite face. They shall extend one inch to the rear of the uprights for the single-face units. The brackets shall be adjustable and fit snugly around the upright to provide maximum support and safety. The parts shall be bolted securely in a recessed manner. The brackets shall have vertical plates approximately 10 in. high which shall match the shelving. Base plates shall have a rubber pad to prevent lateral movement. Brackets shall be 13-gauge.

4. Bottom Channels shall be one-piece, 20-gauge, 2 in. wide and formed to engage the base bracket. The channel sides shall form a filler for the shelf back and allow removal of any section. Channels shall be the length of one section and not continuous.

5. Top Channels shall be one piece, 18-gauge and 2-1/8" side to tie the upright. Channel shall be attached to each upright with a bolt and an acorn-nut.

6. Bracing shall be diagonal of 1/4" diameter rod which can be installed through the base assembly and the top channel, or between the uprights. Adjustment shall be made by means of a nut or turnbuckle. There shall be one pair of braces for not more than 9 ft. of double-face shelving and an additional pair for every third additional section or fraction thereof.

7. Shelf Brackets for the adjustable shelves shall be 16-gauge, same depth as the shelf and shall extend 6-1/4" above the shelf. Front and top edges shall be rolled 1/4" continuously from the column to the bottom front edge of the bracket. Shelf brackets shall be J-fold type to support full depth of shelf, have 2 hooks at the top and a lug at the bottom which shall serve to prevent accidental dislodgement.

NOTES TO ARCHITECT

8. Adjustable Shelves shall be one-piece, 18-gauge and 35-1/2" long between brackets, with three 90€ bends box-formed to give a 13/16" face at front and back, and ends turned down 5/6" to engage brackets. Nominal depth shall be from center of column to face of shelf with actual depth one inch less than the nominal. Shelf shall be constructed to support a uniform load of 40 pounds per square foot with a deflection of 3/16" or less. Nominal depth of shelves shall be 10 inches in Reading Room, 12 inches in Stack Room.

The following number of adjustable shelves shall be provided for each 3-foot unit:

Height	No. of Adjustable Shelves Required
42 in.	2
66 in.	4
78 in.	5

Show height of all units, either on elevations or on plan.

9. Base Shelf shall be one piece 18-gauge and similar to the adjustable shelf, but shall include a base strip. Strip shall have a one inch return top and bottom. Shelf and base strip shall attach to the base brackets with concealed fasteners. Height of shelf and base shall be 3 to 4 inches. Base shelf shall have a back to act as a rear book stop unless a separate book stop is available for it. A 1-1/2" x 3/8"± sheet metal height adjustment strip (and attaching screws), as wide as and finished as for the shelving shall also be provided.

10. End Panels shall be one piece and 18-gauge, installed at all exposed ends. The panel shall extend the full width of the section, including the base, and the full height. Panel shall be flush with a 3/4" radius return on the exposed edges. Return shall be not less than 3 in. parallel to the face. Panel shall have

stiffener flanges at top and bottom. Overall thickness shall be 2 in.

11. Finish and Color: The finish of the metal work shall be of the very highest grade. Each part shall be prepared for painting by a 5-stage cleaning and phosphatizing process known as Bonderizing. After passing thru a dry-off oven, a finish coat of premium semi-gloss baking enamel shall be applied and baked at high temperature. Final finish shall be a minimum of 1.0 mil. Color shall be one color as selected from the manufacturer's standard color chart by the Engineer.

12. Canopy Top: All units, including magazine racks, shall have canopy top standard with manufacturer. Tops for all units up to 42 inches high shall be 18-gauge and in one piece, including the area over the columns.

13. Closed Backs shall be 22-gauge steel punched on both vertical edges for bolting to upright columns. All single-face units not along wall shall have enclosed backs.

14. Label Holders shall be clip type to be secured to the face of the shelf without tools. Material shall be of aluminum or steel. Holders shall be furnished - one for each adjustable shelf.

15. Book Supports shall be wire book supports and hook-on book supports.

    a. Wire book supports shall be cadmium-plated, removable, adjustable and made for insertion into shelf flanges. One required for each adjustable shelf.

    b. Hook-on book supports shall be 9 inches high, 18-gauge, same finish and color as shelves. One required for each top shelf since wire book support cannot be inserted into canopy flange. Contact surface with shelf shall be

provided with buffer material to prevent scraping.

16. Rear Book Stop shall be installed on all standard adjustable shelves. Book stops shall be 20 ga., approximately 1/2" x 1-5/8" with four (4) 90€ bends. Book stops shall be hooked to the perforated slots of the upright columns. A rear book stop shall also be installed on the base shelf unless it has a back of its own.

17. Divider Shelves shall be installed on _____ 3-foot unit of shelves. The number of divider shelves and their depth shall be the same as for one 3-foot unit of standard shelves. Each divider shelf shall have 5 dividers, 6-1/4" high made of 20-ga. steel.

Indicate here and on plan the number and location of these units of divider shelves.

C. Magazine Racks: Magazine racks shall be of the same material and construction as outlined above for the shelving. Units shall be as shown on the drawings, approximately 36 in. wide by 42 in. high by 14 in. deep. Each unit shall have 2 sloping shelves - one horizontal shelf and one base shelf.

D. Metal Storage Shelving (Open-Type): Open-type storage shelving shall be heavy duty, free-standing type, of steel, and shall meet the following requirements:

Specify this type for storerooms only.

1. Posts shall be offset angle post, 14-gauge hot-or cold-rolled steel, min. 1.875" x 1" and punched on 1-,1-1/2- or 2-inch centers. Beaded or Delta posts, 14-gauge, shall be acceptable for front posts only. Where resilient flooring is used, attach to the bottom of each post a metal floor shoe or foot plate which will transfer the post load to the floor without cutting into the flooring. Where posts are anchored to walls, hardware and parts as necessary to enable height adjustment of front posts as necessary for full bearing shall be provided.

2. Shelves shall be 18-gauge with two 90€ bends along side edges to form a channel shape and

NOTES TO ARCHITECT

three 90€ bends along front and back edges to form an open-box shape. Each shelf shall be equipped with 4 shelf hangers. Shelf shall be constructed to support a uniform load of 40 pounds per square foot with a deflection of 3/16" or less.

3. Cross-Braces of one inch wide x 13-gauge thick steel shall be attached to posts at 30 inches o.c. vertically, with one cross-brace at the back and one at each side.

4. Each section shall be 84 inches high x 12 inches deep x 48 inches wide, with 7 shelves including the top and bottom.

Modify depth of shelf to suit your project.

5. Finish and Color: Bonderized and finished with baked enamel. Color shall be as selected by the Engineer from manufacturer's standard color chart.

PART 3 - EXECUTION

3.01 INSTALLATION

All components shall be erected in strict accordance with manufacturer's instructions unless otherwise specified herein. All parts shall be securely screwed and bolted tight, true to line, level and plumb with all shelving placed in correct operating condition. Where shelves are located against a wall, each post shall be anchored to the wall using a clip angle which shall be primed and painted to match the shelving, bolted to the post with 1/4" bolts and fastened to the walls with anchors appropriate to the wall material. For metal bookshelving the height of the adjustment strip shall be moved as necessary to cover the gap between the baseplate and floor due to any out-of-level condition of the latter. Where single-face shelves are free standing, horizontal steel braces primed and painted to match the shelving shall be provided at the top of each post to tie the shelves to adjacent shelves or to the nearest wall.

END OF SECTION

NOTES TO ARCHITECT

This specification covers the installation of curtains and tracks for platforms only, not stage systems. The use of this specification must be tailored to your job.

SECTION 12525 - CURTAINS

PART 1 - GENERAL

1.01 GENERAL

As specified in Section 00800.

1.02 SUBMITTALS

A. Samples and Shop Drawings: Samples of the curtain and any appurtenances together with 6 sets of shop drawings and manufacturer's specifications of the track system shall be submitted to the Engineer for his approval. Neither item shall be ordered or installed without this approval.

B. Certificate: The manufacturer's certificate of flame-proofing of the fabric shall be submitted to the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Curtains

1. Fabric shall have the following characteristics:

   a. Permanent flameproofing (note requirement for certificate).

   b. Abrasion resistant.

   c. Dimensionally stable (maximum shrinkage not over 3%).

   d. Fade resistant (Fadeometer rating 50-100 hours).

NOTES TO ARCHITECT

e. Non-toxic, non-allergenic and odorless.

f. Non-shedding.

g. Mildew, rot and moth resistant.

h. Chemical resistant.

2. Fabric shall be a synthetic yarn weighing not less than 14 ounces per linear yard. Fabric shall include an opaque vinyl backing. Fabric shall conform to the above requirements and shall have not less than a total of 66% of the following fibers or a combination thereof:

   a. Verel Modacrylic.

   b. Saran Flat Monofilament.

3. Valance shall be of the same material as supplied for the curtain installation as hereinafter specified.

4. Color shall be as approved by the Engineer from the manufacturers standard colors.

C. Tracks and Appurtenances:

1. Channel shall be 14-gauge extruded anodized aluminum not less than 1-5/8" wide x 2-1/4" high (14-gauge galvanized steel not less than 1-3/4" wide x 2-1/8" high). Channels shall include hanging clamps spaced not over 5 ft. o.c. including clamps for center overlap, end stops, etc., and #6 hanging chains to suit installation shown.

Use medium duty tracks if platform opening is not more than 45 ft. wide, otherwise specify heavy duty type and modify specifications accordingly.

2. Carriers shall be doubled wheel type, molded nylon wheels riveted to stud axles on self-lubricating bearings. Include master carriers where necessary for complete installation. Carriers shall be spaced not over 12 inches o.c. and shall include not less than 3 links of #10 jack chain.

Also, see attached Supplementary Notes to Architect.

3. Rope for manual operation shall be #8 wire

centered braided nylon or cotton sash cord.

4. Accessories as standard with the manufacturer for the assembly supplies shall be that normally supplied with curtain track.

5. Assemblies shall conform to the above requirements and may be as produced by the following manufacturers or an approved equal:

   a. Tru-Roll Corp. assembly No. 1200.

   b. Automatic Devices Co. Besteel assembly No. 170.

   c. Gorman Assoc. assembly No. TE-1055.

PART 3 - EXECUTION

3.01 PREPARATION WORK

Supports to receive the hanging chains shall be aligned, level, and spaced properly. The Contractor shall be responsible for the examination and acceptance of all conditions affecting the installation of his work. Start of his work shall constitute acceptance of all conditions. Unsatisfactory conditions shall be reported to the Engineer so that corrective measures can be taken.

3.02 INSTALLATION

A. General: Except as otherwise specified below, installation shall conform to the manufacturer's directions for the assembly used and to the layout and details shown on the plans.

B. Curtain shall be installed with 100% fullness, reinforced at head with 3-1/2" heavy-duty jute webbing and shall have brass grommets. Pleats shall be flat and at 9 inches to 12 inches o.c. Curtains shall have chain pocket and canvas chain bag (sewn in). Include zinc-plated chain weight. Where curtains are bi-parting center-opening type, there shall be at least a

6-inch turnback along the vertical hem. Bi-parting curtains shall have a 24-inch overlap, 12 inches on each side of centerline.

C. Valance shall be installed with 100% fullness. Pleats shall be flat and at 9 inches to 12 inches o.c. Valance shall not require grommets or weights but shall require reinforcing similar to that specified above.

D. Tracks and Appurtenances shall be installed strictly according to the manufacturer's directions and complete installation shall be to the satisfaction of the Engineer.

E. The following defects shall be cause for rejection or replacement at the Contractor's expense:

1. Uneven curtain or unaligned surfaces.

2. Soiled curtain not cleaned to original condition.

3. Unworkable track assembly.

4. Color variation in curtain/valance.

5. Loose or broken fittings.

END OF SECTION

SUPPLEMENTARY NOTES TO ARCHITECT

Consider the following when detailing brackets or hangers to support the track hanging chains:

a. Distance above the top of the platform opening must be sufficient to allow for adjustments when the curtain is hung.

b. Distance from the back face of the structure above the opening to center of the front carrier should allow room for folding the curtain. With carriers 12" o.c. the distance shall not be less than 6". The bottom of the track shall not be less than 4" above the top of the opening.

c. Supports must be strong enough to carry weight of

track, equipment and the fullness of the curtain.

d. The valance shall be hung from a wood batten attached to the back face of the beam or structure above the top of the platform opening. Determine the height of the valance from the design of the height of the platform opening. Show the detail of the batten.

e. Modify specification if the project requires side and/or back curtains.

NOTES TO ARCHITECT

SECTION **13288** - TESTING/AIR MONITORING

This guide specification covers the requirements to be followed by the Contractor for testing and air monitoring on an asbestos abatement project.

PART 1 GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 SUMMARY

Since testing and air monitoring are basically an inspection process that is normally delegated to a consultant and specified under a standard scope of work, this section should only list Contractor requirements.

Testing and air monitoring shall be supplied by the Engineer for the purpose of:

A. Verifying compliance with the specifications listed in Section **13281**;

B. Ensuring that the owner's legally required documentation is collected;

C. Providing engineering control during the project.

Since the Contractor must coordinate his efforts with the Inspector, the requirements of Section **13281** should provide work specifications that will assure performance within the limitations to be verified by the Inspector.

1.03 COORDINATION WITH OTHER SECTIONS

The testing/air monitoring requirements included in the scope of work for any testing/air monitoring consultants or inspectors, and all applicable Federal, State, and local regulations shall be coordinated with this section.

PART 2 PRODUCTS

(Not applicable to this section.)

