SPECIFICATIONS

City of Beverly Hills – DOG PARK

344 FOOTHILL ROAD
BEVERLY HILLS, CALIFORNIA

MAY 2, 2016
RTK PROJECT NO. 15-11800

Prepared by:

RTK ARCHITECTS INC.
3975 Landmark Street, Suite 400, Culver City, California 90232

SECTION 00 00 20

PROJECT DIRECTORY

Owner:	CITY OF BEVERLY HILLS Stuart Sam AIA – Project Administration Charles Ackerman – Project Manager, Project Administration 345 North Foothill Road Beverly Hills, CA 90210 Tel: 310.285.1188 Fax: 310.273.1096
Architects:	RTK ARCHITECTS, INC. Contact: Mandana Motahari, AIA 3975 Landmark Street, Suite 400 Culver City, CA 90232-2354 Tel: 310.837.3606 Fax: 310.837.6341 Email: mmotahari@rtkarchitects.com
Civil Engineer:	BRANDOW & JOHNSTON, INC. Contact: Orlando Moreno, P.E. 700 South Flower Street, suite 1800 Los Angeles, CA 90017 Tel: 213.596.4609 Fax: 213.596.4599
Landscape Architect:	KSA DESIGN STUDIO Contact: Sharn Stinson-Ure 4212 ½ Glencoe Ave. Marina Del Rey, CA 90292 Tel: 310.574.4460

SECTION 00 01 10

TABLE OF CONTENTS

00 00 02 Project Directory
00 01 10 Table of Contents

Division 1 – General Requirements
01 10 00 Summary
01 17 00 Requests for Information
01 21 00 Allowances
01 23 00 Alternatives
01 31 19 Project Meetings
01 32 16 Progress Schedules
01 33 23 Submittal and Substitutions
01 40 00 Quality Requirements
01 41 00 Regulatory Requirements
01 42 00 Reference Standards
01 53 00 Temporary Facilities and Controls
01 57 23 Storm Water Pollution Control
01 65 00 Storage and Protection
01 70 00 Execution Requirements
01 71 23 Field Engineering
01 74 00 Waste Management
01 78 00 Closeout Submittals
01 78 36 Warranties and Bonds

Division 2 – Site Construction
02 50 00 Site Remediation

Division 3 – Concrete
03 30 00 Cast-In-Place Concrete

Division 6 – Wood, Plastics, and Composites
06 15 00 Decking (on the Drawings)

Division 7 – Thermal, Moisture & Acoustical
07 14 00 Cold Fluid-Applied Waterproofing

Division 9 – Finishes
09 90 00 Painting and Coatings

Division 31 – Earthwork
31 10 00 Site Clearing
31 20 00 Earthwork
31 22 19 Finish Grading

Division 32 – Exterior Improvements
32 01 00 Operations & Maintenance
32 13 13 Concrete Paving
32 31 13 Mesh Fences
32 31 26 Plant Screening System
32 32 00 Concrete Masonry unit Walls
32 82 00 Irrigation
32 91 00 Tree Protection & plumbing
32 91 13 Decomposed Granite
32 93 00 Landscape

Division 33 – Utilities
33 10 00 Water Distribution
33 31 00 Sanitary Sewer Distribution
33 41 00 Storm Drainage

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: City of Beverly Hills – Police Facility – Second and Third Floor Remodel

B. Owner's Name: City of Beverly Hills

C. Contacts: Alan Schneider, AIA – Director of Project Administration
Charles Ackerman – Project Manager

D. Design Professional's Name: RTK Architects, Inc.
Contact: Mandana Motahari, AIA.

F. The Project consists of Site Improvements to accommodate the City's First Dog Park.
Note: The Demolition and Remediation is under a separate contract and will be performed by others. The excavated site will be ready for rough grading and the remainder of the work to be performed by this contract.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Agreement Document.

.

1.03 WORK BY OWNER

A. Owner will supply and install the following items:
1. Security Cameras.
2. Data Cabling.
3. Trash Receptacles.

A. The following items are owner Furnished, and shall be installed by the Contractor:
1. Trees within the Park.
2. Signage (other than required ADA signage)
3. City Standard Benches.
4. Drinking Fountains.
5. Doggie bag Dispensers.

1.04 OWNER OCCUPANCY

A. Owner intends to occupy the Project upon Substantial Completion.

B. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Arrange use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Others.
   3. Work by Owner.
   4. Use of site and premises by the public.

C. Provide access to and from site as required by law and by Owner:
   1. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Time Restrictions:
   1. Refer to General Conditions.

1.06 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner.

1.07 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
B. Section 01 21 00 - Allowances.
C. Section 01 23 00 - Alternatives.
D. Section 01 22 13 – Unit Price Measurements
E. Section 01 40 00 - Quality Requirements.
F. Section 01 42 00 - Reference Standards.
G. Section 01 53 00 - Temporary Facilities and Controls.
H. Section 01 60 00 - Product Requirements.
I. Section 01 70 00 - Execution Requirements.
J. Section 01 78 00 - Closeout Submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 17 00

REQUESTS FOR INFORMATION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section describes procedures for requesting information other than that shown in the Contract Documents, and discusses conditions under which such requests will be considered.

1.02 REQUESTS FOR INFORMATION

A. Assumption of prior knowledge:
   1. Instructions to Bidders for this Work state requirements that, prior to submitting a bid, bidders become thoroughly familiar with the proposed Contract Documents and that they request and secure clarification of all matters on which there may be any question as to design intent.
   2. Reasons for these requirements include the Owner's wish:
      a. That bidders have complete and adequate knowledge of the proposed Work in order to propose a fair and proper bid price;
      b. To avoid unnecessary time-consuming and effort-consuming requests for information during progress of the Work; and
      c. To discourage frivolous requests for information while encouraging acquisition of complete familiarity with the Drawings, Specifications, and other Documents of the Contract.

B. However, the Owner and the Architect recognize that data may inadvertently have been omitted from the Contract Documents or require clarification of alleged conflict of data, and the following procedures are established for requesting such data.

C. Procedures:
   1. Prior to requesting information, conduct a thorough search of the Contract Documents and determine that the information is apparently missing from the Contract Documents or requires clarification of an alleged conflict of data.
   2. Fill out a "Request for Information" form and deliver it to the Architect.
   3. The Architect will conduct the necessary search.
   4. Within five (5) calendar days, the Architect will respond to the Request for Information.
      a. Should the information be missing, or require clarification, the Architect will respond by giving the proper information to the Contractor.

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Cash allowances.

B. Contingency allowance.

C. Inspecting and testing allowances.

D. Payment and modification procedures relating to allowances.

1.02 RELATED SECTIONS

A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.03 CASH ALLOWANCES

A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts, less cost of delivery to site, less applicable taxes.

B. Costs Not Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing.

C. Design Professional Responsibilities:
   1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
   2. Select products in consultation with Owner and transmit decision to Contractor.
   3. Prepare Change Order.

D. Contractor Responsibilities:
   1. Assist Design Professional in selection of products, suppliers, and installers.
   2. Obtain proposals from suppliers and installers and offer recommendations.
   3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
   4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
   5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Differences in costs will be adjusted by Change Order.

1.04 CONTINGENCY ALLOWANCE – Not Used.

1.05 INSPECTING AND TESTING ALLOWANCES – Not Used.

1.06 ALLOWANCES SCHEDULE

A. **Allowance # 1**

Include an allowance of $ …….for Circular Metal Benches, Reference Key Note #20, Sheet# A-2.0

B. **Allowance # 2**

Include an allowance of $ ……for Curved Benches at Concrete Planter walls, Key Note# 41, Sheet# A-2.0

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00

ALTERNATIVES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Alternative submission procedures.
B. Documentation of changes to Contract Sum and Contract Time.

1.02 RELATED SECTIONS

A. Document 00200 - Instructions to Bidders: Instructions for preparation of pricing for alternatives.
B. Document 00433 - Supplement C - Alternatives: List of alternatives as supplement to Bid Form.
C. Document 00500 - Agreement: Incorporating monetary value of accepted alternatives.

1.03 ACCEPTANCE OF ALTERNATIVES

A. Alternatives quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted alternatives will be identified in the Owner-Contractor Agreement.
B. Coordinate related work and modify surrounding work to integrate the Work of each alternative.

1.04 SCHEDULE OF ALTERNATIVES

A. **Alternative No. 1:**
Alternative Item: Refer to Sheets# A-2.0 North-West and South-East Corner Planters/benches shall be an add alternate item in their entirety, Also refer to Details # 1 & 5 /A-3.0.

B. **Alternative No. 2:**
Alternative Item: Where standard precision concrete masonry block has been called out on the North and West yard walls, provide an alternate cost for Shot Blast finish on all exposed faces.

C. **Alternative No. 3:**
Alternative Item: refer to Sheet #A-1.0 and Sheet# A-2.0, existing North Side landscape area top 9” soil shall be remediated new top soil shall be added and provide new landscaping and irrigation per Landscape drawings (Sheet #L2.0)

D. **Alternative No. 4:**
Alternative Item:

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Construction Manager will conduct project meetings throughout the construction period.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

1.02 SUBMITTALS

A. Agenda items: To the maximum extent practicable, advise the Architect at least 24 hours in advance of project meetings regarding items to be added to the agenda.

B. Minutes:
   1. The Construction Manager will compile minutes of each project meeting, and will furnish required copies to the Contractor and required copies to the Owner.
   2. Recipients of copies may make and distribute such other copies as they wish.

1.03 QUALITY ASSURANCE

A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

PART 2 - PRODUCTS

(No products are required in this Section)

PART 3 - EXECUTION

3.01 MEETING SCHEDULE

A. Except as noted below for Preconstruction Meeting, project meetings will be held weekly, or as designated by the Construction manager.

B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

A. The Construction manager will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.03 PRECONSTRUCTION MEETING

A. Preconstruction Meeting will be scheduled to be held within -- working days after the Owner has issued the Notice to Proceed.
   1. Provide attendance by authorized representatives of the Contractor and major subcontractors.
   2. The Architect will advise other interested parties, including the Owner, and request their attendance.

B. Minimum agenda: Data will be distributed and discussed on at least the following items:
   1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers, Construction manager and Architect.
   2. Channels and procedures for communications.
   3. Construction schedule, including sequence of critical work.
   4. Contract Documents, including distribution of required copies of original Documents and revisions.
   5. Processing of Shop Drawings and other data submitted to the Architect for review.
   6. Processing of Bulletins, field decisions, and Change Orders.
   7. Rules and regulations governing performance of the Work; and
   8. Procedures for safety and first aid, security, quality control, housekeeping, and related matters.
   9. Record drawings and payment schedules.

3.04 PROJECT MEETINGS

A. Attendance:
   1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work.
   2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved.

B. Minimum agenda:
   1. Review, revise as necessary, and approve minutes of previous meetings.
   2. Review progress of the Work since last meeting, including status of submittals for approval.
   3. Identify problems which impede planned progress.
   4. Develop corrective measures and procedures to regain planned schedule.
   5. Complete other current business.

C. Revisions to minutes:
   1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
   2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
   3. Challenge to minutes shall be settled as priority portions of "old business" at the next regularly scheduled meeting.