PART 3 EXECUTION

3.01 ABATEMENT CONTRACTOR RESPONSIBILITIES

There have been instances where the Contractor has assumed that the Engineer would supply his legally required records long after the project was completed.

A. The Contractor shall be responsible for providing the personal monitoring and necessary records for all of the Contractor's employees as required by OSHA (29 CFR 1926.58), Hawaii State Law (12-145) and all other applicable law.

B. The Contractor shall obtain the legally required reports for air monitoring as part of the contract.

Instances have occurred where Contractors have been offered monitoring information, declined

C. Monitoring information developed by the Inspector's activities while under contract with the State shall be for the use of the Engineer.

NOTES TO ARCHITECT

The information will be available and offered to the Contractor when developed, but not thereafter, and shall not waive the Contractor's obligations stated elsewhere in this section.

it, and then requested it later, when it was no longer available.

D. Air monitoring and testing which becomes necessary in order to follow up on work by the Contractor which is rejected as not conforming to the requirements shall be the responsibility of the Engineer. However, the full cost of such additional monitoring and testing shall be borne by the Contractor, and shall be deducted from the final contract payment.

Testing and monitoring are expensive. When it is involved with rechecking defective work the cost burden should be borne by the Contractor.

E. Personal air monitoring that is part of the Inspector's scope of work shall be accomodated by the Contractor and shall not be assumed to be the monitoring required of the Contractor by law or regulation.

The inspector will normally do personal monitoring as part of his overall scope of work, but it should be the responsibility of the Contractor to obtain and retain the Contractor's information.

3.02 TESING / AIR MONITORING INSPECTOR

A. The Inspector will ensure that the applicable specifications are being followed using the methods and requirements of the applicable scope of work.

B. The Inspector shall have the authority to exercise engineering control during the project.

These concepts are actually covered in the GENERAL CONDITIONS, but in practice some parties have assumed it does not apply to inspection done by consultant testing and air monitoring.

END OF SECTION

SCOPE OF WORK

AIR MONITORING AND INSPECTIONAL SERVICES

Date:_____

Project: _____

_____

D.A.G.S. Job No. _____

SECTION 1 - DEFINITIONS

Unless otherwise clear from the context, as used in this contract:

"ACM" means asbestos containing materials.

"Air monitoring specialist" means a member of the construction management team who enters the work area to set up the air monitoring device and then collects the various air samples to be sent to the laboratory for analysis.

"Building representative(s)" means the person or persons designated by the users of the building to act on their behalf.

"Contractor" means the construction firm engaged to remove, encapsulate and/or dispose of the ACM.

"Construction Manager" means the consultant's employee or his consulting subcontractor responsible for ensuring that the work of the contractor is conducted according to the contract documents and in compliance with applicable laws, regulations, ordinances, etc.

"Construction management team" means the consultant's personnel or his consulting subcontractor who are involved in inspecting the work of the contractor and in air monitoring, sampling, testing before, during and after the asbestos abatement project.

"Consultant" means the firm contracted to imspect the work of the contractor during the removal, encapsulation and disposal of the ACM and is capable or has a subcontractor to perform air monitoring, sampling and testing before, during and after the asbestos removal and/or encapsulation. The consultant may be the construction manager or said construction manager may be a subcontractor to the consultant.

"Industrial hygienist" means a Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene who shall direct all air monitoring and project supervision.

"Project designer" means the person of firm who prepared the plans and specifications to remove, encapsulate and dispose of the ACM.

"Project manager" means the State employee responsible for administering the construction contract and ensuring that the work of the contractor is conducted according to the contract documents and in compliance with applicable laws, regulations, ordinance, etc.

"Consulting subcontractor" means firm acting in cooperation with the "consultant" to perform air monitoring and testing work during and after the asbestos removal and/or encapsulation work; or construction manager for the consultant.

Because of the serious health threat that exposure to asbestos fibers pose, the Federal government as well as the State government have enacted laws controlling the removal of ACM. Federal and State agencies administering these laws, in turn have promulgated numerous regulations. Since asbestos is so much risk of potential public harm, it is imperative that asbestos containing materials (ACM), when removed from State buildings, are removed safely in accordance not with only the project plans and specifications, but also in strict compliance with all applicable State and Federal laws and regulations. Asbestos abatement projects can deteriorate rather rapidly with regard to the quality of work performed by the Contractor if the Contractor is left unsupervised. It is therefore essential that a team of competent personnel provide constant inspection at every aspect of the abatement project. This is the objective of the consultant's construction management team.

The construction management team shall provide inspection to include on-site examination of the abatement work to ensure that the work is being performed in accordance with the plans and specs, federal and state regulations. Daily communication with the building users is mandatory as is periodic clarification and instructions from the project designer.

SECTION 2 - CONSTRUCTION INSPECTION

2.1 Pre-Construction Conference

This conference shall be held prior to construction and shall be conducted by the State project manager assisted by the consultant's construction manager. Present also shall be the contractor, project designer, user agency and/or building representative(s), industrial hygienist, and air monitoring personnel. This meeting is intended to:

A. Review final schedule for project
B. Verify legal requirements and special conditions
C. Verify compliance with pre-construction requirement
D. Obtain copies of all mandatory notifications
E. Inspect sample respiratory equipment and other abatement equipment
F. Review procedures and responsibilities
G. Clarify the scope of work and its best impact on the users of the building

2.2 Photographic Record of Project

The on-site construction manager shall record the asbestos abatement project with representative photos. All photos shall become the property of the State and are to be accompanied by a detailed log.

2.3 Project Log

The construction manager at each site shall maintain daily field reports detailing all key activities during abatement. The project designer shall receive summary of project activities, progress, etc. These records shall be available for review by the State project coodinator through the consultant's construction manager. The contents of the daily field reports shall be incorporated with other project data into a final project report (see Section 4.4).

2.4 Visual Inspection of all Containment Areas

The on-site construction manager shall be responsible for regular inspection of all containment areas. Inspections shall be conducted during the actual work performance of the contractor to document the work practices employed by the contractor and prior to air testing in each area to verify that all materials scheduled for abatement were removed and the area was properly cleaned.

2.5 Issuance of Change Order

If changes are necessary once construction begins, the consultant shall review request for change and make a recommendation for approval. Any appropriate change order will be issued subject to and after approval by the State.

SECTION 3 - AIR MONITORING DURING THE PROJECT

Air monitoring during the removal, encapsulation, enclosure and clean-up operations of an asbestos abatement project is required by OSHA regulation 29 CFR 1926.58 and EPA 40 CFR Part 763, Subpart G, Worker Protection. It is vital to protect the health, safety and interests of the State, the building occupants, and the contractor's abatement workers as well as the consultant's employees at the project site. The consultant's on-site air monitoring specialists and industrial hygienists shall perform the following activities associated with this portion of the project:

- On-site environmental and personnel air monitoring as required by EPA, OSHA, and the project specifications (See methodology below).

- Laboratory analysis by PCM analysis using NIOSH 7400 method.
  NOTE: For AHERA projects, TEM analysis will be required for final clearance.

- Monitoring of decontamination procedures at site entry/exit.

- Monitoring of containment maintenance by visual and instrumental inspection.

- Interface with project inspectors, building representatives, representatives of regulatory agencies, and project designers during site visits.

- Ensure that proper respiratory protection is utilized by all persons at the project site.

- Relay to the State project coodinator any discrepancies in contractor's action with provisions of project specifications.

- Act quickly in case of emergencies with appropriate response.

Air quality records are one indication of the professional manner in which the removal is proceeding, whether there are accidental leaks or faulty seals in barriers, whether the outside environment is being contaminated and, most of all, how clean the room finally is when ready for re-occupancy.

3.1 Sampling Design

The following is a typical sampling design per containment area during the actual construction. The number of samples and volume quantities may vary, depending on each project's specifications.

a. Background Samples

Background baseline samples shall be taken prior to abatement to establish pre-abatement airborne fiber concentration levels. Three high volume continuous flow samples shall be taken per estimated containment area. All work area samples shall be analyzed by the NIOSH 7400 method. All personal samples shall be analyzed in accordance with OSHA 29 CFR 1926.58. The reference TWA (time weighted average) shall be established one day prior to the masking and sealing operations.

b. Work Area Samples

Low volume samples of 480 liters each shall be taken in the work area. Ambient air samples shall be taken in the work area for comparison to barrier samples in an effort to ensure that containment systems are secure and that the persons entering the work area are wearing proper respiratory protection. If monitoring inside and outside the asbestos abatement work area shows airborne concentrations have reached the predetermined specified TWA, the consultant shall stop all work, notify the State immediately, have the contractor correct the condition(s) causing the increase and ensure that the contractor obtains the State's approval prior to restarting the removal work.

c. Barrier Samples

Monitoring outside the temporary barriers determines if leakage is occurring outside the work area due to loss of negative pressure or faulty seals. Two high volume samples shall be taken per eight-hour day per barrier.

d. Outside Environmental Samples

Each removal area shall be sealed so that airborne fibers cannot escape into occupied areas. Air is forcibly drawn from the removal area by a negative air machine, filtered and exhausted to the outside environment. High volume samples shall be taken at the negative air unit exhaust to ensure compliance with the levels required by the project specifications and/or any applicable regulations. One sample per eight-hour day per containment area shall be taken.

e. Final Clearance Samples

After air in containment has been exchanged by High Efficiency Particulate Absolute (HEPA) filtration at least 72 times, (air clearance) samples shall be taken to determine if air is cleaned below the specified rate. If not, the area must be cleaned again and a second set of clearance samples run. When the fiber count is below the specified level, a final set of samples shall be collected for analysis by transmission electron microscopy or phase contrast microscopy depending on the size of the abatement area. If these tests reveal that the air has been cleaned to the acceptable standards, the area may be opened for re-occupancy.

3.2 Laboratory Analysis

The consultant's industrial hygienist shall maintain a testing facilities in the vicinity of the project site. An industrial hygiene monitoring setup with high-volume and low-volume pumps, calibrators and all filtering needs, in addition to a fully-equipped laboratory for rapid sample analyses to the field, shall be included in this facility. This is vital because it increases the efficiency of the contractor and allows immediate readings of air samples, rather than mailing them to a laboratory, which sometimes delays the release of containment area.

3.3 TEM Analysis

Samples requiring TEM analysis shall be sent to an approved and certified laboratory which shall be qualified to provide this type of analysis. A short turnaround time is required for receipt of the results. This will affect the project's cost because the shorter the turnaround time imposed on the laboratory, the greater the charge for the analysis. The consultant's TEM lab shall be fully equipped and qualified to complete TEM analysis on all three levels of protocols and shall utilize the level directly related to the information sought;

Level I — the most rapid procedure for screening many samples. However, results should not be used in legal proceedings.

Level II — elemental analysis for regulatory action in addition to all Level I specifications.

Level III — confirmation analysis of controversial samples, required for most legal proceedings.

Of the three levels, use Level II. It analyses the samples of specifications desired for regulatory action.

3.4 Daily Testing Records

At the conclusion of every day's testing, the consultant's industrial hygienist shall provide copies of all air monitoring records of each containment area to the State, the contractor, and the consultant's project manager.

3.5 Constant Project Observation

As stated above, probably one of the most important aspects of combining the portfolio of construction manager and industrial hygienist is that the professional on site is thoroughly familiar with the intricacies and requirements of the project. This allows the State's project manager and the consultant's construction manager to keep a constant check on the project's progress. In this instance, the on-site professional is also charged with maintaining constant project observation. If any problems occur, the consultant's construction manager and the State's project manager are notified immediately.

SECTION 4 - POST ABATEMENT SITE CLEARANCE

At the conclusion of each asbestos abatement project, several inspections shall be conducted to evaluate the contractor's complete adherance with the contract. During the final inspections, the consultant's construction manager shall document all omissions and discrepancies. These records shall become part of the final document package.

4.1 Project Completion Punch List

All areas should be documented during the walk-through portion of the pre-bid conference and checked again at the end of construction. The project completion punch list is an itemized list of materials that were broken or damaged during construction and which the contractor is responsible for replacing or remediating it.

4.2 Certificates of Completion

A final project inspection ensures that all work specified in the contract was completed to the satisfaction of the State and the consultant's project manager. The consultant's construction manager will then recommend that final settlement be published for the contract and final payment made to the contractor.

4.3 Coordination with EPA, OSHA and Other Agencies

Throughout the entire project, the consultant's construction management team will maintain required contact with the EPA and OSHA.

4.4 Preparation of Final Project Report

The consultant shall assemble data to prepare and submit four (4) sets to Inspection Branch or the appropriate neighbor island district office the following data in a bound report:

a. Provide designated project designer's name and accreditation number.

b. Visitor's log showing all persons entering the abatement site.

c. Certification of the abatement contractor's employees.

d. All air monitoring reports.

e. Contractor's notification form to EPA Region 9 and the Department of Health.

f. All asbestos disposal form(s).

g. All change orders.

h. Certificate of completion signed by the consultant's project manager and the certified industrial hygienist.

In the event project involves more than one school, provide three (3) additional sets for each additional school.

SECTION 5 - TIME OF COMPLETION

All work under the contract shall be completed within ten (10) working days after the completion of the construction project.

SECTION 6 - COMPENSATION

Compensation shall be based on the following agreed unit prices:

		Estimated Quantity	Unit Price	Amount
1.	Air Monitoring/Inspection (8-hour shift & 8 samples)	_____ days	$_____	$_____
2.	TEM Analysis (24-hour turnaround)	_____ days	$_____	$_____
3.	Per Diem, Ground and Air Transportation, etc. (cost plus)			$_____
			Estimated Cost	$_____

It is understood that the unit prices shall include all applicable taxes.

It is further understood that the Engineer reserves the right to increase or decrease the quantity of work as required.

NOTES TO DESIGNER

SECTION 13850 - FIRE ALARM SYSTEMS

Modify this spec section as necessary to suit your particular project. (e.g. Amend the spec to suit a hardwired system where required.) Check with Central Services Div. on which type of system to provide.

PART 1 - GENERAL

1.01 GENERAL CONDITIONS: As specified in Section 00700.

1.02 SECTION INCLUDES

Furnish all labor, tools, equipment, materials and accessories required to provide and install a complete, electrically supervised, closed circuit fire alarm system as specified herein and as shown on the plans.

Note: This spec includes and supercedes guidance previously provided under Tech Memo #94 and #109.

1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Power Wiring. All power wiring including wiring to disconnect switches and breakers and wiring to all equipment specified in ELECTRICAL Section.

Check with Central Services whether spare parts should be provided by the contractor as part of the project.

B. Painting. Painting of all conduits, raceways, ducts, cabinets, junction boxes, etc. specified in PAINTING Section.

Be sure to include painting of these items in the PAINTING Section.

1.04 PAYMENT PROCEDURES

Permits, Tests and Inspections: Apply, secure and pay for all required permits, fees, licenses, tests, inspections and royalties necessary to accomplish the work.

1.05 SYSTEM DESCRIPTION

A. Fire Alarm System (General Alarm): The fire alarm control panel shall activate an "alarm mode" and activate all audio and visual device circuits.

When the State obtains written approval from the Fire Department for not sounding a campus-wide general alarm, revise the General Alarm paragraph accordingly.

B. System Interface And Reset For System With Two or More Fire Alarm Control Panels:

Delete paragraph "B" if there will be only one fire alarm control panel.

1. Interface: The panels shall be interconnected for general alarm. Control circuits and the conductor circuit connections interfacing the fire alarm control panels shall be supervised.

2. System Reset: Panels shall be reset by activating a single switch.

C. Grounding: The fire alarm system shall be grounded.

NOTES TO DESIGNER

1.06 SUBMITTALS

A. Quality of Work / Submittals:

1. Drawings: The following applies to all drawings called for herein, such as Modular Systems Wiring and Point-To-Point Wiring Diagrams.

a. Drawings shall be prepared by the manufacturer or fire alarm equipment supplier's representative.

b. All work shall be in accordance with acceptable architectural and/or engineering standards. Workmanship shall be neat with all lines clean and sharp and lettering uniform in height and not less than 1/8" high.

2. Manufacturer's printed literature: Original published manufacturers' catalog cuts shall be provided. Facsimile or "Xerox" copies are not acceptable.

B. Submittal Quantities: Unless otherwise specified herein, submit for approval seven (7) sets of the shop drawings, test plans, and manufacturer's catalog cuts of equipment and devices and resubmit until approval is received before placing order.

Distribution:

3 copies:	User Maint. Agency
2 copies:	Architect / Elec. Engr.
2 copies:	DAGS Inspection

(See attached Note To Designer No. 1)

C. The following drawings, data and/or information, complete in all respects, shall be submitted to the Engineer for approval:

1. Fire Alarm System Equipment, Devices and Components Data: A complete listing of the equipment proposed along with Manufacturer's brochures providing detailed descriptions, technical information, photographs and drawings thereof, showing compliance with this specifications,

NOTES TO DESIGNER

2. Point-To-Point Wiring Diagrams: Drawings shall be job-specific. "Typical" or "generic" drawings are not acceptable. The diagrams shall include but not be limited to the following:

   a. Locations Of All System's Elements: Indicate all devices, junction boxes, handholes, manholes and pass-through devices and entities where the cables and conductors can be accessed by personnel. Indicate the room numbers where devices are located and the number of devices provided.

      Also indicate the locations of all cable and conductor terminations and intermediate connections showing where they pass through without terminations/connections from and to equipment panels and/or devices.

   b. Labeling Of All Elements: All devices junction boxes, etc. shall be labeled by functional designations, locations and numbers such as building alphabet, room function and room number, handhole number, and manhole number.

   c. Fire Alarm Wiring And Color Codes: All cable and conductor color codes, the wire marking system and marker designation as specified herein shall be shown.

   d. Installation Notes: Provide the Installation Notes appended to this Section and other information that may be required by installation and maintenance personnel.

3. Equipment And/Or Modular Systems Wiring Diagram: Wiring diagrams showing all equipment (control panel and annunciator in separate panel) modules, components and key internal cabinet wiring that should be accessed for tests and maintenance. Drawings shall include but not be limited

Note: Fire Department representative have advised that approved relays for fire alarm systems may be used for

NOTES TO DESIGNER

to the following:

a. Equipment Modules and Components: The equipment modules and components layout (relative locations in proportion to the modules, components and cabinet / enclosure sizes) including the fire alarm control panel(s), annunciators, battery cabinets, etc. The drawings shall also show the arrangement of modules, components, wiring and expansion space within the FACP cabinet.

fire alarm interconnect circuits and other fire alarm system auxiliary circuits. An example is the Simplex 2080-9007 which is designed to interface two fire alarm control panels.

b. Input And Output Circuits Labeling: Label the input and output circuits by circuit designations specified herein.

c. Internal - External Circuits Interface Information: Only information that interfaces with external circuits and internal equipment wiring need be shown. All external wiring and circuits shall be shown in the riser diagram and the Contractor furnished Point-To-Point Wiring Diagrams.

Changes in or deletion of the modular system wiring diagrams shall not require changes to the riser diagrams and the Contractor furnished Point-To-Point Wiring Diagrams and vice versa except for the panel deletion or change.

4. Information For Maintaining Existing System Operations: When the existing fire alarm system will be permanently retained, shop drawings shall include wiring and/or circuit diagrams showing how the existing fire alarm system will be kept in operation during the construction period.

Delete paragraph where not applicable.

5. Battery capacity calculations.

6. Guaranty.

7. Operations and Maintenance Manual: Provide five (5) bound copies of the Operations and Maintenance Manuals in three (3) hole

binders with hard covers. The manuals shall be submitted to the Engineer a minimum of two (2) weeks prior to the final test.

a. The manual may be provided in several volumes if so approved by the Engineer.

b. All drawings shall be folded to letter size by individual sheets so they can be retained in the manual.

c. The manual shall contain the following:

(1) Manufacturer's Printed Equipment /System Operations And Maintenance Manual, And Devices Brochures:

(a) Start-up, operating, preventative maintenance, adjustment and troubleshooting procedures, and parts list.

(b) System Control Diagrams.

(c) Internal equipment wiring diagrams.

(2) Manufacturer's Representatives: The names, addresses and phone numbers of the fire alarm system manufacturer, the nearest manufacturer's representative, and the nearest supplier of the manufacturer's equipment and parts.

(3) FACP Programming Access Code.

(4) Fire Alarm System Test Results: Provide completed test plan data sheets with the recorded measured data obtained during pre-final testing in the designated spaces and a printout of the equipment program. The test plan shall be developed in accordance with the Standard Test Plan for Fire Alarm

NOTES TO DESIGNER

Distribution:
3 copies: User Maint. Agency
2 copies: User

During the maintenance and operations manual submittal review / approval, the designer shall verify that all the items specified are complied with and included in the maintenance and operations manual.

Engineers, technicians, and others will use the manual for repair, maintenance and/or system expansion.

System appended at the end of this section or use DPW Standard Test Plan Forms, which can be obtained from the Engineer, and include the following information.

(a) Test information applicable for the project.

(b) Standard attendance signature sheets.

5. Field-Posted As-Built Fire Alarm System Drawings: Provide a copy of the field-posted as-built information, and other diagrams and drawings prepared by the fire alarm system manufacturer or supplier for the project.

1.07 QUALITY ASSURANCE

A. Codes, Standards and Regulations: Perform the entire installation in strict accordance with the requirements, practices and recommendations of the following:

1. American Electricians Handbook by Croft (latest edition), McGraw-Hill;

2. Practical Electrical Wiring by Herbert P. Richter and W. Creighton Schwan, McGraw-Hill;

3. Copper Development, Inc.'s "Copper Building Wire Handbook";

4. National Electrical Code;

5. National Electrical Safety Code:

6. NFPA Codes and Standards for Fire Alarm and Fire Protection Systems;

7. Local ordinances and regulations of the County;

8. International Municipal Signal Association Inc. Specification No. 19-1 1991, polyethylene insulated, polyvinyl chloride jacket signal cable; and

9. Applicable instructions of the manufacturer for equipment and materials supplied for the project.

B. Underwriters' Laboratories Listing And Cross-Listings: Each and all items of the fire alarm system shall be a standard and listed product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc.(UL) or appropriately cross-listed, and shall bear the "U.L." label. All control equipment shall be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable.

C. Underwriters' Laboratories Listing And Marking For Systems Controls: In addition to the UL-UOJZ requirement mentioned above, the system controls shall be UL listed for power limited applications per NEC 760. All circuits shall be marked in accordance with NEC article 760-22, circuit marking.

D. Duration Of Doing Business In State: Prior to the time of bidding, the supplier's office shall have supplied fire alarm systems and provided repair service for those systems in the State of Hawaii for a minimum period of three (3) years.

E. Acceptable Installers: Installation, adjustments, and testing of the fire alarm system shall be performed under the supervision of a NICET certified technician or engineer retained by the Contractor who is qualified with at least two years' experience in the installation and operation of the fire alarm system of the type specified herein.

1.09 GUARANTY AND CERTIFICATE

A. The Contractor shall guaranty and certify in writing all work in this section for period of two (2) years. Should any equipment or material fail due to defective equipment, material or workmanship within this period, the Contractor shall replace the item at no cost to the State.

B. The two (2) year guaranty shall start at the end

of thirty (30) consecutive days of trouble free operation after certification by the Fire Department and acceptance by the State whichever date is the latest.

C. If the existing fire alarm system is inoperative or deficient and requires repair, the guaranty shall begin thirty (30) days after trouble free operation after the date the Contractor installed portion of the fire alarm system is tested to confirm that it is operational and meets contract requirements.

1.10 MAINTENANCE

A. During the fire alarm system's two (2) year guaranty period, the Contractor shall supply complete maintenance and testing services for the entire fire alarm system in accordance with the manufacturer's instructions. The system shall be tested and serviced every six (6) months for a minimum of four (4) times during the guaranty period. Reports prepared on Contractor-furnished standardized forms shall be submitted to Central Services Division, State of Hawaii, Dept. of Accounting and General Services at 729 Kakoi Street, Mapunapuna, each time a test and/or maintenance action occurs.

Amend to indicate appropriate user maintenance agency to suit project.

B. During the two (2) year guaranty period, the Contractor shall, upon the receipt of notice from the State's representative, promptly make all repairs arising out of defective material, workmanship or equipment. The Contractor shall respond to such notices within 24 hours after receipt of the notice.

The local representative or supplier shall have direct access to replacement parts and a fire alarm repairman, either on his own staff or in a manufacturer's service center, to ensure the system can be restored to normal operation within two (2) days of system failure. All costs including air-fare, car rental, travel time, etc. shall be borne by the contractor.

It is understood that the State will undertake

NOTES TO DESIGNER

repairs if, following two (2) working days after receipt of such notice, the Contractor fails to make or undertake the repairs with due diligence. The expense in connection therewith shall be charged to the Contractor.

PART 2 - PRODUCTS

2.01 FIRE ALARM SYSTEM EQUIPMENT, COMPONENTS AND MATERIALS

A. Fire Alarm Control Panel (FACP): The Fire Alarm Control Panel (FACP) shall be modular with solid-state microprocessor based electronics, installed in a single enclosure or group of enclosures mounted at a single location (installed within two feet or less from each other).

(See attached Note to Designer No. 2.)

Show the location of the FACP and transponder units on the contract drawings.

The FACP shall be UL listed for NFPA 72 and power limited applications per NEC article 760 and shall also be fully field configurable, programmable, and editable to minimize delay due to last minute operational changes.

1. FACP Initiating Circuit Quantities: The FACP shall contain _____ [minimum number] _____ [Class `B' (Style B) or Class `A' (Style D)] initiating circuits. The FACP shall have the capacity to expand to _____ [maximum number] initiating circuits with the installation of initiating circuit expansion boards.

Specify minimum and maximum number and type of initiating circuits for hardwired system. Class 'A' (Style D) initiating circuits are usually not used.

or,

The FACP shall include [one] _____ addressable loop(s) with [minimum 127] _____ points expandable up to [maximum 500] _____ points for initiating devices with the installation of additional plug-in circuit modules/cards.

For addressable systems specify the number of loops and points required.

2. FACP Signaling Circuit Quantities: The FACP shall contain _____ [minimum number] independently fused signaling (indicating appliance) circuits and shall have the capacity to expand to _____ [maximum number] signaling circuits by installation

Specify minimum and maximum number of signaling circuits.

of signaling circuit expansion boards.

3. FACP Primary Controls And Displays: The FACP shall contain the following primary controls and displays which shall be visible and accessible through the front access panel:

   a. Local Alarm/Trouble Audible Device: The device shall sound during alarm, trouble, or supervisory conditions. This audible device shall sound differently during each of the above conditions to distinguish one condition from another without having to view the panel.

   b. LCD Display: Dual line with forty characters per line liquid crystal alpha-numeric display (Other alternatives to the liquid crystal display that provide the same functional requirements, serve the same purpose and are as readable are acceptable.). The characters shall be backlit for easy readability and shall be a minimum height of three-sixteenths of an inch (3/16").