SECTION 01 32 16

PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 SUMMARY

A. To assure adequate planning and execution of the Work so that the Work is completed within the number of calendar days allowed in the Contract, and to assist the Architect in appraising the reasonableness of the proposed schedule and in evaluating progress of the Work, prepare and maintain the schedules and reports described in this Section.

B. Related work:
1. Requirements for progress schedule: Bid Package.
2. Construction period: Form of Agreement.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Section 01340.

B. Preliminary analysis: Within ten calendar days after the Contractor has received the Owner's Notice to Proceed, submit one digital file and four prints of a preliminary construction schedule prepared in accordance with Part 3 of this Section.

C. Construction schedule: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit one reproducible copy and four prints of a construction schedule prepared in accordance with Part 3 of this Section.

D. Periodic reports: On the first working day of each month following the submittal described in Paragraph 1.2-C above, submit four prints of the construction schedule updated as described in Part 3 of this Section.

1.03 QUALITY ASSURANCE

A. Employ a scheduler who is thoroughly trained and experienced in compiling construction schedule data, and in preparing and issuing periodic reports as required below.

B. Reliance upon the approved schedule:
1. The construction schedule as approved by the Architect and the Owner will be an integral part of the Contract and will establish interim completion dates for the various activities under the Contract.
2. Should any activity not be completed within 15 days after the stated scheduled date, the Owner shall have the right to require the Contractor to expedite completion of the activity by whatever means the Owner deems appropriate and necessary, without additional compensation to the Contractor.
3. Should any activity be 30 days or more behind schedule, the Owner shall have the right to perform the activity or have the activity performed by whatever method the Owner deems appropriate.
4. Costs incurred by the Owner and by the Architect in connection with expediting construction activity under this Article shall be reimbursed by the Contractor.
5. It is expressly understood and agreed that failure by the Owner to exercise the option either to order the Contractor to expedite an activity or to expedite the activity by other means shall not be considered to set a precedent for any other activities.

PART 2 - PRODUCTS

2.01 CONSTRUCTION ANALYSIS

A. Graphically show by bar-chart, or other means acceptable to the Architect, the order and interdependence of all activities necessary to complete the Work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram.

B. Include, but do not necessarily limit indicated activities to:
   1. Project mobilization;
   2. Submittal and approval of Shop Drawings and Samples;
   3. Procurement of equipment and critical materials;
   4. Fabrication of special material and equipment, and its installation and testing.
   5. Final cleanup;
   6. Final inspecting and testing; and
   7. All activities by the Architect that effect progress, required dates for completion, or both, for all and each part of the Work.

PART 3 - EXECUTION

3.01 PRELIMINARY ANALYSIS

A. Contents:
   1. Show all activities of the Contractor under this Work for the period between receipt of Notice to Proceed and submittal of construction schedule required under Paragraph 1.2-C above;
   2. Show the Contractor's general approach to remainder of the Work;
   3. Show cost of all activities scheduled for performance before submittal and approval of the construction schedule.

3.02 CONSTRUCTION SCHEDULE

A. As required under Paragraph 1.2-D above, update the approved construction schedule.
   1. Indicate "actual" progress in percent completion for each activity;
   2. Provide written narrative summary of revisions causing delay in the program, and an explanation of corrective actions taken or proposed.

3.03 REVISIONS

A. Make only those revisions to approved construction schedule as are approved in advance by the Architect.

END OF SECTION

SECTION 01 34 00

SUBMITTALS & SUBSTITUTIONS
SCHEDULE FOR SUBMITTALS

		Shop Drawings	Samples	Manufacturer literature	Material List	Tests
Division 3 – Concrete						
033000	Cast-In-Place Concrete		X		X	X
Division 6 – Wood, Plastics & Composites						
061500	Decking	X	X	X	X	
Division 7 – Thermal, Moisture and Acoustics						
071400	Cold Fluid-Applied Waterproofing		X	X	X	X
Division 9 – Finishes						
099000	Painting & Coating		X	X	X	X
Division 31 - Earthwork						
312000	Earthwork				X	
312219	Finish Grading					X
Division 32 – Exterior Improvements						
321313	Concrete Paving		X		X	X
323113	Mesh Fences	X	X		X	
323126	Plant Screening System	X	X		X	
323200	Concrete Masonry Unit Walls	X	X	X	X	X
328200	Irrigation	X			X	X
329100	Tree Protection & Plumbing	X				
329113	Decomposed Granite		X	X		
329300	Landscape	X			X	
Division 33						
333100	Sanitary Sewer Distribution				X	
334100	Storm Drainage			X		X

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Quality assurance submittals.

C. Mock-ups.

D. Control of installation.

E. Tolerances.

F. Testing and inspection services.

G. Manufacturers' field services.

1.02 RELATED SECTIONS

A. Document 00300 - Information Available to Bidders: Soil investigation data.

B. Document 00700 - General Conditions: Inspections and approvals required by public authorities.

C. Section 01210 - Allowances: Allowance for payment of testing services.

D. Section 01300 - Administrative Requirements: Submittal procedures.

E. Section 01425 - Reference Standards.

F. Section 01600 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCES

A. ASTM C 1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2001.

B. ASTM C 1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2005b.

C. ASTM C 1093 - Standard Practice for Accreditation of Testing Agencies for Unit Masonry; 2006.

D. ASTM D 3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2004a.

E. ASTM E 329 - Standard Specification for Agencies Engaged Construction Inspection and/or Testing; 2005b.

F. ASTM E 543 - Standard Practice for Agencies Performing Nondestructive Testing; 2004.

1.04 SUBMITTALS

A. Testing Agency (Services retained by the owner):
   1. Prior to start of Work, agency name, address, and telephone number, and names of full time registered Engineer and responsible officer will be published.
   2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

B. Design Data: Submit for Design Professional's knowledge as contract administrator or for the

Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

C. Test Reports: After each test/inspection, promptly submit two copies of report to Design Professional and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Conformance with Contract Documents.
      k. When requested by Design Professional, provide interpretation of results.
   2. Test reports are submitted for Design Professional's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Design Professional, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   2. Certificates may be recent or previous test results on material or product, but must be acceptable to Design Professional.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Design Professional's benefit as contract administrator or for Owner.
   1. Submit report in duplicate within 30 days of observation to Design Professional for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

G. Erection Drawings: Submit drawings for Design Professional's benefit as contract administrator or for Owner.
   1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
   2. Data indicating inappropriate or unacceptable Work may be subject to action by Design Professional or Owner.

1.05 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Design Professional before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Design Professional shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING AND INSPECTION AGENCIES

A. Owner will employ and pay for services of an independent testing agency to perform specified and other required testing.

B. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

C. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

D. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

E. Contractor Employed Agency:
   1. Testing agency: Comply with requirements of ASTM E 329, ASTM E 543, ASTM C 1021, ASTM C 1077, and ASTM C 1093.
   2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
   3. Laboratory: Authorized to operate in Project Location.
   4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
   5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Design Professional before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Tests will be performed under provisions identified in this section and identified in the respective

product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

D. Where mock-up has been accepted by Design Professional and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

3.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Design Professional before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

A. See individual specification sections for testing required.

B. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Design Professional and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Design Professional and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Design Professional.
   6. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Design Professional and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Design Professional. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

3.05 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment, and to initiate instructions when necessary.

B. Submit qualifications of observer to Design Professional 30 days in advance of required observations.
   1. Observer subject to approval of Design Professional.
   2. Observer subject to approval of Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

END OF SECTION

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section describes testing and inspecting to be provided by the Contractor.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Requirements for testing may be described in various Sections of these Specification.

PART 2 - PRODUCTS

2.01 PAYMENT FOR TESTING

A. The Owner will pay for all testing and inspecting required under this Section of these Specifications, and to cover all testing and inspecting required by governmental agencies having jurisdiction. Testing and inspecting specifically requested by the Architect over and above those described above.

B. When tests requested by the Architect indicate noncompliance with the Contract Documents, all testing and subsequent retesting occasioned by the noncompliance shall be performed by the same testing laboratory and the costs thereof shall be paid by the Contractor.

2.02 SPECIFIC TESTS AND INSPECTIONS

A. Tests and inspections will be performed where required by governmental agencies having jurisdiction, required by provisions of the Contract Documents, and such other tests and inspections as are directed by the Architect. List of special inspection is identified on Structural drawings Sheet #S-0.0.0

B. Tests include, but are not necessarily limited to, those described in detail in Part 3 of this Section.

PART 3 - EXECUTION

3.01 TAKING SPECIMENS

A. Except as may be specifically otherwise approved by the Architect, have the testing laboratory secure and handle all samples and specimens for testing.

3.02 COOPERATION WITH TESTING LABORATORY

A. Provide access to the Work at all times and at all locations where the Work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.

3.03 SOIL INSPECTING AND TESTING

A. Make required inspections and tests including, but not necessarily limited to:

1. Visually inspect on-site and imported fill and backfill, making such tests and retests as are necessary to determine compliance with the Contract requirements and suitability for the proposed purpose;

2. Make field density tests on samples from in-place material as required;

3. As pertinent, inspect and test the scarifying and recompacting of cleaned subgrade; inspect the progress of excavating, filling, and grading; make 90% density tests at fills and backfills; and verify compliance with provisions of the Contract Documents and governmental agencies having jurisdiction.

B. Make and distribute necessary reports and certificates.

3.04 CONCRETE INSPECTING AND TESTING

A. Portland cement:

1. Secure from the cement manufacturer Certificates of Compliance delivered directly to the concrete producer for further delivery directly to the testing laboratory.

2. Require the Certificates of Compliance to positively identify the cement as to production lot, bin or silo number, dating and routing of shipment, and compliance with the specified standards.

3. If so required by the Architect, promptly provide such other specific physical and chemical data as requested.

B. Aggregate:

1. Provide one test unless character of material changes, material is substituted, or additional test is requested by the Architect.

2. Sample from conveyor belts or batching gates at the ready-mix plant:

a. Sieve analysis to determine compliance with specified standards and grading;

b. Specific gravity test for compliance with specified standards.

C. Laboratory design mix:

1. After approval of aggregate, and whenever character or source of materials is changed, provide mix design in accordance with ACI 613.

2. Provide designs for all mixes prepared and signed by a registered California engineer.

D. Molded concrete cylinders:

1. Provide three test cylinders for each 115 cu m (150 cu yds), or fraction thereof, of each class of concrete of each day's placement.

2. Test one cylinder at seven days, one at 28 days, and one when so directed.

3. Report the mix, slump, gage, location of concrete in the structure, and test results.

4. Take specimens and make tests in accordance with the applicable ASTM standard specifications.

E. Core tests:

1. Provide only when specifically so directed by the Architect because of low cylinder test results.

2. Cut from locations directed by the Architect, securing in accordance with ASTM C42, and prepare and test in accordance with ASTM C39.

F. Placement inspections:

1. Provide continuous or other inspection of concrete if required by governmental agencies having jurisdiction.

2. Throughout progress of concrete placement, make slump tests to verify conformance with specified slump.

3. Using all required personnel and equipment, throughout progress of concrete placement verify that finished concrete surfaces will have the level or slope that is required by the Contract Documents.