      Messages shall be displayed in laymen's terms. Manufacturer's code words will not be allowed. For example, messages shall read "Open circuit trouble." or "Signal crct #1", not "Code #1".

   c. LED Display Colors For Various Functions: Individual alarm, trouble, supervisory service and "power on" LED's (Other alternatives to the LED's that provide the same functional requirements, serve the same purpose and are as readable are acceptable).

      The LEDs shall be colored and differentiated as follow:

      (1) Alarm LED - red.

(2) Trouble LED - yellow.

(3) Supervisory service LED - yellow.

(4) "Power On" LED - green.

d. Functions Keys (single action controls):

(1) Alarm, trouble and supervisory service acknowledge keys: When the acknowledge keys are activated the display shall respond/display the location and type of alarm, trouble, or supervisory service.

(2) Alarm silence key: When activated, the alarm audible device shall silence and the alarm indicators shall remain illuminated until the system is returned to normal conditions.

(3) System reset key: When activated, the entire system shall return to normal operating mode. If an alarm condition continues to exist, then the system shall remain in an alarmed state. The time period between activation of the reset key and acknowledgement by the system shall not exceed 30 seconds.

4. Panel Modules and Expansion Cards: The following panel modules, expansion cards and/or a combination thereof shall be provided in the FACP:

a. Master Controller Central Processing Unit: One (1) master controller central processing unit with audio, power supply and charger.

b. Auxiliary Control Relay Module: Provide _____ ( ) Auxiliary Control Relay Module containing four (4) DPDT, positive feedback auxiliary control relays to determine the operational status of remote devices.

Specify quantity required.

5. FACP Functional and Operational

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Requirements: The FACP shall provide the following functional and operational requirements:

a. Date and Time: The FACP shall display the current date and time and provide for the setting and resetting of the date and time.

b. Alarm Verification: Only a verified alarm shall initiate the alarm sequence operation, to eliminate the possibility of false alarms. The activation of any detector (smoke or heat) shall initiate an alarm verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If within one (1) minute after resetting, a second alarm is reported from the same or any other detector, the system shall process the condition as an alarm condition. If within one (1) minute no other alarm is reported, then the detector shall return to normal operation mode.

Delete Items b and c when alarm verification is not required for the project. Where alarm verification tally is required, select one of the two methods described.

c. Alarm Verification Tally: The FACP shall have the capability to display the number of times a zone has gone into an alarm verification mode. Should the alarm verification tally reach a pre-programmed number, a trouble condition shall occur.

OR,

The FACP shall monitor the sensors/zones for maintenance and trouble conditions and generate report logs at the panel.

d. Disable and Enable Control: The FACP shall have the capability to disable /enable a device or a circuit at its point so the system will not alarm during repair and/or maintenance of the device or circuit.

e. Operational, Alarm and Trouble Relay Status: The FACP shall have the capability to check the operational, alarm and trouble status of the DPDT auxiliary control relays.

f. Supervision: The incoming power, system battery power, all devices and LED's (or equivalent alternatives as described herein) in the system shall be supervised and accomplished as follows:

(1) Incoming power shall be supervised so that any power failure shall be visibly and audibly indicated at the FACP and remote annunciator. A "power on" LED, shall be displayed continuously while incoming power is present.

(2) System batteries shall be supervised so that a low battery condition or disconnection shall be visibly and audibly indicated at the FACP and remote annunciator.

(3) The alarm initiating circuits specified herein shall be independently supervised so that a fault in any one circuit shall not affect the subsequent alarm operation of any other initiating circuit within the system.

(4) The alarm signaling (indicating appliance) circuits specified herein shall be independently supervised so that faults or disarrangement in any one alarm signaling circuit shall not affect the operation of any other alarm signaling circuit within the system.

(5) All devices shall be supervised and annunciated at the FACP Annunciator. Annunciation shall include the following conditions for each point:

(a) Alarm.

(b) Trouble.

(c) Open.

(d) Short.

(e) Device missing/failed.

(6) All LED's (or equivalent alternative as described herein) shall be supervised for burnout or disarrangement. A complete and operable circuit for an LED (lamp) test shall be included. For any problem(s) that should occur during testing, the FACP annunciator shall display the location of the problem.

(7) Exceptions No.'s 10 and 11 of NFPA 72 Section 4-2.1 notwithstanding, all fire alarm system panels and equipment internal modules, ribbon cables and wires shall be continuously supervised.

Should modules, ribbon cables and wiring become disconnected and/or severed, the fire alarm system trouble LED shall illuminate and the audible trouble device shall sound.

Note: The State Fire Council ("authority having jurisdiction"), has disapproved the use of NFPA 72's Section 4.2.1, Exceptions 10 and 11.

g. Historical Alarm Log: The log shall record and display chronological information which includes alarm events by date and time and a brief description of the event. The alarm log shall be separate and not combined with the trouble log.

h. Historical Trouble Log:

(1) The log shall record and display chronological trouble information which includes trouble events by date and time and a brief description of the event.

(2) The log shall also record and display walk tests to check for problems that may have occurred during testing.

i. Walk Test:

(1) A zone-by-zone test of the fire alarm system that can be done by one (1) person.

(2) During testing, the system shall pulse the signal for alarm conditions and sound steady for trouble conditions.

(3) There shall be an option for a silent test (Silent Walk Test).

(4) After the walk test has been logged into the Historical Trouble Log the system shall automatically reset itself to normal operation mode.

j. Primary Operator Interface:

(1) Interface shall be via a simplified operator`s panel with indicators and interaction keys required for operation during both normal and emergency situations.

(2) Simplified operating instructions shall be imprinted on the panel face in a manner that is durable and readable.

k. System Operational Functions: System operational functions shall be restricted via categories or access levels with passcodes. The categories or access levels shall deter unauthorized access to various system software procedures.

(1) The first or lowest category/level (Category 1/Level 1) of access shall be reserved for routine

actions for normal operation and shall consist of the following functions:

(a) Alarm Silence.

(b) System Reset.

(c) Use of the acknowledge keys.

(d) Access to system data such as: View Historical Logs and View Point Status.

(2) The highest category or access level shall be reserved for access to sensitive functions by an authorized technician and shall consist of the following functions:

(a) The use of the Walk Test function.

(b) The clearing of the Alarm Verification Tally.

(3) Passcodes shall consist of a number with a minimum of three (3) digits. A passcode shall not be required to access Category 1/Level 1 functions.

(4) If the programs or functions are not used within a category or access level for a period of ten (10) minutes the FACP shall return to normal operation (Category 1/Level 1).

(5) Other Functions: All other functions shall be placed in their respective categories or access levels as determined by the manufacturer.

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l. Operation: The operation of the FACP shall be as follows:

(1) During normal operation the front panel shall display "SYSTEM IS NORMAL" or an equivalent message stating that the system is in a normal operation mode with no problems.

(2) The system alarm operation subsequent to alarm activation by any initiating device shall be as follows:

(a) All audible alarm devices shall sound a three-pulse temporal pattern signal per NFPA 72 until silenced by the alarm silence switch.

(b) All visual alarm indicating appliances shall flash until reset by the alarm silence switch.

(c) Appropriate LED's shall illuminate and the corresponding zone/device information shall be displayed on the FACP display.

(d) Alarm conditions shall be immediately displayed by the fire alarm panel.

Where an existing Fire Alarm System is present, verify whether the panel and devices can sound the three-pulse temporal pattern. If not, discuss the matter with your DAGS Project Coordinator and Central Services Division to determine whether the existing system should be upgraded or whether a variance should be sought from the Fire Dept. to maintain the existing signal pattern (e.g. march-time pattern).

(3) Should the alarm silence button be pressed, all alarm signals shall be silenced, but the alarm LED's shall remain illuminated until all conditions return to normal.

(4) Should the "System Reset" button be pressed, the system shall return to its normal state after an alarm condition has been remedied. If an alarm condition remains then the system shall remain in an alarmed state.

(5) The system trouble operation shall be as follows:

(a) An open or ground in the system shall cause a separately mounted trouble signal to sound continuously until the system has been restored to normal or until the signal has been silenced by a cut-off switch.

(b) Any open circuit or ground in the system shall not cause a General Alarm (false alarm).

(c) All trouble conditions shall be immediately displayed by the FACP.

(d) When the cut-off switch has silenced the trouble signal, a red pilot light shall be illuminated to indicate such action. Upon restoration of the system to normal working order, should the trouble still exist, the trouble signal shall again sound until the cut-off switch has been restored to its normal position and thereby also extinguishing the pilot light.

(e) Should a trouble condition be present within the system and the audible trouble signal is silenced, the trouble signal shall resound at preprogrammed time intervals to act as a reminder that the fire alarm system is not 100% operational.

m. The FACP shall be Simplex 4100 series, Notifier NOTI-FIRE-NET, EST-3 Series, Cerberus MXLV / MXLR Series, or approved equal.

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6. Voice Communications Control: Provide [one (1)] __ ( ) control circuit(s). The control circuit shall have UL listing NFPA 72F and shall provide the following features and functions:

Specify the quantity of Voice Communication Control Circuits required. If none required, delete paragraph.

a. Fire and Voice Control Audio System: The system shall provide one-way voice communication, alarm tones and/or be automatically generated for the conditions as specified above and by firefighting personnel activating the above functions and features or by manually sending voice messages using the system's microphone.

b. Amplifiers: Provide _____ ( ) [25 watt or 75 watt] _____ or larger amplifier(s). The amplifiers shall provide a minimum of 25 VRMS with a minimum frequency range of 120 Hertz to 12,000 Hertz to the speaker circuits as defined by IEEE/EIA standards and definitions. Each amplifier shall be capable of providing acceptable signals to all the speakers including future speaker as specified herein.

Specify wattage required.

c. Single Channel Audio Control Switch: Provide _____ ( ) single channel audio control switch(s) to provide manual access to audio operations for authorized personnel. The module shall include an "ALL Circuits" switch.

Specify number of switches required.

d. Microphone Enclosure: Provide One (1) microphone enclosure when one or more amplifiers as described below in the voice communication control circuit section are required.

e. Microphone:

(1) Hand-held, push-to-talk, noise cancellation type.

(2) Frequency range: 200 Hz to 4000 Hz

(3) Equipped with a self-winding five foot (5') coiled cable.

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(4) An LED (or equivalent alternative as described herein) shall indicate that the microphone push-to-talk button has been pressed and speaker circuits are ready for transmission.

f. Digitized Voice Message:

Coordinate specific messages for your project with the Fire Department. Delete paragraph when not required.

(1) The system shall automatically transmit a pre-recorded digitized voice message to building occupants during alarm conditions.

(2) The automatic message shall not rely on a tape or other mechanical means of transmission.

(3) The standard evacuation message shall be as follows:

"ATTENTION...ATTENTION...ATTENTION ...AN EMERGENCY HAS BEEN REPORTED...ALL OCCUPANTS WALK TO THE NEAREST STAIRWAY EXIT AND WALK DOWN TO YOUR ASSIGNED REENTRY FLOOR OR MAIN LOBBY...DO NOT USE THE ELEVATOR...WALK TO THE NEAREST STAIRWAY...DO NOT USE THE ELEVATOR...WALK TO THE NEAREST STAIRWAY."

Field verify existing messages if present. Modify the message to suit your particular project. Delete horn or bell where not applicable.

(4) The digitized message shall be preceded by an audible alarm signal and ended with an audible alarm signal, i.e., beep, beep, beep, digitized message, beep, beep, beep, etc. The audible signal (e.g. "beep", slow-whoop, etc.) shall be different from other audible signal sounds used at the facility, such as the the school program bell.

(5) The system shall transmit the message for five (5) minutes.

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(6) A self-contained speaker shall also be included and installed to test the message without disturbing the occupants of the facility.

g. Firefighter Master Telephone for Two-Way Communication:

Usually not applicable for schools. Delete paragraph when not required for project.

(1) The system shall be equipped with a firefighters master telephone module which allows two-way voice communication from the FACP to any of the firefighters phone jacks located as shown in the plans.

Specify the number of talk lines and jacks required.

(2) The firefighters phone system shall be fully supervised.

(3) The FACP shall also have a master telephone handset with a flexible coiled cord recessed within the FACP.

(4) The system shall be capable of handling single or simultaneous conversations with all phones connected into the system.

(5) Phone jacks shall be mounted on a single gang plate designed for use with pluggable emergency phones. "Fire Emergency Phone" shall be engraved on the steel cover plate for the jack.

(7) Provide ten (10) pluggable emergency phones within a manufacturer's furnished storage cabinet.

h. Selective Manual Voice Paging:

(1) The system shall also include a selective manual voice paging function.

(2) Upon activation of any speaker

manual control, two (2) attention getting beeps shall sound over the speakers indicating that an impending voice will occur. When the speaker manual control switches are activated, the operator shall be able to make announcements via the push-to-talk microphone.

(3) Total facility paging on all speakers shall be accomplished by activation of the "All Circuit" switch in the single channel audio control switch module as described herein.

7. Battery Capacity Requirements: The fire alarm panel shall include sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of [twenty-four (24)] _____ ( ) hours with five (5) minutes of alarm operation at the end of this period.

The 120 VAC power shall be on a dedicated circuit. Address breaker type and size on the drawings.

Specify a different time period if required.

a. Batteries shall be sealed and "maintenance free" type.

b. The system shall automatically transfer to the standby batteries upon power failure.

c. All battery charging and recharging operations shall be automatic. When required, provide separate enclosure for mounting batteries adjacent to the existing control panel.

d. Provide calculations that both new and existing equipment and device loads do not exceed the battery capacity for the period of alarm operation noted above.

e. All new circuits requiring system operating power shall be 24 VDC and shall be individually fused at the new and existing control panel.

B. Remote Fire Alarm Annunciator: Where shown in the plans, provide and install a fire alarm

Modify paragraph to suit

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your particular project.

annunciator. The annunciator shall be microprocessor based, compatible with the FACP and shall provide the following features and functions:

1. Local Alarm/Trouble Audible Alarm Device: The device shall sound differently during alarm, trouble, and supervisory conditions to distinguish one condition from another without having to view the panel.

2. Displays:

   a. Dual line with forty characters per line liquid crystal alpha-numeric display.

   b. Other alternatives to the liquid crystal display that provide the same functional requirements, serve the same purpose and are as readable are acceptable.

   c. The characters shall be backlit for easy readability and shall be a minimum height of three-sixteenths of an inch (3/16").

3. LED Display Colors For Various Functions:

   a. LED display for individual alarm, trouble, supervisory service and "power on".

   b. Other alternatives to the LED's that provide the same functional requirements, serve the same purpose and are as readable are acceptable.

   c. The LEDs shall be colored and differentiated as follow:

      (1) Alarm LED - red.

      (2) Trouble LED - yellow.

(3) Supervisory service LED - yellow.

(4) "Power On" LED - green.

4. Functions Keys (single action controls):

a. Alarm, trouble and supervisory service acknowledge keys: When the acknowledge keys are activated the display shall respond/display the location and type of alarm, trouble, or supervisory service.

b. Fire Alarm Annunciator Functions Keys:

(1) The annunciator shall contain the function keys as specified herein to access system data such as disable/ enable status, alarm verification tallies, acknowledge status and relay status.

(2) The annunciator shall include the five (5) programmable function keys as specified above for the FACP.

(3) Access to the annunciator's system operational function shall be via access levels and codes similar to that as specified for the FACP.

c. System reset key: Provide a system reset key to acknowledge and reset the main fire alarm control panel. System reset time shall not exceed 30 seconds.

5. Fire Alarm Annunciator Supervision: The fire alarm annunciator shall be supervised within the annunciator and by the FACP.

6. Simplex 4600 Series Annunciator or approved equal.

C. FACP Transponder Units:

1. [Addressable or Hardwired] _____, UL listed for NFPA 72 and power limited application per NEC article 760.

Specify system type.

2. Communications among the remote transponders and the FACP shall be by multiplexing.

3. The FACP and transponder panel shall be NFPA 72A-Type stand-alone system that can be used in normal stand-alone network mode. Each shall have a keypad for control function, i.e. only peer-to-peer network will be accepted; master-to-slave arrangements are not acceptable.

D. FACP, Annunciator And Other Panel Cabinets:

1. General Requirements:

a. Type: Surface mounted wall cabinets with a hinged door and cylinder lock.

b. Construction: Sixteen (16) gauge steel.

c. Finish: Factory paint fire alarm panels and cabinets with a primer coat and not less than two coats of a hard, durable weatherproof enamel.

d. Color: Beige.

e. Keying: Cabinets shall be keyed-alike.

2. FACP Cabinet:

a. Equipped with an auxiliary door for access to normally used switches and meters without exposing wire terminals.

b. Size:

(1) Provide a minimum of four inches (4") of top and side gutters and a minimum of six inches (6") of bottom gutter for wiring.

(2) Sufficient to provide space reserved for additional modules and cards for system expansion.

(3) The enclosure shall be no smaller than [two feet (2')] ____( ) by [three feet (3')] _____ ( ).

Specify the minimum size of the cabinets, especially the FACP.

3. Annunciator Cabinet:

a. Equipped with a hinged door, full-sized

plexiglass window and a cylinder lock.

b. The enclosure shall be no smaller than [two feet (2')] ____( ) by [three feet (3')] _____ ( ).

E. Peripheral Devices:

1. Manual Stations:

Modify paragraphs as necessary to suit your particular project. (See attached Note to Designer No. 3.)

a. [Addressable or Hardwired] _____ single-action type initiating stations with cast-in operating directions. Switch shall be normally open.

Specify system type.

b. Wall mounted over flush outlet boxes.

(See attached Note to Designer No. 4.)

(1) For surface mounted manual stations provide factory manufactured surface back box with same base size as the manual station or to suit enclosure.

(2) When exposed to weather, outlet box shall be of cast metal with watertight gasket between box and station.

c. Keys to reset stations and the fire alarm control panel shall be keyed alike.

d. The fire alarm pull stations shall not utilize break-glass windows or glass rods. When the station is operated, the handle shall lock in a protruding manner to facilitate quick visual identification of the activated station.

e. Stations which utilize screw drivers, Allen wrenches or other commonly available tools to reset them will not be permitted.

f. Screw type terminals for separate wire

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leads to in/out wiring for each leg of the associated signal circuit.

g. Pull station guard covers shall be equipped with tamper-proof latch which may be opened for testing or resetting after station has been operated for fire drills.

h. Simplex No.2099-9754, or approved equal.

2. Bells:

Delete paragraph unless bells are required to match an existing fire alarm system.

a. Polarized, operated by 24 VDC.

b. Screw type terminals for separate wire leads to in/out wiring for each leg of the associated signal circuit.

Vibrating type bells are acceptable for non-school projects.

c. Single stroke type with minimum sound pressure level output of 78 db at 10 feet.

Be sure to show the location of devices on the plans (refer to ADAAG 4.28.2 - Audible Alarms).

d. Steel, 10 inches in diameter, finished in baked-on red enamel paint.

e. Suitable for surface or semi-flush mounting.

3. Horns:

Audible devices must be located where necessary to satisfy the minimum decibel criteria. However, do not locate the devices within small rooms (e.g. restrooms, walk-in closets, etc.) and sound controlled rooms (e.g. conference rooms, sound recording rooms, etc.) where the noise will be deafening unless their provision in the room is required and modifications are made to mitigate its noise impact.

a. 24 VDC.

b. Semi-flush, grill vibrating type suitable for use in electrically-supervised circuits.

c. Screw type terminals for separate wire leads to in/out wiring for each leg of the associated signal circuit.

d. Min. sound output rating: 87 db at 10 feet.

e. Simplex type 4901-9805 or approved equal.

Delete paragraph 3 if only bells are used. Be sure to show the location of devices on the plans (refer to ADAAG 4.28.2 - Audible Alarms).

4. Speakers:

a. 25 VRMS.

b. Semi-flush, 4" diameter, moisture repellant, fire retardant type.

c. Screw type terminals for separate in/out wiring for each leg of the associated signal circuit.

d. Matching multi-tap transformer with taps at 0.25 W, 0.5 W, 1 W, and 2 W at 25 VRMS.

e. Frequency response: 400 Hz to 4000 Hz.

f. Min. sound output rating: 85 db at 10 feet.

g. Simplex type 4902-9703 or approved equal.

5. Visual Alarm Devices:

Be sure to show the location of devices on the plans.

a. 24 VDC.

b. The lamp shall be xenon strobe type or equal.

c. The color shall be clear or nominal white (i.e. unfiltered or clear filtered white light).

d. The maximum pulse duration shall be two-tenths of one second (0.2 sec) with a maximum duty cycle of 40 percent. The pulse duration is defined as the time interval between initial and final points of 10 percents of maximum signal.

See Note to Designer No. 5 regarding visual alarms in sleeping areas.

e. The intensity shall be minimum of 75 candela.

f. The flash rate shall be a minimum of 1 Hz and a maximum of 3 Hz.

g. Tamper resistant lens and polarized in/out wiring.

h. Screw type terminals for separate in /

out wiring for each leg of the associated signal circuit.

i. Simplex type 4904-9137 or approved equal. Combination type devices (i.e. visual alarm device with horn, bell, chime or speaker) shall not be used.

6. Door Holders:

a. 24 VDC. AC models are not acceptable.

b. Long-life electromagnet w/minimum magnet projection. Min. holding force: 25 lbs.

c. Screw type terminals for separate in / out wiring for each leg of the associated signal circuit.

d. The door portion shall be composed of a pivotal-mounted stainless steel armature with a shock-absorbing nylon bearing.

e. Simplex type 2088-9588 (single door) or approved equal.

7. Heat Detectors:

a. [Addressable or Hardwired] _____ thermostat designed to automatically detect the excessive heat created by a fire. The unit shall have fixed temperature sensing and rate compensation self restoring operation.

Specify system type.

When the project requires an addressable system, specify addressable heat detectors and smoke detectors and as noted earlier, manual pull stations.

b. 24 VDC.

c. Min. rated area of coverage: _____ s.f.

Specify coverage.

d. Compact, rugged in construction, unaffected by vibration, and have a large area of protection per unit.

e. Screw type terminals for separate in / out wiring for each leg of the associated signal circuit.

f. No exposed metal parts shall carry current.

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g. Simplex type 4098-9613 or approved equal.

8. Ionization Smoke Detectors:

a. [Addressable or Hardwired] _____ detectors.

Specify system type.

b. UL listed to Standard 268.

c. Either two (2) or four (4) wire, 24 VDC operation.

d. Min. rated area of coverage: _____ s.f.

Specify coverage.

e. Low profile.

f. Ceiling or wall mounted.

g. Totally shielded electronics to protect against false alarms from EMI and RFI.

h. Containing both a pulsing and alarm LED indicator.

i. Locking screw to discourage unauthorized removal of the head from the base.

j. Completely closed back to restrict entry of dust and air turbulence.

k. Magnetically operated test switch that will test the electronics of the unit and put it into alarm.

l. Screw type terminals for separate in / out wiring for each leg of the associated signal circuit.

m. Simplex type 2098 Series or approved equal.

9. Photoelectric Smoke Detectors:

a. [Addressable or Hardwired] _____ detectors with drift compensation.

Specify system type.

b. UL listed to Standard 268.

c. 24 VDC operation

d. Min. rated area of coverage: _____ s.f.

Specify coverage.

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e. Wall or ceiling mounted.

f. Shall not contain radioactive material.

g. Operate on the photoelectric light scatter principle. Each unit's sensing chamber shall house a light source and a light sensor.

h. Power-on indicator.

i. Full functional test switch.

j. Screw type terminals for separate in / out wiring for each leg of the associated signal circuit.

k. Simplex type 4098-9601 Series or approved equal.

Modify paragraph to include other types of new "smart detectors" (e.g. Tru-Alarm, Pytronic Sensors, etc.) where appropriate for your project.

F. Below Grade Direct Burial Type Cables:

1. Below grade fire alarm wiring shall be direct burial multi-conductor type PVC-jacketed cable with #14 AWG and/or larger Type THHN/THWN.

(See attached Note to Designer No. 6.)

2. Multi-conductor cable shall be UL listed, Type TC cable conforming to National Electrical Code Article 340.

   a. Copper conductors shall be concentric stranded, class B (7 strands).

   b. Insulation shall be PVC or nylon with an overall PVC jacket.

   c. Cable Conductor number and color coding shall be as shown on the plans.

3. Below grade twisted pair or twisted shielded pair cable shall be direct burial type with minimum #18 AWG conductors. The cables shall be type _____ or _____.

G. Above Grade Cables And Conductors: Cables and conductors shall be Type THHN / THWN. Type TW is not permitted. Voice (speaker) circuits shall be provided with twisted shielded pair (TSP) cable.

Describe all above-grade cables and conductors required for the project. Minimum conductor gauge shall be

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Conductors shall be ___ AWG.

#14(AWG).

H. Raceways: Raceways shall be installed as specified in Electrical Section. Conceal all raceways unless otherwise noted on the drawings.

Specify and describe type of raceways if they are selected for the installation.

I. Frame for School Campus Map and Operating Instructions: The frame material shall be _____.

Include specifications for frame material that will be compatible with the existing locations and describe their fabrication and mounting requirement to suit the project for the framed map and instructions.

J. Conductor Markers:

1. Taped-band type of permanent material, machine printed with proper identification. Hand written labels are not acceptable.

2. The marker shall be white and the markings black in color so that the identification can be easily read.

K. Cable Markers:

1. Rectangular, commercially available polyethylene cable tags with prepunched holes at each corner for the attachment with self-locking ties.

2. Minimum 0.035-inch thick.

3. Ave. tensile strength: 4500 pounds p.s.i.

4. Non-corrosive, non-conductive, resistant to acids, alkalis, organic solvents, salt water and distortion-resistant in temperatures up to 300 degrees F.

5. White or yellow and machine printed with the phrase "Fire Alarm Cable - Buildings __ to __ " in black block letters 1/8" or larger in vertical height. Handwritten markers are not acceptable.

Indicate building designations.

a. The preprinting shall be permanent and shall not fade or dissolve.

b. The tags shall be suitable for marking with black permanent markers. There shall also be space available for

additional notes (for maintenance / service contractor use only).

L. Cable and Conductor Ties: One-piece, self-locking nylon ties having a minimum loop tensile strength of 175 pounds and resistance to the same conditions as cable marker.

M. Nameplates: Provide metallic and/or phenolic noncorrosive and non-heat sensitive nameplates for:

1. Fire Alarm Control Panel, Annunciators and Transponders: The nameplates shall be factory installed, securely mounted inside the fire alarm panel with machine screws or glue, and shall also be accessible and visible. Information on the nameplates shall be 1/8" or larger lettering stamped or engraved with the following:

   a. Manufacturer's name and address.

   b. Model Number.

   c. Serial Number.

   d. Date of Manufacture.

   e. Manufacturer's drawing number (if available).

2. Subpanels And Modules: The nameplates shall be securely mounted on the Subpanels and/or module with machine screws or glue and include the following information:

   a. Subpanel and/or module model and/or type number.

   b. Catalog number.

N. Panel Layout And Circuit Connections Diagram: The diagram shall be printed on bond paper no smaller than 8-1/2 inches by 11 inches. Securely mount the diagram inside the fire alarm control panel and support equipment.