3.05 CONCRETE REINFORCEMENT INSPECTING AND TESTING

A. Prior to use, test all reinforcement steel bars for compliance with the specified standards.

1. Material identified by mill test reports, and certified by the testing laboratory, does not require additional testing.

2. Require the supplier to furnish mill test reports to the testing laboratory for certification.

3. Tag identified steel at the supplier's shop.

4. When steel arrives at the job site without such tags, test it as unidentified steel.

B. Unidentified steel:

1. Have the testing laboratory select samples consisting of two pieces, each 450 mm (18") long, of each size.

2. Have the testing laboratory make one tensile test and one bend test for each 2250 kg (2-1/2 tons) or fraction thereof of each size of unidentified steel.

C. Provide continuous inspection for all welding of reinforcement steel.

3.06 STRUCTURAL STEEL INSPECTING AND TESTING

A. Prior to use, test all structural steel for compliance with the specified standards.

1. Material identified by mill test reports, and certified by the testing laboratory, does not require additional testing.

2. Require the supplier to furnish mill test reports to the laboratory for certification.

3. Tag identified steel at the supplier's shop.

4. When steel arrives at the job site without such tags, test it as unidentified steel.

B. Unidentified steel:

1. Have testing laboratory make one tensile test and one bend test for each 4500 kg (five tons) or fraction thereof of each shape and size of unidentified structural steel.

C. Shop welding:

1. Provide qualified testing laboratory inspector.

2. On single pass welds, inspect after completion of welding and prior to painting.

3. On multiple pass welds, and on butt welds with cover pass on the back side, provide continuous inspection.

D. Field welding: Continuous inspection will be required.

3.07 ROOFING AND WATERPROOFING INSPECTING AND TESTING

A. Prior to start of membrane waterproofing and membrane roofing installation, conduct a job site meeting attended by representatives of the installing subcontractors, the Contractor's field superintendent, the testing laboratory inspector, the manufacturers representative and the Architect, to agree upon procedures to be followed.

B. Prior to start of installation, verify that materials at the job site comply with the specified

standards, that the subcontractor is qualified to the extent specified, and that the installing personnel are fully informed as to procedures to be followed.

C. During installation, verify that materials are installed in strict accordance with the manufacturers' recommendations as approved by the Architect.

D. When so directed by the Architect, make test cuts to verify conformance with the specified requirements.

3.08 WAIVER OF INSPECTION AND/OR TESTS

A. Specified inspections and/or tests may be waived only by the specific approval of the Architect.

END OF SECTION

SECTION 01 42 00

REFERENCE STANDARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Work included:
   1. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.
   2. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship which meet or exceed the specifically named code or standard.
   3. Proof:
      a. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Architect, to deliver to the Architect all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard.
      b. Such proof shall be in the form requested by the Architect, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Architect.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and other Sections of Division One of these Specifications.
   2. Specific naming of codes or standards occurs on the Drawings and/or in these Specifications.

1.02 QUALITY ASSURANCE

A. In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.

B. Rejection of non-complying items:
   1. The Architect reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements.
   2. The Architect further reserves the right, and without prejudice to other recourse the Architect may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Architect and the Owner.

C. Applicable reference standards include, but are not necessarily limited to, standards of agencies and associations who may be referred to in the Specifications by the following abbreviations.

   1. "AA" = Aluminum Association
   2. "AABC" = Associated Air Balance Council
   3. "AAMA" = American Architectural Manufacturers' Association
   4. "AASHTO" = American Assoc. of State Highway and Transportation Officials
   5. "ACI" = American Concrete Institute

6.	"ADC"	=	Air Diffusion Council
7.	"AGC"	=	Associated General Contractors of America
8.	"AI"	=	Asphalt Institute
9.	"AIA"	=	American Institute of Architects
10.	"AISC"	=	American Institute of Steel Construction, Inc.
11.	"AISE"	=	Association of Iron and Steel Engineers
12.	"AISI"	=	American Iron and Steel Institute
13.	"AITC"	=	American Institute of Timber Construction
14.	"ANSI"	=	American National Standards Institute
15.	"APA"	=	American Plywood Association
16.	"API"	=	American Petroleum Institute
17.	"ARI"	=	Air Cond. and Refrigeration Institute
18.	"ASCE"	=	American Society of Civil Engineers
19.	"ASHRAE"	=	American Institute of Heating, Refrigerating, and Air Conditioning Engineers
20.	"ASME"	=	American Society of Mechanical Engineers
21.	"ASTM"	=	American Society for Testing and Materials
22.	"AWI"	=	Architectural Woodwork Institute
23.	"AWS"	=	American Welding Society
24.	"AWWA"	=	American Water Works Association
25.	"BIA"	=	Brick Institute of America
26.	"BOCA"	=	Building Officials and Code Administrators, International
27.	"CDA"	=	Copper Development Association
28.	"CRSI"	=	Concrete Reinforcing Steel Institute
29.	"CS"	=	"Commercial Standards" of the U. S. Department of Commerce Office of Industry and Commerce Commodity Standards Division
30.	"CSA/CAN"	=	Canadian Standards Association
31.	"DOE"	=	United States Department of Energy
32.	"DOT"	=	United States Department of Transportation
33.	"FGMA"	=	Flat Glass Marketing Association
34.	"NEMA"	=	National Electrical Manufacturers' Assoc.
35.	"NFPA"	=	National Fire Protection Association
36.	"PCI"	=	Precast/Prestressed Concrete Institute
37.	"SMACNA"	=	Sheet Metal and Air Conditioning Contractors' National Association
38.	"SSPC"	=	Steel Structures Painting Council
39.	"TCA"	=	Tile Council of America, Inc.
40.	"UL"	=	Underwriters Laboratory

END OF SECTION

SECTION 01 53 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary telephone and facsimile service.

B. Temporary Controls: Barriers, enclosures, and fencing.

C. Security requirements.

D. Vehicular access and parking.

E. Project identification sign.

F. Field offices.

1.02 RELATED SECTIONS

A. Section 01525 - Field Offices.

B. Section 01550 - Vehicular Access and Parking.

C. Section 01565 - Security Measures.

D. Section 01585 - Project Signs.

1.03 TEMPROARY UTILITIES – NOT USED

1.04 TEMPORARY SANITARY FACILITIES – Not Used

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Construction: Contractor's option.

B. Construction: Commercial grade chain link fence.

C. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 EXTERIOR ENCLOSURES

A. Contractor to provide barricades and temporary construction in order to provide access to the building during work on the exterior improvements of the building.

1.08 SECURITY - See Section 01 56 50

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

1.09 VEHICULAR ACCESS AND PARKING -

A. Coordinate access and haul routes with governing authorities and Owner.

B. For contractor's parking, see ----------

C. Do not allow vehicle parking on existing pavement.

1.10 WASTE REMOVAL

A. See Section 01 74 00 - Waste Management, for additional requirements.

B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

C. Provide containers with lids. Remove trash from site periodically.

D. locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

1.11 PROJECT SIGNS -

1.12 PROJECT IDENTIFICATION

A. Provide project identification sign of design and construction indicated on Drawings.

B. No other signs are allowed without Owner permission except those required by law.

1.13 FIELD OFFICES –

1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Restore existing facilities used during construction to original condition.

B. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 57 23

Storm Water Pollution Control

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 apply to this Section.

1.2 SUMMARY

This Section includes general guidelines for implementation and monitoring of Storm Water Pollution Prevention Plan for the purpose of preventing the discharge of pollutants from the Project site during construction.

A Storm Water Pollution Prevention Plan is a fundamental requirement of all projects, and it is required for the following:

Identifies all potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from the construction site

Describes practices to be used to reduce pollutants in storm water discharges from the construction site, and

Helps assure compliance with the terms and conditions of the permit (when the plan is designed for the individual site, and is fully implemented)

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide the quality, grade, and type of materials as specified in The California Stormwater Quality Association (CASQA) - The Construction Handbook.

PART 3 - EXECUTION

3.01 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement:

1. The County of Los Angeles, Department of Public Works –Development Best Management Practices Handbook –Construction Activities.
2. Erosion control plan for the project.
3. Specifications for dry and wet weather best management practice (BMPs), issued by California Stormwater Quality Association (CASQA) in the BMP handbook-Part A – Construction Activities.

3.02 IMPLEMENTATION

A. Install perimeter controls prior to starting Work at the Project site.

B. Contain on-site storm water on the Project site. Do not drain on-site water directly into the storm drain or street without proper filter systems.

C. Surrounding Streets shall be swept daily and periodically to remove any nuisance sediment that leaves the enclose project site.

D. Revise Storm Water Pollution Prevention BMPs and Plan to suit changing Project site conditions and also when properly installed systems are ineffective.

E. Upon Substantial Completion:

1. Leave storm water pollution prevention controls in place when required for post-construction storm water management and remove those that are not needed as determined by OWNER. OWNER will maintain prevention controls left in place.

2. Provide Site Monitoring Reports, Storm Water Pollution Prevention Plan revisions, Compliance Certifications and related documents to OWNER. Post-construction storm water operation and the management plan as mentioned in the compliance certifications are considered to be in place at Final Completion.

3.03 MONITORING

A. Conduct examination of pollution prevention controls on a weekly basis, as well as before and after each storm and each day during extended storm events. Prepare and maintain, at the Project site, a log of each inspection

3.04 LIABILITIES AND PENALTIES

A. Review of the Storm Water Pollution Prevention Plan and inspection log by OWNER shall not relieve CONTRACTOR from liabilities arising from non-compliance of storm water pollution regulations.

B. Payment of penalties for non-compliance by CONTRACTOR shall be the sole responsibility of CONTRACTOR.

C. Compliance with the Clean Water Act pertaining is the sole responsibility of CONTRACTOR. Any fine against OWNER due to non-compliance by CONTRACTOR, OWNER shall recover all costs of the fine by appropriate assessment.

END OF SECTION

SECTION 01 66 00

STORAGE AND PROTECTION

PART 1 GENERAL

1.01 SUMMARY

A. Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division l of these Specifications.
   2. Additional procedures also may be prescribed in other Sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.03 MANUFACTURERS' RECOMMENDATIONS

A. Except as otherwise approved by the Architect, determines and comply with manufacturers' recommendations on product handling, storage, and protection.

1.04 PACKAGING

A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
   1. Maintain packaged materials with seals unbroken and labels intact until time of use.
   2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

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

1.05 PROTECTION

A. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.

B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.06 REPAIRS AND REPLACEMENTS

A. In event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the Owner.

B. Additional time required to secure replacements and to make repairs will not be considered by the Architect to justify an extension in the Contract Time of Completion.

END OF SECTION

SECTION 01 70 00

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Surveying for laying out the work.

F. Cleaning and protection.

G. Starting of systems and equipment.

H. Demonstration and instruction of Owner personnel.

I. Closeout procedures, except payment procedures.

1.02 RELATED SECTIONS

A. Section 01100 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 30 00 - Administrative Requirements: Submittals procedures.

C. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.

D. Section 01 53 00 - Temporary Facilities and Controls: Temporary exterior enclosures.

E. Section 01 53 00 - Temporary Facilities and Controls: Temporary interior partitions.

F. Section 01 51 00 - Temporary Utilities: Temporary heating, cooling, and ventilating facilities.

G. Section 01 74 00 - Waste Management: Additional procedures for trash/waste removal, recycling, salvage, and reuse.

H. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

I. Section 02 41 19 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

J. Section 07 84 00 - Fire stopping.

K. Individual Product Specification Sections:
   1. Advance notification to other sections of openings required in work of those sections.
   2. Limitations on cutting structural members.

L. Section 13284 - Removal and Disposal of U.S. Federal Toxic Substances: Removal of equipment containing substances regulated under the Federal Toxic Substances Control Act (TSCA), including but not limited to PCB- and mercury-containing equipment.

1.03 SUBMITTALS

A. See Section 01 33 23 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.

D. Cutting and Patching: Submit written request in advance of cutting or alteration which affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.
   6. Include in request:
      a. Identification of Project.
      b. Location and description of affected work.
      c. Necessity for cutting or alteration.
      d. Description of proposed work and products to be used.
      e. Alternatives to cutting and patching.
      f. Effect on work of Owner or separate Contractor.
      g. Written permission of affected separate Contractor.
      h. Date and time work will be executed.

E. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.04 QUALIFICATIONS

A. For demolition work, employ a firm specializing in the type of work required.

B. For survey work, employ a land surveyor registered in Project Location and acceptable to Design Professional. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in Project Location.

1.05 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

1. Minimize amount of bare soil exposed at one time.
2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

G. Pest Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.06 COORDINATION

A. See Section 01100 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01600.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Design Professional four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Design Professional, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK – Not Used

3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 CUTTING AND PATCHING

A. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.

B. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

C. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

E. Restore work with new products in accordance with requirements of Contract Documents.

F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of the penetrated element.

H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

I. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

J. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement

of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Design Professional and owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Section 15950 and 01400.

3.12 FINAL CLEANING

A. Owner will provide comprehensive cleaning after final acceptance.

B. Execute final cleaning prior to final project assessment.
   1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

C. Use cleaning materials that are nonhazardous.

D. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

F. Clean filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, and drainage systems.

H. Clean site; sweep paved areas, rake clean landscaped surfaces.

I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

J. Clean Owner-occupied areas of work.

END OF SECTION

SECTION 01 71 23

FIELD ENGINEERING

PART 1 - GENERAL

1.01 SUMMARY

A. Provide such field engineering services as are required for proper completion of the Work including, but not necessarily limited to:
   1. Establishing and maintaining lines and levels;
   2. Structural design of shores, forms, and similar items provided by the Contractor as part of his means and methods of construction.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 23.

B. Upon request of the Architect, submit:
   1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
   2. Documentation verifying accuracy of field engineering work.
   3. Certification, signed by the Contractor's retained field engineer, certifying that elevations and locations of improvements are in conformance or nonconformance with requirements of the Contract Documents.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

1.04 PROCEDURES

A. In addition to procedures directed by the Contractor for proper performance of the Contractor's responsibilities:

   1. Locate and protect control points before starting work on the site.
   2. Preserve permanent reference points during progress of the Work.
   3. Do not change or relocate reference points or items of the Work without specific approval from the Architect.
   4. Promptly advise the Architect when a reference point is lost or destroyed, or requires relocation because of other changes in the Work.
      a. Upon direction of the Architect, require the field engineer to replace reference stakes or markers.
      b. Locate such replacements according to the original survey control.

END OF SECTION

SECTION 01 74 00

WASTE MANAGEMENT

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Owner may decide to pay for additional recycling, salvage, and/or reuse based on Landfill Alternatives Proposal specified below.

E. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood: May be used as blocking or furring.
   5. Land clearing debris, including brush, branches, logs, and stumps: See Section 02230 for use options.
   6. Concrete: May be crushed and used as riprap, aggregate, sub-base material, or fill.
   7. Bricks: May be used on project if whole, or crushed and used as landscape cover, sub-base material, or fill.
   8. Concrete masonry units: May be used on project if whole, or crushed and used as sub-base material or fill.
   9. Precast concrete panels: May be used for erosion control or landscape features.
   10. Asphalt paving: May be recycled into paving for project.
   11. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   12. Glass.
   13. Gypsum drywall and plaster.
   14. Plastic buckets.
   15. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (http://flooring.dupont.com) and Interface (www.interfaceinc.com) conduct reclamation programs.
   16. Asphalt roofing shingles.
   17. Paint.
   18. Plastic sheeting.
   19. Rigid foam insulation.
   20. Vinyl siding.
   21. Windows, doors, and door hardware.
   22. Plumbing fixtures.
   23. Mechanical and electrical equipment.
   24. Fluorescent lamps (light bulbs).
   25. Acoustical ceiling tile and panels.

F. Owner has authorized a waste-management firm to deal with waste generated from this project. The contractor shall contract with selected firm for bins' provisions and disposal. Subject firm will manage all recyclable materials.

G. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.
   5. Incineration, either on- or off-site.

H. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, State and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED SECTIONS

A. Section 01100 - Summary: List of items to be salvaged from the existing building for relocation in project or for Owner.

B. Section 01300 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

C. Section 01500 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

D. Section 01600 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

E. Section 01700 - Execution Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

F. Section 02230 - Site Clearing: Handling and disposal of land clearing debris.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Once Owner has determined which of the landfill alternatives addressed in the Proposal above are acceptable, prepare and submit Waste Management Plan; submit within 10 calendar days after notification by Design Professional.

C. Submit Waste Management Plan within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.

D. Waste Management Plan: Include the following information:
   1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
   2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
   3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
      a. List each material proposed to be salvaged, reused, or recycled.
      b. List the local market for each material.
      c. State the estimated net cost, versus landfill disposal.
   4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
   5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
   6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
   7. Recycling Incentives: Describe procedures required to obtain credits, rebates, or similar incentives.

E. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
   1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
   2. Submit Report on a form acceptable to Owner.
   3. Landfill Disposal: Include the following information:
      a. Identification of material.
      b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project disposed of in landfills.
      c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
      d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and

cost.

4. Incinerator Disposal: Include the following information:
   a. Identification of material.
   b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project delivered to incinerators.
   c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
5. Recycled and Salvaged Materials: Include the following information for each:
   a. Identification of material, including those retrieved by installer for use on other projects.
   b. Amount, in tons or cubic yards (cubic meters), date removed from the project site, and receiving party.
   c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
   e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
6. Material Reused on Project: Include the following information for each:
   a. Identification of material and how it was used in the project.
   b. Amount, in tons or cubic yards (cubic meters).
   c. Include weight tickets as evidence of quantity.
7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

F. Recycling Incentive Programs:
   1. Where revenue accrues to Contractor, submit copies of documentation required to qualify for incentive.
   2. Where revenue accrues to Owner, submit any additional documentation required by Owner in addition to information provided in periodic Waste Disposal Report.

PART 2 PRODUCTS

2.01 PRODUCT SUBSTITUTIONS

A. See Section 01 60 00 - Product Requirements for substitution submission procedures.

B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01600:
   1. Relative amount of waste produced, compared to specified product.
   2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
   3. Proposed disposal method for waste product.
   4. Markets for recycled waste product.

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01 10 00 for list of items to be salvaged from the existing building for relocation in project or for Owner.

B. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

C. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.

D. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.

E. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Design Professional.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Pre-bid meeting.
   2. Pre-construction meeting.
   3. Regular job-site meetings.
   4. Job safety meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. As a minimum, provide:
      a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
      b. Separate dumpsters for each category of recyclable.
      c. Recycling bins at worker lunch area.
   2. Provide containers as required.
   3. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
   4. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
   5. Locate enclosures out of the way of construction traffic.
   6. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   7. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
   8. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified

materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED SECTIONS

A. Section 00 72 00 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Section 01 70 00 - Execution Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Design Professional with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Design Professional will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit 1 copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Design Professional comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Conversion of schematic layouts:
   1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, are shown schematically and are not intended to portray precise physical layout.
      a. Final physical arrangement is determined by the Contractor, subject to the Architect's approval.
      b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items that are shown only schematically on the Drawings.

D. Store record documents separate from documents used for construction.

E. Record information concurrent with construction progress.

F. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

G. Final project record documents.
   1. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
   2. Approval of recorded data prior to transfer:
      a. Following receipt of the electronic file (CADD – latest version), and prior to start of transfer of recorded data thereto, secure the Architect's approval of all recorded data.
      b. Make required revisions.
   3. Transfer of data to Drawings:
      a. Carefully transfer change data shown on the job set of Record Drawings to the corresponding transparencies, coordinating the changes as required.
      b. Clearly indicate at each affected detail and other Drawings a full description of changes made during construction, and the actual location of items in 3.01-C above.
      d. Call attention to each entry by drawing a "cloud" around the area or areas affected.
      d. Make changes neatly, consistently, and with the proper media to assure longevity and clear reproduction.
   4. Transfer of data to other Documents:
      a. If the Documents other than Drawings have been kept clean during progress of the Work, and if entries thereon have been orderly to the approval of the Architect, the job set of these Documents other than Drawings will be accepted as final Record Documents.
      b. If any such Document is not so approved by the Architect, secure a new copy of that Document from the Architect at the Architect's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the approval of

the Architect.

5. Review and submittal:
   a. Submit the completed set of Project Record Documents to the Architect.
   b. Participate in review meetings as required.
   c. make required changes and promptly deliver the final Project Record Documents to the Architect.

H. Changes subsequent to acceptance:
   1. The Contractor ahs no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

3.02 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Include color coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative

maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

N. Include test and balancing reports.

O. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 x 11 inch (216 x 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Design Professional, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.

e. Maintenance instructions for equipment and systems.
f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties and bonds.

J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

K. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Design Professional, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

F. Manual: Bind in commercial quality 8-1/2 x 11 inch (216 x 279 mm) three D side ring binders with durable plastic covers.

G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 01 78 36

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Summary
B. Form of Warranty
C. Submittal Requirements
D. Form of Submittal
E. Time of Submittals
F. Submittals Required

1.02 RELATED REQUIREMENTS:

Section 01700 - Contract Closeout
Sections 02000 through 16000

1.03 INCLUDED:

A. Summary

1. Warranties between Contractor and manufacturers and between Contractor and suppliers shall not affect warranties between Contractor and the Owner.

2. In addition to other requirements specified:
   a. Compile specified service and maintenance contracts.
   b. Co-execute submittals when so specified.
   c. Review submittals to verify compliance with Contract Documents.
   d. Submit to the Architect for review and transmittal to the Owner.

B. Form of Warranty

1. Submit two (2) originals of the warranty form provided as Attachment “A”, typed on the Contractor’s letterhead, for the entire Work or special warranties, typed on Subcontractor’s letterhead and notarized, when required by a Specification Section. All work in place shall be guaranteed, at a minimum for one (1) year after date of Substantial Completion.

C. Submittal Requirements

1. Assemble warranties, bonds, and service and maintenance contracts executed by each of the respective manufacturers, suppliers, and Contractors.