O. Corrosion And Fungus Protection: Metallic equipment shall be coated with a rust inhibiting

treatment and standard finish per the manufacturer's standard. Components shall be protected against corrosion and fungus (e.g. circuit boards shall be epoxy coated).

P. Surge Protection: All electrical circuits (120V and 24 VDC) supplying power to the system components shall be equipped with surge protectors.

PART 3 - EXECUTION

3.01 EXAMINATION OF THE DRAWINGS AND SPECIFICATIONS

Confirm and coordinate voltages and requirements of equipment furnished by other trades which will be connected to the fire alarm system. They include fire sprinkler flow and tamper switches, and any other equipment connected to the fire alarm system. Include the above information on the field-post as-built drawings.

3.02 EXAMINATION OF EXISTING SITE CONDITIONS

A. Cabinets, panels, annunciators, outlets, pull stations, audio / visual devices and other equipment and devices shall be installed in the locations and heights shown on the drawings and/or as specified herein.

1. The location of the equipment and devices shown on the plans are approximate. Before installing, the Contractor shall study adjacent construction, verify all dimensions and sizes of equipment at the job site and perform installation in what he considers the most logical manner.

2. Any changes from the locations shown on the drawings must be approved by the Engineer and shown on the "field-posted as-built" drawings.

3. Any device may be relocated within 10'-0" before installation at the direction of Engineer without additional charge to

State.

B. The Contractor shall determine the location of existing cables and record their route on the field-posted as-built drawings.

3.03 INSTALLATION

A. Protect dissimilar metals with approved fittings and treatment.

B. Coat steel conduits installed underground with an approved asphaltic paint or plastic coating, or wrap with a shingled layer of a pressure sensitive plastic tape, half-lapped. Do not use aluminum in contact with the earth.

C. All metallic conduits and boxes shall be grounded with a green wire ground conductor.

D. Panels Mounting Height: The FACP, fire alarm annunciator and all additional panels shall be mounted such that the top of the cabinet does not exceed six feet (6') above the finished floor.

E. Cables and Conductors:

1. Below Grade Cable Installation: Cable shall be installed in concrete-encased Schedule 40 PVC conduit.

a. Conduits shall be sloped as noted on the drawings to provide drainage at handholes and manholes.

b. Cables shall not be installed in the same ducts, conduits, handholes, manholes, etc. with non-fire alarm circuits.

Specify slope required to achieve drainage. Include this item on the plans; that is, provide for the lower or several of the lower handholes to have drainage in the event of flooding in the area.

c. **CABLES LESS THAN 1,000 FEET IN LENGTH SHALL BE INSTALLED IN CONTINUOUS LENGTHS, i.e. WITHOUT SPLICES. WHERE CABLES GREATER THAN 1,000 FEET IN LENGTH ARE REQUIRED, THE INDIVIDUAL CABLE**

Due to critical nature of the requirement, denote paragraph in bold print. Also add the

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SECTIONS SHALL BE PROVIDED IN THE LONGEST LENGTHS POSSIBLE (UP TO 1,000 FEET) AND SPLICES SHALL BE THE WATERPROOF TYPE.

requirement onto the contract drawings.

d. Align and clean ducts and conduits before cable installation using mandrels, and scrapers and wire brushes. Arrange with the Engineer to have an inspector present for conduit and duct cleaning, and cable installation.

e. Properly sized tensiometer and pulling devices shall be used for cable installation. Jerking of cables during the pulling installation process shall not be allowed.

   (1) At the request of the Engineer, the Contractor shall provide proof and date of calibration of the tensiometer and cable pulling devices used.

   (2) Cable pulling tensions shall not exceed manufacturer`s recommended pulling tensions.

   (3) Use cable lubricants and compounds that will neither change the physical characteristics nor increase the conductor insulation dielectric constants of the cable sheath.

f. Should the contractor proceed with conduit cleaning and cable installation without having notified the Engineer, if directed by the Engineer, the Contractor shall remove the cable(s) for inspection and reinstall at no additional cost to the State.

   (1) The Contractor may reinstall the removed cable if inspection and/or tests show no cable damage.

   (2) If the cable is damaged, the Contractor shall install a new replacement cable at no additional cost to the State.

2. Above Grade Conductor Installation:

   a. Conductors shall not be installed in the same conduits, ducts, junction boxes, etc. with non-fire alarm circuits. 120 volt AC fire alarm circuit conductors shall not be in the same cable nor installed with cables and other conductors in the same conduits, ducts, enclosures, junction boxes, etc. with 24 volt DC fire alarm circuits.

   b. Conductors shall be installed in continuous lengths. Splices shall be made in above ground junction boxes by terminating wires with wirenut connections.

   c. Cable pulling tensions shall not exceed manufacturers' recommended pulling tensions.

   d. Wire-nut connectors: Permitted for connections in above grade locations only, in junction boxes and equipment and to devices that are not available or manufactured with screw-type connections.

3. Conductor Color Code: Conductors shall be provided with insulation color coded as follows:

   a. Power Branch Circuit Conductors: Red (+), White (-) for 120 VAC. Black (+), Red (-), and White (neutral) for 240 VAC.

   b. Initiating Device Circuit: Red (+), Black (-).

   c. Audible Signal Device Circuit: Blue (+), Orange (-).

   d. Visual Signal Circuit: Brown (+), Yellow (-).

   e. Detector Power Supply or separate

See APPENDIX regarding provision of notes on the drawings for wire markings.

(See attached Note to Designer No. 7.)

annunciator wiring color code: Violet (+), Black (-).

f. Tie Circuit:

(1) Red (+), Black (-) if used as an initiating circuit.

(2) Blue (+), White (-) if used as a signaling circuit.

g. Door Holder Circuit (DHC): Pink, Pink.

h. Voice (Speakers) Circuits: Twisted Shielded Pair (TSP) Cable with Red Outer Jacket (cable sheath).

F. Cable and Conductor Terminations And Dress. The following requirements shall apply to terminal cabinets, junction and outlet boxes larger than 12" x 12":

1. Electric equipment shall be installed in a neat and workmanlike manner in accordance with NEC 373-7, Space in Enclosures.

2. Cable conductors or individual conductors shall be bundled, dressed and held together with cable straps, ties or lace and fanned in a manner that equipment terminals are visible and accessible, and allow the connections to be removed and reconnected without moving a large number of wires.

a. Conductors to screw type connectors shall be terminated with wire lugs or with approved cable termination connectors compatible with the specific termination.

b. A minimum of 6 inch excess length shall be provided for conductors from the bundles to the connectors using a vibration loop as described by NEC 300-14.

c. Conductors shall be labeled as specified herein.

NOTES TO DESIGNER

3. Cross-connected conductor pairs in junction and device outlet boxes or cabinets will not require bundling and cable straps, ties or lace but shall be neatly installed with a minimum of 6 inches of excess length so conductors can be easily traced between terminals. Label all conductors as specified herein.

4. Cabinets, junction boxes, outlet boxes, other boxes, shall have sufficient space to accommodate all conductors installed in them without crowding.

5. Completed work shall be uncrowded and uncluttered and shall allow accessibility without cutting and/or removing of any straps, ties, laces, cables, components, devices, brackets, modules, equipment and like items.

6. Cables shall be secured to junction boxes, equipment cabinet backboards, console members or to other system components using cable clamps and wraps. Provide cable support posts as required to facilitate system installation.

G. Cable and Conductor Identification System

Provide not on the dwgs. stating that cables and conductors shall be labeled at all accessible locations.

1. Underground Cable Markers:

   a. Provide markers at both ends of the cables and at all intermediate locations where the cables are accessible and visible.

   b. Each marker shall be secured with two (2) nylon ties.

2. Conductor Markers:

   a. Provide markers at both ends of each conductor connected to the panels or other terminations (e.g. cabinets, equipment terminal outlet / junction

boxes, devices, etc.) and at all accessible locations that conductors pass through.

b. Attach markers a minimum of four (4) inches from the ends of conductors in a manner that will not permit accidental detachment.

3. Initiating Circuits: Initiating circuits (hardwired systems) shall be labeled by zone number as shown on the drawings. Conductors shall be labeled in the fire alarm panel(s), the building's main fire alarm junction box or termination cabinet and at all devices.

(See attached Note to Designer No. 8.)

4. Audible And Visual Signaling Circuits: Signaling circuits shall be labeled by signaling circuit number as shown on the drawings. Conductors shall be labeled in the fire alarm panel(s), in the building's main fire alarm junction box or termination cabinet and at all devices.

5. Annunciator Cables Or Conductors: Annunciator cables or conductors and miscellaneous items and functions peculiar to manufacturer's panels shall be labeled by annunciator or function number and cable, conductor function or zone number as shown on the drawings.

H. Integration of New Panels Into The Existing System:

(See attached Note to Designer No. 9.)

1. Integrate new panels into the existing fire alarm system as specified herein.

2. The integrated fire alarm panels shall operate as a single fire alarm system per Codes and Standards or as a two-part system subject to the control requirements for elevators as shown in the plans.

3. Reprogramming:

NOTES TO DESIGNER

a. Reprogram the new and existing FACP's to accommodate new circuits and/or modified to provide an integrated fire alarm system.

Include panel names such as fire alarm control and fire alarm power panel.

b. One additional programming change to be performed during the final test or within the 2-year guaranty period shall be included at no additional cost to the State.

I. Framed School Campus Map: A framed map of the school campus drawn at a min. scale of _____, showing zone areas served by the fire alarm system, the location of each pull station, and audio and visual alarm devices shall be printed on a white background, and permanently mounted adjacent to the main fire alarm annunciator-control panel.

Indicate the scale of map required. Central Services Division requires the map and instructions for repair and maintenance. The designer is responsible to select and specify suitable map, frame and hardware material for the project.

J. Framed Operating Instructions: A framed set of operating instruction printed on a white background or engraved Main Fire Alarm Panel Operating Instructions shall be provided. The framed instructions shall be permanently mounted adjacent to the main fire alarm annunciator-control panel.

K. Field Touch-up Painting: Touch-up painted surfaces and fire alarm system components damaged during installation to match the existing or specified paint and color.

3.04 TESTING

A. CHANGED CONDITIONS: Changes in the condition of the existing fire alarm system shall be reported in writing to the Engineer with a request for approval and/or direction for the installation of new fire alarm components and circuits if so affected.

B. Testing Of The Existing Fire Alarm System:

1. Prior to working on an existing fire alarm

system, the Contractor shall test the system to ensure that all components of the existing system are in proper working order. The test shall be scheduled with the Engineer and the user a minimum of three weeks prior to any anticipated work on the system.

2. Should any defect or malfunction be discovered during the test, no work on the system shall be performed. A list of the deficiencies shall be submitted to the Engineer and repairs shall be made by the State.

   The Contractor shall allow the State two weeks to make the necessary repairs. After repairs are completed, the Contractor shall again test the system to confirm it is in proper working order, at no additional cost to the State.

3. Unless the Contractor complies with the above, the Contractor shall be held responsible for any deficiency and shall restore the existing/modified fire alarm system to fully operational condition. Expected or normal operating parameters such as, but not limited to, the voltages and currents for the various circuits and functions of the system shall be provided.

4. If any malfunction occurs after contract work completion, the Contractor shall show evidence why the Contractor's work did not cause the fire alarm system to fail.

C. Testing Of The New Fire Alarm Systems:

1. After completion of the fire alarm system's installation, turn on and leave the system on for a minimum of three (3) consecutive weeks to demonstrate that contract work operates, meets the requirements of the specifications and does not affect the operation of the entire fire alarm system.

2. Upon successful completion of the three (3) week operational period, arrange with the Engineer for a prefinal fire alarm system test and inspection. The test and inspection shall demonstrate that all the Contractor installed fire alarm system

equipment, devices cables and conductors are operating acceptably and have been installed in accordance with this specification.

Accordingly, the test demonstrates that the system is ready for a final test of the overall fire alarm system.

Representatives at the prefinal test shall include the Contractor, fire alarm system mfr. representative, user, the user's facility maintenace agency personnel, F.A. system design consultant, and the Engineer. Representatives at the Final test shall include all the foregoing representatives and the County Fire Department Inspector.

3. Fire Alarm Panel And Equipment Tests: Test all equipment by disconnecting modules, ribbon cables and wiring to verify that the system/equipments are supervised. Demonstrate both normal and abnormal modes of operation and the required responses of each mode.

4. Power Supply: Conduct a complete test of the power supply including rectifier, charging rates, and automatic controls in accordance with the manufacturer's instructions and recommendations.

   Record operating input and output AC and DC voltages and currents (load) at the time of the tests and provide the data as part of the test and maintenance documentation submission requirements as specified herein.

5. Detailed Circuit Tests: Make detailed tests of supervisory features and trouble alarm circuits and relays. Tests shall be performed in accordance with the manufacturer's instructions and recommendations. Record operating amps per signal circuit and voltage at the last signal device.

6. Trouble Line Operations Test: Simulate line trouble by removing circuit wires from

NOTES TO DESIGNER

terminals or applying grounds to these terminals in the fire alarm panel.

7. Audio Tests:

When Buildings or rooms are not sound-proof or air-conditioned, delete audio tests.

a. Provide test equipment and conduct audio test for the fire alarm system in and around the building and in areas where new audio alarm devices have been installed.

b. Audio measurements shall be made in classrooms and other rooms (e.g. equipment and storage rooms) and buildings with the doors in the open and closed position.

c. The audio test plan and proposed test equipment shall be submitted for review and approval with the test plans submittal specified herein.

d. The measured data shall be recorded on data sheets provided by the Contractor and shall be part of the test plan submission and records.

e. At the request of the Engineer, the Contractor shall provide proof of instrument calibration and date of calibration.

8. In addition to satisfactory acceptance tests of the Contractor portion of the fire alarm system, where a new fire alarm system is tied into an existing system, the entire fire alarm system must be accepted and certified by the County Fire Department before commencement of the specified two-year system warranty period with full maintenance responsibility.

The tests must demonstrate that the entire campus (or facility) fire alarm system is operating in order to receive the Fire

Department Certification.

9. If requested by the Engineer, isolate the contract work from the overall system and demonstrate that the contract work does not affect the operation of the overall fire alarm system and shall repeat tests at no additional cost to the State.

D. Concealed Work: Concealed work re-opened and re-closed at random during the formal inspection as requested by the Engineer shall be done at no additional cost to the State.

E. Testing Tools and Equipment: The Contractor shall provide the tools and equipment, including walkie-talkies, etc. necessary to accomplish the testing.

3.05 REPAIR AND RESTORATION

A. Removal Of Existing Fire Alarm Equipment:

1. Where required, the Contractor shall remove all existing unused control panel, annunciator, pull stations, wires, signals and other devices. Remaining junction boxes, etc. shall be covered and painted to match the existing building. Wall penetrations shall be patched and painted to match the adjacent wall finish.

2. Removed equipment in good condition, as determined by the Engineer, shall be placed in cardboard cartons, labeled and delivered to Central Services Division, State of Hawaii, Department of Accounting and General Services at 729 Kakoi Street, Mapunapuna.

3.06 TRAINING:

NOTES TO DESIGNER

A. Conduct training and instruction for the operating and maintenance staff, as designated by the Engineer, on the operation of the fire alarm panel and system.

B. The training session shall be conducted during normal business hours, and shall last as long as necessary to properly instruct the staff, but not less than 1-hour.

C. Instruction shall include hands-on training in routine operations and queries (reading of normal status and trouble status) of the fire alarm system.

D. Training shall be provided for the existing fire alarm system and new fire alarm system and additional circuits and devices.

E. If the main control panel and annunciator panel are of the central processing unit (CPU) type system, instruction shall include operations and query of system status, etc.; and hands-on training in the procedures and process for operations and obtaining system status, trouble and other functional information to determine when to call for repairs and how to report the type of trouble encountered.

END OF SECTION

APPENDIX TO SECTION 13850 - INSTALLATION NOTES

I. Installation Notes for Point-to-Point Wiring Diagrams

Ensure that the following installation notes are included in at least one of the drawings (preferably in all the point-to-point wiring diagrams) and referenced to that sheet in all the other drawings:

A. Provide wire marking required by the NEC for all wire connections/terminations (fire alarm control panel, terminal cabinet, junction boxes, terminations, and devices) and indicated as follows:

VSC1-I = Visual Signal Circuit #1 - In
VSC1-O = Visual Signal Circuit #1 - Out

ASC4-I = Audio Signal Circuit #1 - In
ASC4-O = Audio Signal Circuit #1 - Out

ICZ6-I = Initiating Circuit Zone #6 - In
ICZ6-O = Initiating Circuit Zone #6 - Out

DRH16-I = Door Holder Circuit #16 - In
DRH16-O = Door Holder Circuit #16 - Out

COMM1-I = Communications Circuit #1 - In
COMM1-O = Communications Circuit # - Out

B. Provide wire nut connections for all devices with pigtails. All others shall be by screw or terminal connections.

C. Provide size in ohms and rating in watts for all "end-of-line" resistors in the final as-built drawings.

D. Provide six feet of slack for all spare incoming conductors in fire alarm control panel, or the fire alarm system termination cabinet or junction box when provided. Secure wiring with cable ties to interior of the fire alarm control panel. (Goal is to provide maximum access to panel components and minimize congestion in the fire alarm panel(s).)

E. Install wire markers a minimum of 4 inches from their ends in a manner that will not permit accidental detachment. Provide a minimum of 6 inches of wire slack per NEC and/or a minimum of 6 inches of wire in a vibration loop. Provide a vibration loop for each wire termination to equipment terminals inside fire alarm control panels and other equipment.

F. Install cable markers for each control cable in all handholes and locations where cables terminate or pass through as required in the specifications.

II. Equipment Wire Connections Method

Unless the Contractor knows of a better method for managing and accounting for the massive number of wires that must be connected to equipment and equipment module terminals that will result in a relatively neat installation, he shall use the method for strapping, bundling and tying of wires using temporary ties as described hereinafter:

A. Use insulated #14 and #12 AWG wires (either used material or unusable short scrap pieces) for temporary strapping, bundling and tying.

B. Secure wire in bundles by wrapping short tie wires around them and twisting the tie-wire ends to keep the bundle shapes.

C. Tie the bundles down at convenient locations in the panel.

D. Use insulated #12 AWG wire scraps as stiffeners for small bundles or to keep single or paired wires in place. (The ends of the stiffener wires may be anchored to the rack or equipment for permanent installation.)

E. After completing the labeling of the wires, checking/testing for correct connections and making the final terminations/connections in the order stated above, install the permanent ties.

F. Finally, remove the temporary ties.

SUBJECT: SECTION 13850 - FIRE ALARM SYSTEMS
NOTES TO DESIGNERS

Note to Designer No. 1:
[Spec Reference: Paragraph 1.06 C. - Drawings, Data & Info to be Submitted; page 2]

The objective is to have a record of the installation in our contract file and minimize the number of drawings for review and retention in our Design Plan File.

Contract Fire Alarm Installation Drawings customarily include the Legend, Site Plan, Signal Plans (floor plans showing locations of fire alarm devices, panel and equipment), Riser Diagrams, etc.

To comply to DPW requirements, the Riser Diagrams must be sufficient to ensure a quality Fire Alarm design as well as provide information for bidding, installation, repair and maintenance. The Riser Diagram must include the following information:

A. Locations of all panels and devices.

B. Minimum conduit sizes and conductor counts, cables, junction boxes, terminating cabinets, handholes, etc.

C. Sequence of Connections of all initiating circuits' and signaling circuits' devices so the sequence of circuit numbers, and sequence of connections of all devices can be readily determined and followed. End-of-line resistors must also be shown.

D. Initiating zones must be assigned for hardwired systems to each building or building clusters. For addressable systems, loop or loops must be shown. For addressable loop or loops, specify or provide system design installation requirements which will allow personnel to isolate open circuits and other problems by circuit segments within each floor and by floors with the minimum of effort and time. In addition, loop or loops segments must also be extended to all buildings in a manner to make isolating trouble easier.

   Addressable systems allow T-Tapping and some do not. The designer can specify and show the segments discussed above. Require and confirm that the Contractor shows the actual connections for loops, i.e., sequenced or T-Tapped as as-built information (four wires for loops and two wires for T-Taps).

E. Installation Notes.

F. Conductor and cable conductor color codes and assignments by circuits with number of spares shown/specified, and cable conductor count which will equate to circuit pairs.

G. Statement that the minimum size of cable conductors and conductors must be reconfirmed by the Contractor subject to the minimum current requirements of the Contractor furnished fire alarm system components-devices. If the required conductor sizes differ from those shown in the contract drawings, the Contractor shall

indicate the change on the Shop Drawings.

H. Statement that the Contractor shall determine the final cable conductor and above grade conductor size and count which must accommodate the Contractor furnished components-devices and the number of initiating (Or addressable loop or loops) and signaling circuits specified.

****

Note to Designer No. 2:
[Spec Reference: Paragraph 2.01 A. - Fire Alarm Control Panel (FACP); page 8]

For projects using the existing fire alarm control panel, indicate on the plans or specifications the brand name, model number and operating voltage of the existing system.

Specify how the panel must be upgraded and new voltage of existing system. Show new modules and changes in the modular system wiring diagram similar to the requirements for a new panel.

Show how the new spare or existing zone/signal circuits will be used.

For projects requiring new and use of existing fire alarm control panels indicate and describe on the contract drawings the panels interface connections required.
****
Note to Designer No. 3:
[Spec Reference: Paragraph 2.01 E. - Peripheral Devices; page 22]

Specify addressable initiating devices when an addressable system is required for the project. Applies to manual stations, smoke and heat detectors.

€ Coordinate the voltage requirements for Duct Smoke Detectors with the Mechanical Engineer.

€ Clearly indicate the required location of devices in accordance with ADAAG on the drawings.
****
Note to Designer No. 4:
[Spec Reference: Paragraph 2.01 E.1 - Manual Stations; page 22]

The Fire Department is allowing the installation of manual stations inside classrooms within six feet from the door nearest to the building's exit or exit stairs. Coordinate with the Fire Department for their approval if a distance greater than six feet is required and can be justified.

The Fire Department will allow installation for covers over single action pull stations to adhere to the requirement of two allowable actions. Moving the **cover** is defined as one action, pulling the manual station is defined as another action for a total two actions allowed by Code.
****
Note to Designer No. 5:
[Spec Reference: Paragraph 2.01 E.5. - Visual Alarm Devises; page 24]

Sleeping Areas: Specify 110 candela at 20 feet from the pillow if the unit is mounted 24 inches or more from the ceiling; 177 candela if mounted less than 24 inches from the ceiling, where smoke obscuration might be a significant factor. Note: Visual notification devices shall also be provided to alert room occupants of incoming telephone calls and a door knock or bell. Notification devices shall not be connected to auxiliary visual alarm signal appliances. [Source: US Architectural and

Transportation Barriers Compliance Board Bulletin #2: Visual Alarms dated July 1994. Note: The "Bulletin" indicates a distance of 20 feet but is not specific on where the dimension is measured from. The NFPA National Fire Alarm Code and UL 1971 Std. specifies a 110 candela level 16 feet "from the pillow". Therefore, the "Bulletin" requirement has been amended to reflect this location.]

****

Note to Designer No. 6:
[Spec Reference: Paragraph 2.01 F. - Below Grade Direct Burial Type Cable; page 26]

Use for fire alarm systems in new facilities and projects where the entire system will be upgraded.

The design consultant shall field verify the condition and capacity of existing conduits, including those below grade, that are proposed to be reused and to clearly indicate in the contract documents the requirements necessary for their re-use (e.g. address removal and replacement of existing wiring where pulling of new wiring will damage the existing wires).

Where the condition of existing conduits and wiring, especially those below grade, cannot be satisfactorily determined during the design stage, the Proprosal shall be modified to include unit prices as a contingency to accomodate the possible need to install new conduits and wiring. The location and routing of the new conduits should be determined by the consultant after the need has been established and existing site conditions, including that of the proposed route, have been verified. (Note: Placement of conduits atop of roofs is not acceptable.)

Confirm minimum conductor and cable conductor gauge specified will provide sufficient voltage for all devices connected. Use Simplex Sales Engineering Bulletin Notification Appliance Circuit Wiring (STRM, Section. E.2.2, dated 12/17/91) or other applicable technical data for confirmation and/or calculations. Provide calculations and confirmation information with prefinal plans and specifications submittal. Simplex Bulletin is available from the Quality Control Branch.

Systematically assign cable conductor numbers and color codes to match fire alarm system circuit assignments. Include a minimum two (2) spare conductor or 20% minimum even number of spare conductors.

Include the type and description for all the cables required for the project. Specify TC twisted shielded pair cables where necessary to suit project conditions. Note: Some equipment require twisted pair cable for communication /data transmission instead of twisted shielded cable. Reason: The additional capacitance of the shield absorbs energy and distorts and attenuates data pulses which results in no communications/data transmission.

****

Note to Designer No. 7:
[Spec Reference: Paragraph 3.03 E.3. - Conductor Color Code; page 31]

Include/show the standard color codes in both the specifications and the contract plans, i.e., the riser diagrams and the point-to-point wiring diagrams.

Assign cable conductors by the cable conductor number in circuit pairs uniformly, i.e., cable conductor number one and two used for a circuit becomes circuit pair number one.

Compare and match existing fire alarm cable conductor assignments when feasible and advantageous.

Reasons: Usually, installers and technicians do not have the contract specification during installation and maintenance.

Installers and technicians will memorize cable conductor numbers and color codes, and circuit color code assignments.

Uniformity in assigning the above color codes will minimize errors in installation and maintenance.

Delete circuits if they are not required for the project.

Exception for the cables above: For below grade cables when direct burial type cables are mandatory for installation, use other available colors for outer jacket when red outer jacket and suitable direct burial type cables are not available. Black and Gray outer jacket are acceptable direct burial type cables.

Note: Red outer jacket is selected to differentiate the cable from the Data Bus (Network) Twisted Shielded Pair Cable which the color black was selected.

When the design mandates the use of a direct burial type cable which includes conductors with color code of green, white and gray, include a note in the specifications and the plans that the green, white and gray conductors shall not be used.

****

Note to Designer No. 8

[Spec Reference: Paragraph 3.03 G.3 Initiating Circuits; page 33]

List buildings and building groups assigned to initiating and signaling circuit zones on the drawings. Clusters of buildings in a single zone must not be more than 100 feet apart. The foregoing does not apply to addressable loops for addressable initiating devices; however, the loop or loops routing and segments should be systematically planned, specified and shown in the plans and specifications.

****

Note to Designer No. 9:

[Spec Reference: Paragraph 3.03 H. - Integration of New Panels into the Existing System; page 33]

All additional panels for the project shall be integrated into the existing fire alarm system, especially for FACPs which require reprogramming of software. Estimated cost; $800 - $2500.