2. Number of Original Signed Copies Required: Two (2) each.

3. Table of Contents: Neatly typed; in orderly sequence. Provide complete information for each item; include:
   a. Product or work item.
   b. Firm (Subcontractor or supplier) name with name of principal, address, and telephone number.
   c. Scope of work or service covered.

d. Date of beginning of warranty, bond, or service and maintenance contract.]
e. Duration of warranty, bond, or service and maintenance contract.

f. Provide the following information for the Owner.
   (1) Proper procedure in case of failure.
   (2) Circumstances which might affect the validity of warranty or bond.
g. Contractors' name, name of responsible principal, address, and telephone number.

D. Form of Submittal

1. Prepare in duplicate packets: four (4) complete Submittals; two (2) originals and two (2) copies.

2. Format:
   a. Size: 8 ½ " x 11" sheets punched for three-ring binder. Fold larger sheets to fit into binders.
   b. Cover: Identify each packet with typed or printed title, "WARRANTIES AND BONDS." List:
      (1) Title of Project.
      (2) Name of Contractor.

3. Binders: Commercial quality three-ring, with durable and cleanable plastic covers.

E. Time of Submittals

1. Within thirty (30) days after date of Substantial Completion, prior to final request for payment.

2. For items of work, where acceptance is delayed more than thirty (30) days beyond the date of Substantial Completion, provide updated submittal within ten (10) days after Final Completion, listing the date of Final Completion as the start of the warranty period.

F. Submittals Required

1. Submit special warranties, bonds, and service and maintenance contracts specified in the individual Sections.

SECTION 01 78 36
ATTACHMENT "A"
(SAMPLE FORM OF WARRANTY - SUBMIT ON CONTRACTOR/SUBCONTRACTOR LETTERHEAD)

CITY OF BEVERLY HILLS – POLICE FACILITY – 2ND AND 3RD FLOOR REMODEL

WRITTEN WARRANTY
FOR_____
(Entire work, in the case of the Contractor, or a specific Specification Section, in the case of a Subcontractor.)

We hereby warrant
_____
(Description of work, equipment, product, etc.)

Which we have provided in
_____
(Description of location:)

has been completed in accordance with the Specification Section stated above and the Contract Documents requirements and is hereby warranted for a period of
_____
(Indicate overall duration)

commencing on _____and ending on _____.
(Start date) (End date)

We agree to repair or replace any or all of our Work, together with any other adjacent work which may be displaced or damaged by so doing, which may prove to be either patently defective in its workmanship or materials within the period of time prescribed by law or latently defective in its workmanship or materials within the period of time prescribed by law from date established in the Certificate of Substantial Completion of the above-named structure, ordinary wear and tear and unusual abuse or neglect excepted.

We also agree to repair any damages resulting from such defects.

In the event of our failure to comply with above-mentioned conditions within a reasonable time but in no case longer than fourteen (14) calendar days after being notified in writing by the Owner, we collectively and separately do hereby authorize the Owner to have said defective work and damages repaired or replaced and made good at our expense and will honor and pay the costs and charges therefor upon demand.

SIGNED_____
(Subcontractor's name, address, license number, and date of signing)

or

SIGNED_____
(Subcontractor's name, address, license number, and date of signing)

COUNTERSIGNED_____
(Contractor's name, address, license number, and date of signing

SECTION 020500
SITE REMEDIATION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 WORK INCLUDED

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete all clearing and grubbing together with the removal and disposal of items, as shown on the drawings and as specified herein, complete.

1. Remove all trees, plants and site materials that have been designated for demolition, after receiving approval from Agency's Representative.

1.3 RELATED WORK

A. Plant Protection and Pruning. Section 329100

B. Landscape Irrigation. Section 328000

C. Landscaping. Section 329300

D. Operation and Maintenance. Section 320100

1.4 JOB CONDITIONS

A. Condition of Premises: Accept the premises as found and clear the Project site as specified.

B. Protection:

1. Existing Vegetation: Protect from damage individual trees, groups of trees, shrubbery, lawns and other vegetation designated to remain. Replace at Contractor's expense items damaged or destroyed with like items in sizes and quantity of the damaged or destroyed material. Assessment of material value shall be established by a Certified Arborist.

2. Protect existing utilities shown to remain.

3. Provide barricades and guards as required to protect trees or existing improvements.

4. Existing irrigation lines watering areas outside the limit of work line.

PART 2 **- PRODUCTS**

Not used

PART 3 **- PRODUCTS**

3.1 CLEARING AND GRUBBING

A. Verify all trees and shrubs to be removed with Agency's Representative prior to starting any demolition work.

B. Clearing: Fell trees, dispose of the trees and other vegetation designated for remove together with the downed timber, snags, brush and rubbish, occurring within the construction limits. All limbs, branches, and roots damaged during construction, together with those required to be trimmed, shall be neatly cut next to the bole of the tree or main branch or root under the direction of a certified Arborist.

C. Grubbing: Remove and dispose of all stumps above grade, all matted roots and all roots larger than 3 inches in diameter to a depth of 12".

D. Removal: All cleared and grubbed plants and construction debris shall be promptly removed completely away from the Project site. Do not store or permit materials to accumulate on the Project site.

1. Do not burn materials or debris on the premises.

2. Remove all debris from the Project site to a legal dumping area.

3.2 TREE AND TREE STUMP REMOVAL

A. Trees and tree stumps designated for removal shall be removed to 2 feet below finish grade minimum.

END OF SECTION

SECTION 03 30 00

Cast-In-Place Concrete

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.

B. Related Sections:

1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
2. Division 32 Section "Concrete Paving" for concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer and testing agency.

B. Welding certificates.

C. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Curing compounds.
6. Bonding agents.
7. Adhesives.
8. Repair materials.

D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates.

E. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Architectural Concrete Form Product: Where architectural concrete form liner has been called out on the drawings, use architectural form panel, By: Sylvan Industries, LLC (503)639.6969. Type: Custom Polyethylene faced plywood with polyurethane edge sealer. Plywood material shall be bendable to conform to the curved shape of low planter walls.

B. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1.

C. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

2.3 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type II. Supplement with the following:

a. Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregates: ASTM C 33, coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1-1/2 nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

C. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

D. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals - Building Systems; Confilm.
b. Edoco by Dayton Superior; BurkeFilm.
c. Meadows, W. R., Inc.; EVAPRE.
d. Sika Corporation; SikaFilm.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals - Building Systems; Kure 200.
b. Conspec by Dayton Superior; W.B. Resin Cure.
c. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
d. Edoco by Dayton Superior; Res X Cure WB.
e. Meadows, W. R., Inc.; 1100-CLEAR.

2.7 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 15 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.8 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 4 inches, plus or minus 1 inch.

2.9 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.2 REMOVING AND REUSING FORMS

A. General: Formwork for parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.3 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall

within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

3.9 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.10 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel reinforcement placement.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 033000

SECTION 07140

COLD FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
Provide a complete polyurethane waterproofing membrane system including all applicable sealants and elastomeric flashings needed to prevent water penetration at locations indicated.

B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Section 01340.

B. Product data:
1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
3. Shop Drawings or catalog illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades;
4. Manufacturer's current recommended installation procedures which, when reviewed by Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
5. Written documentation of applicator's qualifications, including reference projects of similar scope and complexity, with current phone contacts of architects and owners for verification.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

B. Applicator qualifications:
1. Applicator shall have at least three years experience in installing materials of types specified and shall have successfully completed at least three projects of similar scope and complexity.
2. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation.

C. Convene a pre-installation job-site conference three weeks prior to commencing work of this Section:
1. Secure attendance by Architect, Contractor, applicator, and authorized representatives of the membrane system manufacturer and interfacing trades.
2. Examine Drawings and Specifications affecting work of this Section, verify all conditions, review installation procedures, and coordinate scheduling with interfacing portions of the Work.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to job site in manufacturer's unopened containers with all labels intact and legible at time of use.

B. Maintain the products in accord with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.

C. Comply with pertinent provisions of Section 01620.

1.05 SUBSTRATE CONDITIONS

A. General:
   1. Provide applicator with surfaces that are broom clean, dry, sound and free of voids, bugholes, rockpockets, honeycombs, protrusions, excessive roughness, foreign matter, frost, ice and other contaminants which may inhibit application or performance of the waterproofing membrane system.
   2. Using suitable abrasive methods, remove residue of form release, curing compound, chemical retarders and other surface treatments, laitance, mortar smear, sawcutting residue, mill scale, rust, loose material and other contaminants from concrete, masonry and ferrous metal surfaces to receive the work of this Section.

B. Concrete: Where work of this Section will be applied to concrete, provide surfaces that are smooth with finish equal to one that is light steel troweled followed by a fine hair broom.

C. Plywood: Where work of this Section will be applied to plywood, provide exterior grade plywood, 5/8" thick minimum, with A-side up, fastened with ring-shank nails.

D. Decks:
   1. Slope deck surfaces to drains that have flanges at membrane level which are flush with deck surfaces.
   2. Rigidly install pipe, vents and other surface protrusions, properly flash them, and cover to prevent entry of membrane materials.

E. Metal flashings: Where metal flashings are substrate to waterproofing membrane, set the flashings in continuous bedding bead of urethane sealant; install sealant S-bead between metal laps and mechanically fasten to substrate along leading edges at every 4" on center, staggered linearly, to lay flat without fishmouths.

F. Joints: Configuration shall be consistent with this Section and with all other requirements of the Contract Documents.

1.06 WARRANTY

A. Deliver to the Architect signed copies of the following written warranties against defective materials and workmanship executed for the following periods following date of completion. Warrant that installed waterproofing membrane system shall be free of defects including adhesive failure, cohesive failure, and waterproofing failure resulting from substrate cracking up to 1/16 inch.
   1. Manufacturer's standard warranty covering materials for five year period;
   2. Applicator's standard warranty covering workmanship for two year period.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide a complete fluid applied elastomeric waterproofing membrane system designed for concealed building components subject to hydrostatic head that is polyurethane, coal-tar free and complies with ASTM C 836:
   1. Acceptable product:
      a. TREMproof 250 GC; Tremco Inc.
      b. or prior approved equal

2.02 ACCESSORIES

A. Primer: As recommended by waterproofing membrane system manufacturer;

B. Joint backing: Closed-cell, polyethylene rod as recommended by membrane manufacturer;

C. Reinforcing fabric: Woven fiberglass scrim cloth;

D. Elastomeric sheet flashing: 1/16 inch thick by 12 inch wide uncured neoprene sheeting;

E. Elastomeric transition flashing to above-grade: polyurethane liquid-applied coating system with ultraviolet protective topcoat.
   1. Acceptable product:
      a. Vulkem 350/351; Tremco Inc.

F. Joint Treatment:
   1. Acceptable product:
      a. Dymeric 240FC; Tremco Inc.
      b. TREMproof 250GCT; Tremco Inc.
      c. or prior approved equal

G. Protection course: As recommended by waterproofing membrane manufacturer.
   1. Acceptable product for walls/slabs:
      a. Protection Mat; Tremco Inc.

H. Prefabricated Composite Drainage: Two-part prefabricated composite drainage material consisting of a formed polystyrene core covered on one side with filter fabric.
   1. For backfilled walls less than 20 feet in height, a composite drainage mat with non-woven polypropylene filter fabric, 9 gpm/ft flow capacity per unit width and 10,800 lbs/ft² compressive strength. Acceptable product:
      a. Tremdrain; Tremco Inc.

   2. For backfilled walls 20 feet or greater in height, a composite drainage mat with non-woven polypropylene filter fabric, 16 gpm/ft flow capacity per unit width and 15,000 lbs/ft² compressive strength. Acceptable product:
      a. Tremdrain 1000; Tremco Inc.

   3. For slabs receiving concrete topping and for planters, a composite drainage mat with woven monofilament filter fabric, 18 gpm/ft flow capacity per unit width and 21,000 lbs/ft² compressive strength. Acceptable products:
      a. Tremdrain 2000; Tremco Inc.

   4. For slabs receiving pavers, a composite drainage mat with non-woven polypropylene filter fabric, 9 gpm/ft flow capacity per unit width and 30,000 lbs/ft² compressive strength. Acceptable product:
      a. Tremdrain S; Tremco Inc.

5. For water collection and high profile section for water flow around the perimeter of the structure, a drainage composite with non-woven needle-punched polypropylene filter fabric, a transition section to couple with adjoining drainage mat, high profile flow capacity of 100 gpm and fitted with compatible factory-molded universal tees, universal outlets and 12” corner guards. Acceptable product:
   a. TREMDrain Total-Drain; Tremco Inc.

2.03 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the membrane system manufacturer as compatible, subject to review of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Applicator shall examine the areas and conditions under which work of this Section will be performed.
   1. Verify conformance with manufacturer's requirements;
   2. Report unsatisfactory conditions in writing to the Architect;
   3. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Surface preparation and detailing procedures to be in accord with waterproof membrane system manufacturer's instructions and recommendations except where more stringent requirements are indicated.

B. Clean all deck surfaces to receive membrane system in accord with manufacturer's instructions; vacuum clean or blow clean with oil-free compressed air all surfaces to receive sealants, detailing materials or membranes immediately prior to installation.

C. Rout, clean, prepare and detail surface cracks in accord with manufacturer's instructions; install backer rod where required.

D. Clean metal surfaces to bright metal by wire brushing or mechanical etching; scuff-sand lead flashing and plastic surfaces.

E. Prime surfaces in accord with manufacturer's instructions.

F. Install 1/4" diameter backer rod into corner of all horizontal-to-vertical junctures subject to movement and cover with 1" detail cant of approved sealant; install 1" detail cants at projections, curbs and other horizontal-to-vertical junctures.

G. Install detail coats, joint and crack treatments, elastomeric flashing and reinforcing fabric in accord with manufacturer's instructions.

H. Allow detail applications to cure in accordance with manufacturer's instructions prior to general application of membrane.

3.03 APPLICATION

A. General: Install waterproofing system in accord with manufacturer's recommendations and instructions as applies to the Work except where more stringent requirements are indicated.
   1. Grid deck surfaces to assure proper coverage rates and verify membrane wet-film mil thickness with gauges as work progresses.
   2. Retain empty product containers during course of work to aid in determining whether completed membrane complies with required average dry-film thickness.

B. Verify proper dry condition of substrate using method recommended by membrane system manufacturer; perform adhesion checks prior to general application of membrane system using field adhesion test method recommended by manufacturer.

C. Mask off adjoining surfaces not to receive membrane system.

D. Wipe clean all detail coats with white rags wetted with Xylene solvent; do not saturate detail coat.

E. Apply membrane uniformly and allow to cure in accordance with manufacturer's instructions.

F. Feather terminating edge when entire area cannot be completed in one day; clean area 6" wide along terminating edge of membrane with Xylene solvent on clean white rags prior to startup on next working day; use interlaminary primer per manufacturer's instructions as needed; overlap existing work by 6" with new work.

G. Flood test: Follow ASTM D 5957. Plug drains on deck surfaces and use sand bags or other means to restrict runoff. Flood deck with water to depth of 2" (50 mm) and allow to stand at least 48 hours.

H. Install protection course over cured membrane in accord with manufacturer's instructions.

I. Install drainage material in accord with manufacturer's instructions.

3.04 PROTECTION AND CLEAN-UP

A. Promptly remove primer or membrane system material from adjacent surfaces with MEK, Toluene or Xylene; leave work area in broom clean condition.

B. Prohibit traffic over completed work and protect against work overhead until protection course is installed; protect from damage until protected beneath overlaying work.

END OF SECTION

SECTION 09 90 00

PAINTING & COATING

PARTS 1 – GENERAL

1.01 SUMMARY:

A. Section Includes: Painting and finishing of all interior and exterior items and surfaces, unless otherwise indicated or listed under exclusions below:
   1. Paint all exposed surfaces, except as otherwise indicated, whether or not colors are designated. Include field painting of exposed exterior and interior plumbing, mechanical and electrical work, except as indicated below. .
   2. Paint exterior stucco where indicated on Drawings.

B. Work Included:
   1. The intent and requirements of this Section is that all work, items and surfaces which are normally painted and finished in a building of this type and quality, shall be so included in this contract, whether or not said work, item or surface is specifically called out and included in the schedules and notes on the drawings, or is, or is not, specifically mentioned in these specifications.

C. The following general categories of work and items that are included under other sections shall not be a part of this section:
   1. Shop prime painting of structural and miscellaneous iron or steel.
   2. Shop prime painting of hollow metal work.
   3. Shop finished items.

D. The Room Finish Schedules indicated on the drawings indicates the location of interior room surfaces to be painted or finished. The schedule indications are general and do not necessarily define the detail requirements. Include all detailed refinements and further instructions as may be given for the required complete finishing of all spaces and rooms.

1.02 SUBMITTALS:

A. Product Data: Submit complete manufacturer's descriptive literature and specifications in accordance with the provisions of Section 01 30 00.

Materials List: Submit complete lists of materials proposed for use, giving the manufacturer's name, catalog number, and catalog cut for each item when applicable. When required, provide a list of paint and coating materials proposed for use, which equates such materials with the design-basis products specified.

B. Samples: In accordance with provisions of Section 01300, submit, on 8-1/2 inch by 11 inch hardboard, samples of each color, gloss, texture and material selected by the Architect from standard colors available for the coatings required.

For natural and stained finishes, provide sample on each type and quality of wood used on the project.

C. Manufacturer's Instructions: *Submit* the manufacturer's current recommended methods of installation, including relevant limitations, safety and environmental cautions, application rates, and composition analysis

1.03 QUALITY ASSURANCE:

A. Regulatory Requirements: Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this Specification, comply with the more stringent provisions. Regulatory changes may affect the formulation, availability, or use of specified coatings. Confirm availability of coatings to be used prior to job going out to bid and before start of painting project.

Comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA).

Comply with South Coast Air Quality Management District (SCAQMD) Rule 1113. A copy of this regulation can be obtained from http://www.aqmd.gov/rules/reg/reg11/r1113.pdf.

B. Field Sample: When and as directed by the Architect, apply one complete coating system for each color, gloss and texture required. When approved, the sample panel areas will be deemed incorporated into the Work and will serve as the standards by which the subsequent Work of this Section will be judged.

1.04 DELIVERY, STORAGE, AND HANDLING:

A. Storage and Protection: Use all means necessary to protect the materials of this Section before, during, and after installation.

B. Deliver materials to job site in new, original, and unopened containers bearing manufacturer's name and trade name. Store where directed in accordance with manufacturer's instructions.

1.05 PROJECT CONDITIONS:

A. Do not apply exterior materials during fog, rain or mist, or when inclement weather is expected within the dry time specified by the manufacturer. No exterior or interior painting shall be done until the surfaces are thoroughly dry and cured. Do not apply paint when temperature is below 50o F. Avoid painting surfaces when exposed to direct sunlight.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Manufacturer's catalog names and number of paint types in this Section herein are based on products manufactured or distributed by the Dunn-Edwards Corporation www.dunnedwards.com and are the basis of design against which the Architect will judge equivalency. The quantity of titanium dioxide, the use of clays, aluminum silicate, talc and the purity of acrylic materials are a few of the criteria which will be used by the Architect in determining equivalency of materials.

B. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 Product Requirements. When submitting request for substitution, provide complete product data specified above under Submittals, for each substitute product.

C. Acceptable Manufacturers
   1. Carboline www.carboline.com
   2. Deft www.deftfinishes.com
   3. Dumond Chemicals www.dumondchemicals.com
   4. Okon www.okoninc.com
   5. Rustoleum www.rustoleumibg.com
   6. Valspar www.valsparwood.com

2.02 MATERIALS:

A. Paints: Provide ready-mixed, except field catalyzed coatings. Pigments shall be fully ground maintaining soft paste consistency, capable of being readily and uniformly dispersed to complete homogeneous mixture. Paints shall have good flowing and brushing properties and be capable of drying or curing free of streaks and sags.

B. Accessory Materials: Linseed oil, shellac, solvents, and other materials not specified but required to achieve required finishes shall be of high quality and approved by manufacturer.

C. Colors shall be selected from color chip samples provided by manufacturer of paint system approved for use. Match approved samples for color, texture and coverage.

D. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

E. Restricted Components: Paints and coatings shall not contain any of the following.
   1. Acrolein.
   2. Acrylonitrile.
   3. Antimony.
   4. Benzene.
   5. Butyl benzyl phthalate.
   6. Cadmium.
   7. Di (2-ethylhexyl) phthalate.
   8. Di-n-butyl phthalate.
   9. Di-n-octyl phthalate.
   10. 1,2-dichlorobenzene.
   11. Diethyl phthalate.
   12. Dimethyl phthalate.
   13. Ethylbenzene.
   14. Ethylene Glycol.
   15. Formaldehyde.
   16. Hexavalent chromium.
   17. Isophorone.
   18. Lead.
   19. Mercury.
   20. Methyl ethyl ketone.
   21. Methyl isobutyl ketone.
   22. Methylene chloride.
   23. Naphthalene.
   24. Toluene (methylbenzene).
   25. 1,1,1-trichloroethane.
   26. Vinyl chloride.

2.04 MIXES:

A. Mix, prepare, and store painting and finishing materials in accordance with manufacturer's directions.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Examine surfaces to be painted before beginning painting work. Work of other trades that has been left or installed in a condition not suitable to receive paint, stain other specified finish shall be repaired or corrected by the applicable trade before painting. Painting of defective or unsuitable surface implies acceptance of the surfaces.

B. Beware of a condition known as critical lighting. This condition causes shadows that accentuate even the slightest surface variations. A pigmented sealer will provide tooth for succeeding decorative coating, but "does not" equalize smoothness or surface texture. Any corrective action to drywall must be done by the drywall contractor prior to decorating.

3.02 PROTECTION:

A. Protect previously installed work and materials, which may be affected by Work of this Section.
   1. Protect prefinished surfaces, lawns, shrubbery and adjacent surfaces against paint and damage.
   2. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or splatter from fouling surfaces not being painted.

Protect surfaces, equipment, and fixtures from damage resulting from use of fixed, movable and hanging scaffolding, planking, and staging.

B. Provide wet paint signs, barricades, and other devices required to protect newly finished surfaces. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.03 PREPARATION:

A. Perform preparation and cleaning procedures in strict accordance with coating manufacturer's instructions for each substrate condition.