All panels required for supervision of elevators and elevator shafts shall not be installed in the elevator machine room. ANSI/ASME safety code for elevators and escalators Rule 101.26 states that only equipment required for elevator operation are permitted in the elevator machine room. This requirement is strictly enforced by the Building Department's elevator inspectors.

****

NOTES TO ARCHITECT

This guide specification covers the requirements to be followed by the Contractor for testing and air monitoring on an asbestos abatement project.

Since testing and air monitoring are basically an inspection process that is normally delegated to a consultant and specified under a standard scope of work, this section should only list Contractor requirements.

Since the Contractor must coordinate his efforts with the Inspector, the requirements of Section 13997 should provide work specifications that will assure performance within the limitations to be verified by the Inspector.

There have been instances where the Contractor has assumed that the Engineer would supply his legally required records long after the project was completed.

Instances have occurred

SECTION 13998 - TESTING/AIR MONITORING

PART 1 GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 SUMMARY

Testing and air monitoring shall be supplied by the Engineer for the purpose of:

A. Verifying compliance with the specifications listed in Section 13997;

B. Ensuring that the owner's legally required documentation is collected;

C. Providing engineering control during the project.

1.03 COORDINATION WITH OTHER SECTIONS

The testing/air monitoring requirements included in the scope of work for any testing/air monitoring consultants or inspectors, and all applicable Federal, State, and local regulations shall be coordinated with this section.

PART 2 PRODUCTS

(Not applicable to this section.)

PART 3 EXECUTION

3.01 ABATEMENT CONTRACTOR RESPONSIBILITIES

A. The Contractor shall be responsible for providing the personal monitoring and necessary records for all of the Contractor's employees as required by OSHA (29 CFR 1926.58), Hawaii State Law (12-145) and all other applicable law.

B. The Contractor shall obtain the legally required reports for air monitoring as part of the contract.

C. Monitoring information developed by the

NOTES TO ARCHITECT

Inspector's activities while under contract with the State shall be for the use of the Engineer. The information will be available and offered to the Contractor when developed, but not thereafter, and shall not waive the Contractor's obligations stated elsewhere in this section.

where Contractors have been offered monitoring information, declined it, and then requested it later, when it was no longer available.

D. Air monitoring and testing which becomes necessary in order to follow up on work by the Contractor which is rejected as not conforming to the requirements hsall be the responsibility of the Engineer. However, the full cost of such additional monitoring and testing shall be borne by the Contractor, and shall be deducted from the final contract payment.

Testing and monitoring are expensive. When it is involved with rechecking defective work the cost burden should be borne by the Contractor.

E. Personal air monitoring that is part of the Inspector's scope of work shall be accomodated by the Contractor and shall not be assumed to be the monitoring required of the Contractor by law or regulation.

The inspector will normally do personal monitoring as part of his overall scope of work, but it should be the responsibility of the Contractor to obtain and retain the Contractor's information.

3.02 TESING / AIR MONITORING INSPECTOR

A. The Inspector will ensure that the applicable specifications are being followed using the methods and requirements of the applicable scope of work.

B. The Inspector shall have the authority to exercise engineering control during the project.

These concepts are actually covered in the GENERAL CONDITIONS, but in practice some parties have assumed it does not apply to inspection done by consultant testing and air monitoring.

END OF SECTION

NOTES TO ARCHITECT

SECTION 158**30** - CEILING FANS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 GENERAL REQUIREMENTS

Furnish and install ceiling fans as shown on the drawings and perform all operations to complete the installation ready for use.

1.03 QUALITY ASSURANCE

A. Fans shall be provided with metal identification plates **or adhesive labels** permanently affixed in a conspicuous location identifying the manufacturer, model and **model** number.

B. Fans shall be U.L. listed. **The U.L. label shall be firmly affixed to the fan.**

C. Fans shall either be assembled and/or manufactured or distributed in the U.S.A. Imported fans and parts are acceptable provided they comply with the requirements of this specification and are distributed through an American based distributing/manufacturing company who shall be responsible for the execution of the fan's guaranty/warrant agreement.

D. The manufacturer or the American based distributing/manufacturing company shall be an established company who has regulary engaged in the manufacture and/or distribution of ceiling fans for the past 10 years.

E. The fan distributor/manufacturer shall maintain an Authorized Service Center in the State of Hawaii. In addition, the service center shall maintain a local inventory of replacement and service parts.

1.04 SUBMITTALS

Submit six (6) copies of the following to the

Engineer:

A. Shop drawings and/or manufacturer's product data showing construction and installation details.

B. Manufacturer's installation instructions.

C. Manufacturer's electrical control diagrams.

D. Manufacturer's operations and maintenance manual.

E. Manufacturer's standard color chart for body and blades.

F. Manufacturer's guaranty/warranty.

G. Maintenance Service Contract.

1.05 GUARANTY AND WARRANTY

The Contractor shall furnish the following:

A. A written guaranty against all defects in materials, workmanship and installation. He shall certify that he will correct any defects other than ordinary wear or improper use that may develop within one year from the date of project acceptance at no cost to the State.

B. Manufacturer's **standard 15 year warranty on the fan motor.**

C. Manufacturer's standard 5 year warranty on the flywheel.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing

materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

B. Ceiling fan shall be constructed with the following requirements and accessories:

1. General:

a. Minimum 4-blade type with minimum 52" sweep which will provide quiet operation.

b. All-metal construction.

c. **The fan body** and switch cup/cap shall be die-cast or stamped heavy gage steel. **The switch cup/cap shall be removable for ease of service.**

d. **The support assembly (two-piece canopy with cross bar mounting bracket or single piece canopy with mounting bracket) with a ball and socket hanging system (Cathedral Hanging) shall be U.L. listed. The locking system shall be by cross pin and set screw. Where a two-piece canopy is used, the cross bar mounting bracket shall be made of either die-cast or stamped heavy gauge galvanized steel or stainless steel. Aluminum or zinc is not acceptable. Where a mounting bracket is used as the support assembly beneath a single piece canopy, it shall be made of high quality non-recycled**

NOTES TO ARCHITECT

die cast zinc.

Fasteners used to secure the support assembly to the substrate shall be electroplated steel or stainless steel.

e. **Non-rotating stationary hanger pipe of cold rolled steel with powder coated finish, specifically designed and manufactured to support the fan, nominal 1/2" (minimum 5/8") inside diameter, fastened directly to the motor housing. Thin walled Electrical Metal Tubing (EMT) and aluminum tubing is not acceptable.**

For unusually wet environments, specify the provision of galvanized steel or stainless steel hanger pipes.

f. **Fan control wiring shall be located within the hanger pipe, protected from rotating parts.**

g. Extension lead wires shall be of sufficient length to accomodate the required length of extension poles. Rewiring of the fan unit or splicing of the wires to increase its length is not acceptable.

2. Motor:

a. The motor shall be manufactured in accordance with NEMA, U.L. or CSA Standards.

b. The motor shall be either an "Induction Type" or "Spinner Type" as described below:

(1) Induction Type (K55 or approved equal):

(a) Stator width = min. 140 mm.
(b) Stator ht. = min. 25.0 mm.
(c) No. of winding poles = Min. 18.
(d) Min. 2,244 lineal feet of

copper wire winding.

(2) Spinner Type:

(a) Stator width = min. 188 mm.
(b) Stator ht. = min. 20 mm.
(c) No. of winding poles = Min. 16.
(d) Casing = Aluminum, minimum 5/16" thick.

c. The motor shall be direct drive, 120 VAC, 60 Hz, rated miminum **0.7** Amps, reversible, with 100% copper windings.

d. Electrical windings shall be insulated in accordance with U.L. Class "B" Standards. Paper insulation is not acceptable.

e. The motor's operation shall not interfere with radio or television reception.

3. Bearings:

a. Bearing shall be corrosion resistant, permanently lubricated, sealed, no-oil type requiring no maintenance.

b. Where spinner type motors are used, the bearings provided shall be high quality double shielded bearings of the type described above.

Delete the type of control switching which does not apply to your project.

4. Control Switch:

a. Triple capacitor speed control.

b. Single switch controlling a single fan unit:

(1) Solid-state speed control, step

speed selection, reversible to pull the air up or push it down.

(2) Switch shall have a knob for "off", "low", "medium" and "high" speed control.

(3) Speed range shall be approximately 20 RPM to 210 RPM.

(4) Switch shall be mounted in a metal box on the wall.

c. Single switch controlling a bank of fan units:

(1) "On-off" control switch controlling the number of fans as indicated on the drawings. Switches shall be mounted in a common metal box on the wall.

(2) The control switch shall have sufficient amperage to supply power to the number of fans connected to the switch as indicated on the drawings.

(3) The fan speed control pull chain shall be equipped with break-away linkage.

5. Fan Blades **and Fan Blade Holders**:

a. Fan blades shall be manufactureed from seasoned hardwood, minimum 6-ply cross-laminated construction with sealed edges.

NOTES TO ARCHITECT

b. **Blade holders shall be U.L. listed, rigid, manufactured from die-cast steel or non-recycled zinc alloy. Stamped steel is not acceptable.**

   The angle or "Pitch" of the holder shall be factory calibrated to be no more than 16 degrees and no less than 12 degrees.

c. **Each set of fan blades and holders (for each individual fan)** shall be balanced to within one gram of each other.

d. **Where stator motors are used, noise-reducing components such as isolation rings and rubber cushions shall be provided.**

Specify fan blade color.

e. Blade finish shall be _____.

6. **Flywheels: Where provided, flywheels shall be manufactured of butyl, neoprene or EPDM (ethylene propylene diene monomer) modified rubber** and shall be warranted for a minimum of 5 years against deterioration and sagging. **Plastic flywheels are not acceptable.**

7. **Finish: Electroplated, epoxy or baked-on paint coating finishes shall provide a uniform smooth finish that is tarnish, rust and scratch resistant.**

Specify fan finish color.

   The fan body and pipe extension finish shall be _____.

   a. **Brass finishes shall be electroplated and finished with a clear acrylic or epoxy.**

   b. **Painted color finishes shall be an electrostatically applied, baked-on powder coat system.**

PART 3 - EXECUTION

3.01 INSPECTION

The Contractor and the Installer shall examine the areas and conditions under which the ceiling fans

NOTES TO ARCHITECT

are to be installed.

Should any condition be found unsuitable, no work shall be done until the unsatisfactory conditions have been corrected and are acceptable to the Installer. Proceeding with work will imply acceptance of the conditions by the Installer.

3.02 INSTALLATION

Show mounting detail on plans.

A. Verify the existing **roof/ceiling** deck slope and mounting conditions. Install mounting plates as required to provide a solid, level and plumb surface for mounting of the outlet box. Mounting plates and outlet box shall be securely mounted and capable of supporting a minimum of 40 lbs. Only UL listed outlet boxes labeled "For Fan Support" shall be used.

Indicate fan location and mounting height on plans. Coordinate location of fans with room lighting so as to no induce strobing effect.

B. Fan motor shall be properly grounded.

C. Assemble and install the fans in accordance with the manufacturer's instructions and recommendations, complete and ready to use.

D. Fans shall be installed at a height as noted on the plans, but in no case shall a fan be mounted with the bottom of its blades lower than 7'-6" above the finished floor surface. In addition, fans shall be installed so that fan blades are no closer than 18 inches away from adjacent walls and finishes.

E. Fan blades shall be uniformly balanced and tightly fastened to the blade holders. Blade holders shall be tightly fastened to the flywheel or motor casing.

F. Fans shall be well balanced and shall not wobble or shake when running at all speeds. A maximum

of 1/8" **horizontal** movement **(at the end of the fan blades)** is acceptable.

3.03 INSTRUCTION TO PERSONNEL

Instruct the operations personnel in the aspects of safety, operation and maintenance of the fans.

3.04 FIELD QUALITY CONTROL

Operational Test: Perform an operational test as required by the manufacturer in the presence of the Engineer. **Each fan unit shall be operated at low, medium and high speeds.**

3.05 CLEANING

Prior to acceptance of the work, thoroughly clean the fan unit and the surrounding area. Patch and/or paint any surface marred or damaged as a result of the fan installation as required to restore the surface to its original condition.

3.06 TWO-YEAR MAINTENANCE SERVICE CONTRACT

A. In addition to the Guaranty on materials and workmanship noted under Sub-Section 1.05, the Installer shall provide a Maintenance Service Contract, countersigned by the General Contractor.

B. The maintenance service shall provide for all labor, material, equipment and parts to service the ceiling fan complete, on a periodic basis, so as to assure its proper operation and function. Such service shall include cleaning of

the fan and blades, re-balancing of the blades where necessary to eliminate wobbling or shaking, etc.

C. The Maintenance Service Contract shall extend for a period of two (2) years commencing on the Project Acceptance Date. All costs for periodic maintenance services shall be included in the lump sum base bid price.

D. Following each service/inspection, furnish an inspection report to the user agency.

E. All maintenance work shall be performed between the hours of 7:30 a.m. to 4:00 p.m., on normal working days from Monday through Friday, excluding State holidays. The contractor shall schedule their visit and work with the user agency.

F. The maintenance contractor shall exercise caution during the progress of his maintenance and repair work to prevent damage to the ceilings and other building elements. The contractor shall restore existing construction, damaged by his negligence, to its original condition at his own expense.

G. The Maintenance Contractor shall keep a separate log recording all maintenance calls to the project at his office. The log shall include, as a minimum, the following information:

1. Name of the person making the service call.
2. Date of the service call.
3. Time in and out from the project.
4. Findings and work performed.

H. The Maintenance Service Contract does not include repairs resulting from vandalism, negligent use or misuse of the equipment.

I. Periodic maintenance shall be performed on a quarterly basis.

NOTES TO ARCHITECT

END OF SECTION