B. Concrete and Masonry: Surfaces shall be dry, clean, and free of dirt, efflorescence, encrustation, and other foreign matter. Glazed surfaces on concrete shall be roughened or etched to uniform texture.

C. Ferrous Metal: Clean oil, grease, and foreign matter with solvent. Surface shall be primed within 3 hours after preparation.

D. Sand and scrape metal to remove loose primer and rust.

E. Non-Ferrous Metal: Chemically or solvent clean and then treat with an etching-type solution if recommended by the finish manufacturer. Cleaned and retreated Non-Ferrous Metal shall be primed the same day that cleaning has been performed.

F. Wood Surfaces: Remove dust, grit and foreign matter. Sand surfaces and dust clean. Spot coat knots, pitch streaks, and sappy section with pigmented stain sealer when surfaces are to be painted. Fill nail holes, cracks and other defects after priming and spot prime repairs when fully cured.

G. Remove hardware and accessories, machined surfaces, plates, lighting fixtures and similar items in place and not-to-be-finish painted, or provide surface-applied protection. Reinstall removed items upon completion of work in each area.

H. Existing surfaces to be recoated shall be thoroughly cleaned and deglossed by sanding or other means prior to painting. Patched and bare areas shall be spot primed with same primer as specified for new work.

I. Thoroughly backpaint all surfaces of exterior and interior finish lumber and millwork, including doors and window frames, trim, cabinetwork, etc., which will be concealed after installation. Backpaint items to be painted or enameled with the priming coat. Use a clear sealer for backpriming where transparent finish is required.

3.03 PREPARATION:

A. Bare and covered pipes, ducts, hangers, exposed steel and ironwork, and primed metal surfaces of equipment installed under mechanical and electrical work shall be cleaned prior to priming.

B. Preparation of other surfaces shall be performed following specific recommendations of the coatings manufacturer.

C. Bond breakers and curing agents shall be removed and the surface cleaned before primers, sealers or finish paints can be applied.

D. All drywall surfaces shall be completely dry and dust free before painting. Skim coated drywall shall be sealed with a sealer recommended by the paint manufacturer for this surface. Use the appropriate light or medium tack masking tape.

3.04 APPLICATION:

A. Apply painting and finishing materials in accordance with the manufacturer's recommendations.
   1. The number of coats specified is the minimum that shall be applied. Apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color and appearance.

B. Apply each material at not less than the manufacturer's recommended spreading rate:

C. Apply prime coat to surface which is required to be painted or finished.

D. Finish exterior doors on tops, bottoms, and edges same as exterior faces, after fitting.

E. Sand lightly and dust clean between succeeding coats.

3.05 CLEANING, TOUCH-UP AND REFINISHING:

A. Carefully remove all spattering, spots and blemishes caused by work under this section from surfaces throughout the project.

B. Upon completion of painting work remove all rubbish, paint cans, and accumulated materials resulting from work in each space or room. All areas shall be left in a clean, orderly condition.

C. Runs, sags, misses, holidays, stains and other defects in the painted surfaces, including inadequate coverage and mil thickness shall be satisfactorily touched up, or refinished, or repainted as necessary.

3.06 FINISH SCHEDULE

A. Apply the following finishes to the surfaces specified on the finish schedule or on the drawings. Apply all materials in accordance with manufacturer's instructions on properly prepared surfaces and foundation coats. All intermediate undercoats must be tinted to approximate the final color.
   1. Architect will issue a color schedule prior to start of painting to designate the various colors and locations required for the work.

B. Exterior Systems:

   1. Masonry Concrete Tilt-up
      a. Flat - 100% Acrylic
         First Coat EFF-STOP Select Masonry Primer/Sealer (ESSL00)
         Second Coat SPARTASHIELD Exterior Flat Paint (SSHL10)
         Third Coat SPARTASHIELD Exterior Flat Paint (SSHL10)

      b. Velvet - 100% Acrylic
         First Coat EFF-STOP Select Masonry Primer/Sealer (ESSL00)
         Second Coat SPARTASHIELD Exterior Velvet Paint (SSHL20)
         Third Coat SPARTASHIELD Exterior Velvet Paint (SSHL20)

      c. Eggshell - 100% Acrylic
         First Coat EFF-STOP Select Masonry Primer/Sealer (ESSL00)
         Second Coat SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
         Third Coat SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

      d. Low Sheen - 100% Acrylic
         First Coat Eff-Stop Select Masonry Primer/Sealer (ESSL00)
         Second Coat SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
         Third Coat SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

      e. Semi-Gloss or Gloss - 100 % Acrylic
         First Coat Eff-Stop Select Masonry Primer/Sealer (ESSL00)
         Second Coat SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)
         Third Coat SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)

   2. Masonry and Stucco

      a. Flat – Modified Copolymer / 100% Acrylic
         First Coat FLEX-PRIME Select, Flexible Crack-Resistant Primer (FPSL00)
         Second Coat SPARTASHIELD Exterior Flat Paint (SSHL10)
         Third Coat SPARTASHIELD Exterior Flat Paint (SSHL10)

      b. Velvet Sheen - Modified Copolymer / 100% Acrylic
         First Coat FLEX-PRIME Select, Flexible Crack-Resistant Primer (FPSL00)
         Second Coat SPARTASHIELD Exterior Velvet Paint (SSHL20)
         Third Coat SPARTASHIELD Exterior Velvet Paint (SSHL20)

      c. Eggshell - Modified Copolymer / 100% Acrylic
         First Coat FLEX-PRIME Select, Flexible Crack-Resistant Primer (FPSL00)
         Second Coat SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
         Third Coat SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. Low Sheen – Modified Copolymer / 100% Acrylic
First Coat FLEX-PRIME Select, Flexible Crack-Resistant Primer (FPSL00)
Second Coat SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss or Gloss – Modified Copolymer / 100% Acrylic
First Coat FLEX-PRIME Select, Flexible Crack-Resistant Primer (FPSL00)
Second Coat SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)
Third Coat SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)

f. Elastomeric - Modified Acrylic
First Coat ELAST-O-KOTE Surface Conditioner
Second Coat ELAST-O-KOTE 5, High Build Elastomeric Waterproofing
Third Coat ELAST-O-KOTE 5, High Build Elastomeric Waterproofing

g. Graffiti Barrier - Unpainted Surface - Waterborne Urethane/Waterborne Polyurethane
First Coat DUMOND CHEMICAL, WATCH DOG CPU, Masonry Primer/Sealer
Second Coat DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

h. Graffiti Barrier - Painted Surface - Waterborne Polyurethane
One Coat DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

3. Exterior Gypsum Board

a. Flat – 100% Acrylic
First Coat ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet Sheen – 100% Acrylic
First Coat ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell – 100% Acrylic
First Coat ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. Low Sheen – 100% Acrylic
First Coat ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss or Gloss – 100% Acrylic
First Coat ULTRA-GRIP Premium, Multi Purpose Primer (UGPR00-1)
Second Coat SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)
Third Coat SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)

4. Concrete Block – CMU

a. Flat –Acrylic Copolymer / 100% Acrylic
First Coat SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet - Acrylic Copolymer / Acrylic
First Coat SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell - Acrylic Copolymer / Acrylic
First Coat SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. Low Sheen – Acrylic Copolymer / Acrylic
First Coat SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss or Gloss – Acrylic Copolymer / Acrylic
First Coat SMOOTH BLOCFIL SELECT CONCRETE BLOCK FILLER (SBSL00)
Second Coat SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)
Third Coat SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)

f. Graffiti Barrier - Unpainted Surface - Waterborne Urethane/Waterborne Polyurethane
First Coat DUMOND CHEMICAL, WATCH DOG CPU, Masonry Primer/Sealer
Second Coat DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane 09 90 00-9

g. Graffiti Barrier - Painted Surface - Waterborne Polyurethane
One Coat DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

5. Wood – Paint Finish

a. Flat – 100% Acrylic
First Coat EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
Second Coat SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet - 100% Acrylic
First Coat EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
Second Coat SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell - 100% Acrylic
First Coat EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
Second Coat SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. Low Sheen – 100% Acrylic

First Coat	EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
Second Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss or Gloss – 100% Acrylic

First Coat	EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
Second Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)
Third Coat	SPARTASHIELD, Exterior Semi-Gloss or Gloss Paint (SSHL50) or (SSHL60)

f. Graffiti Barrier - Painted Surface - Waterborne Urethane/Waterborne Polyurethane

One Coat	DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

6. Wood Rough Sawn – Stain Finish – Opaque:

Two Coats	SPARTASHIELD Exterior Flat Paint (SSHL10)

7. Wood – Stain Finish – Semi-Transparent:

Two Coats	OKON WEATHER PRO, 100% Acrylic Semi-Transparent Stain (WPT3)

8. Ferrous Metal

a. Flat – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. Low Sheen - Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)

f. Semi-Gloss – Modified Aluminum Epoxy Mastic / Aliphatic Acrylic Polyurethane

First Coat	CARBOLINE, CARBOMASTIC, Epoxy 15
Second Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 133 Series
Third Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 133 Series

g. Gloss – Alkyd Emulsion / 100% Acrylic

First Coat	BLOC-RUST Premium, Rust Preventative Metal Primer (BRPR00-1 series)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Gloss Paint (W-10)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Gloss Paint (W-10)

h. Gloss - Modified Aluminum Epoxy Mastic / Aliphatic Acrylic Polyurethane

First Coat	CARBOLINE, CARBOMASTIC, Epoxy 15
Second Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 134 Series
Third Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 134 Series

i. Graffiti Barrier - Painted Surface - Waterborne Urethane/Waterborne Polyurethane

One Coat	DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

9. Non-Ferrous Metal

a. Flat – Alkyd / 100% Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)
Third Coat	SPARTASHIELD Exterior Flat Paint (SSHL10)

b. Velvet Sheen - Alkyd / 100% Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)
Third Coat	SPARTASHIELD Exterior Velvet Paint (SSHL20)

c. Eggshell - Alkyd / 100% Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)
Third Coat	SPARTASHIELD, Exterior Eggshell Paint (SSHL30)

d. **Low Sheen - Alkyd / 100% Acrylic** (Existing Exterior/Site Metals)

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)
Third Coat	SPARTASHIELD, Exterior Low Sheen Paint (SSHL40)

e. Semi-Gloss – Alkyd / 100% Acrylic (Exterior Metal Doors, factory primed)

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Semi-Gloss Paint (W-9)

f. Semi-Gloss – Modified Aluminum Epoxy Mastic / Aliphatic Polyurethane

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	CARBOLINE, CORBOMASTIC EPOXY 15
Second Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 133 Series
Third Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 133 Series

g. Gloss – Alkyd / 100%Acrylic

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	GALV-ALUM Premium, Non Ferrous Metal Primer (GAPR00)
Second Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Gloss Paint (W10)
Third Coat	SYN-LUSTRO, Rust Preventive 100% Acrylic Gloss Paint (W10)

h. Gloss - Modified Aluminum Epoxy Mastic Aliphatic Polyurethane

Pretreatment	SUPREME CHEMICAL, METAL CLEAN AND ETCH (ME 01)
First Coat	CARBOLINE, CARBOLINE, CORBOMASTIC EPOXY 15
Second Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 134 Series
Third Coat	CARBOLINE, CARBOTHANE, Acrylic Polyurethane 134 Series

i. Graffiti Barrier - Painted Surface - Waterborne Urethane/Waterborne Polyurethane

One Coat	DUMOND CHEMICAL, WATCH DOG CPU-747, Polyurethane

NOTICE

Availability of products listed in this specification may be affected by local, state, or federal regulatory requirements for architectural coatings. Consult your Dunn-Edwards representative for information on current product availability. Submittals prepared by Dunn-Edwards in accordance with this specification may include product codes that are modified with a letter suffix (e.g., W 901V or W 901E) to indicate the specific product formulation currently available to meet applicable requirements.

END OF SECTION

SECTION 31 1000

SITE CLEARING

PART 1 - GENERAL:

1.1 GENERAL REQUIREMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 WORK INCLUDED

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete all clearing and grubbing together with the removal and disposal of items, as shown on the drawings and as specified herein, complete.

1. Remove all trees, plants and site materials that have been designated for demolition, after receiving approval from City's Authorized Representative.

1.3 RELATED WORK:

A. Tree Protection and Pruning. Section 32 9100

B. Irrigation. Section 32 8400

C. Landscape. Section 32 9300

D. Operation and Maintenance. Section 32 0100

1.4 JOB CONDITIONS:

A. Condition of Premises: Accept the premises as found and clear the Project site as specified.

B. Protection:

1. Existing Vegetation: Protect from damage individual trees, groups of trees, shrubbery, lawns and other vegetation designated to remain. Replace at Contractor's expense items damaged or destroyed with like items in sizes and quantity of the damaged or destroyed material. Assessment of material value shall be established by a Certified Arborist.

2. Protect existing utilities shown to remain.

3. Provide barricades and guards as required to protect trees or existing improvements.

4. Existing irrigation lines watering areas outside the limit of work line.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING:

A. Verify all trees and shrubs to be removed with City's Authorized Representative prior to starting any demolition work.

B. Clearing: Fell trees, dispose of the trees and other vegetation designated for remove together with the downed timber, snags, brush and rubbish, occurring within the construction limits. All limbs, branches, and roots damaged during construction, together with those required to be trimmed, shall be neatly cut next to the bole of the tree or main branch or root under the direction of a certified Arborist.

C. Grubbing: Remove and dispose of all stumps above grade, all matted roots and all roots larger than 3 inches in diameter to a depth of 12". Remove all rocks, debris and pebbles over 1" diameter.

1. Removal: Do not burn materials or debris on the premises.

D. Remove all All cleared and grubbed plants and construction debris shall be promptly removed completely away from the Project site. Do not store or permit materials to accumulate on the Project site.

1. Debris from the Project site to a legal dumping area.

E. Store boulders on site (Rocks over 24" in any dimension) for use on project. Under direction of City's Authorized Representative, promptly remove those boulders which will not be used on site.

3.2 TREE AND TREE STUMP REMOVAL:

A. Trees and tree stumps designated for removal shall be removed to 2 feet below finish grade minimum.

END OF SECTION

SECTION 31 20 00

Earthwork

GENERAL

1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Preparing and grading subgrades for slabs-on-grade, walks, pavements and landscaping
2. Excavating and backfilling for buildings and structures.
3. Drainage and moisture-control fill course for concrete slabs-on-grade.
4. Base course for pavements.
5. Subsurface drainage backfill for walls and trenches.
6. Excavating and backfilling trenches for utilities and appurtenances outside building lines.

B. Related Sections:

1. Division 01 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities.
2. Division 03 Section "Cast-in-Place Concrete" for granular course beneath the slab-on-grade.
3. Division 31 Section "Site Clearing" for site stripping, grubbing, and removal of above- and below-grade improvements and utilities.

1.3 REFERENCE SPECIFICATION

A. Perform all work in accordance with applicable provisions of "Standard Specifications for Public Works Construction", latest editions, and UBC and 2013 CBC. Unless otherwise noted, mention herein of section numbers refers to sections of the Reference Specification. Where Reference Specification refers to "Agency", substitute the word "Owner". Where Reference Specification refers to "Engineer", substitute the word "Architect". Where Reference Specification is in conflict with these Specifications, these Specifications shall govern.

B. The recommendations found in the Geotechnical Site Evaluation prepared by Gorian and Associates apply to this Section.

1.4 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and the surface pavement in paving system.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill when sufficient approved soil material is not available from excavations

E. Drainage Fill: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered to subgrade elevations and the re-use or disposal of materials removed.

1. Authorized Additional Excavation: Excavation below subgrade elevations as directed by Architect.
2. Unauthorized Excavation: Excavation below subgrade elevations without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

L. Compaction: Any method of mechanically stabilizing a material by increasing its density at a controlled moisture condition. "Degree of Compaction" is expressed as a percentage of the maximum dry density obtained by the test procedure described in ASTM D 1557 for general soil types abbreviated in this Specification as 90 percent of maximum dry density".

M. Hard Material: Weathered rock, dense consolidated deposits or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal

N. Lift: A layer or course of soil placed on top of previously prepared or placed soil in a fill or embankment.

O. Unsatisfactory Material: Soil or other material identified as having insufficient strength or stability to carry intended loads without excessive consolidation or loss of stability.

1.5 SUBMITTALS

A. Product Data: For each type of the following manufactured products required:
1. Warning Tape
2. Geotextile
3. Stormwater Water Quality Filter Media

B. Location of Borrow Materials.

C. Material Test Reports

D. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1. Pre-excavation photographs of existing retaining wall along the south side of the property.

1.6 QUALITY ASSURANCE

A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction

B. Testing and Inspection Service: Owner will employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.

C. Pre-excavation Conference: Before commencing earthwork, meet with representatives of the governing authorities, Owner, Architect, consultants, Geotechnical Engineer, independent testing agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.

1.7 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted in writing by the Architect and then only after acceptable temporary utility services have been provided.

1. Provide a minimum 48-hours' notice to the Architect and receive written notice to proceed before interrupting any utility.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies and owner to shutoff services if lines are active.

C. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

D. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

E. Utility Locator Service: Notify UNDERGROUND SERVICE ALERT for area where Project is located before beginning earth moving operations.

F. Do not commence earth moving operations until temporary erosion/sedimentation control measures, specified in Division 01 are in place.

G. Perched Groundwater was encountered at 20 feet below the ground surface during exploration.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil materials imported or excavated on the property determined to be suitable as referenced in the project Geotechnical Investigation Report; and approved by the Geotechnical Engineer.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487 or a combination of these groups.

1. Refer to Geotechnical Investigation Report, for unsuitable materials and disposal methods for unsatisfactory soils.

D. Backfill and Fill Materials: Satisfactory soil materials.

E. Base Material: Shall conform to crushed aggregate base or crushed miscellaneous base, as specified on plan, in accordance with section 200-2.2 or 200-2.4, respectively, of the Reference Specification, and compacted to at least 95% of the maximum dry density as determined by ASTM Test Method D 1557.

F. Engineered Fill: Base Materials and compacted fill materials

G. Bedding Material: Shall be base materials with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve; or clean sand classified in accordance with ASTM D 2487.

H. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate grading size 57, with 100 percent passing a 1-1/2-inch sieve and not more than 5 percent passing a No. 8 sieve

I. Filtering Material: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 50 sieve.

J. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.

2. Grab Tensile Strength: 157 lbf (700 N); ASTM D 4632.
3. Sewn Seam Strength: 142 lbf (630 N); ASTM D 4632.
4. Tear Strength: 56 lbf (250 N); ASTM D 4533.
5. Puncture Strength: 56 lbf (250 N); ASTM D 4833.
6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.2 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.
6. White: Steam systems

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.
6. White: Steam Systems

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Tree protection is specified in the Section 311000 "Site Clearing". Refer to landscape architectural plans for instructions.

D. Prepare subgrade and place base materials in accordance with sections 301-1.2 and 301-2, respectively, of the Reference Specification.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Dewatering shall be done in accordance with NPDES waste discharge requirements. Contractor shall obtain all necessary Dewatering permits from state and local jurisdictions.

C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. General: Excavation shall be to the contours, elevations and dimensions indicated. Keep excavations free from water and debris while construction is in progress. Notify the Owner immediately in writing where it becomes necessary to remove hard, soft, weak, or wet material to a depth greater than indicated. Unless otherwise indicated, concrete placed below grade will be formed and excavations shall allow for placement and removal of forms. Side cuts shall be cribbed and shored as required.

B. Unclassified Excavation: Excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions as described in the referenced Geotechnical Investigations Report.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials, replace with satisfactory soil materials.

2. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and rocks.

3. Rock fragments greater than 3 inches in diameter shall be taken off-site, or placed in accordance with the recommendations of the Geotechnical Engineer in areas designated as suitable for rock disposal.

3.5 STABILITY OF EXCAVATIONS

A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

B. Unshored Temporary Excavations:

1. Unshored temporary excavations may be sloped back at 1 to 1 (horizontal to vertical) or flatter up to 5 feet in height. Where sloped embankments are used, the tops of the slopes should be barricaded to prevent vehicles and storage loads within seven feet of

the tops of the slopes. If the temporary construction slopes will be maintained during the rainy season, construct berms along the tops of the slopes where necessary to prevent run-off water from entering the excavation and eroding the slope faces.

3.6 EXCAVATION FOR STRUCTURES

A. Excavation Limits:

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot. Do not disturb bottom of excavations intended as bearing surfaces.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

3.7 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.8 EXCAVATION FOR UTILITY TRENCHES

A. Excavation made with power-driven equipment is not permitted within two feet of any known utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, use hand or light equipment excavation. Start hand or light equipment excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines and other existing work affected by the excavation work of this Section until approval for backfill is granted by the geotechnical engineer. Immediately report damage to utility lines or subsurface construction to the Owner.

B. Where unidentified existing utilities are encountered, determine whether these are active or abandoned. Remove interfering portions of abandoned utilities and cap or plug open ends of pipe to remain. The cap or plug must seal the opening in such a manner that would permit remaining portions of the utility to be reactivated. Notify Owner for instructions on utilities which are determined to be active. Do not proceed without instructions, except to correct an immediate hazard or emergency condition. Relocation work performed on an active utility without obtaining prior approval from Owner shall be done at the Contractor's expense and liability.

C. In areas where compacted backfill has been placed, additional consolidation may occur after completion due to changes in moisture content and surcharge. Utility connections crossing this backfill, and improvements adjoining the building at the backfill line shall be installed taking into account this additional consolidation, or sufficient time shall be scheduled between backfilling operations and such improvements to allow this consolidation to take place. Damage to utilities or other improvements due to Contractor's negligence in regard to this paragraph shall be repaired at the Contractor's expense

D. Protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, and any other damage. Repair and re-establish damaged or eroded grades and slopes and restore surface construction prior to acceptance

E. Cutting Pavement, Curbs, and Gutters: Saw cut with neat, parallel, straight lines one foot wider than trench width on each side of trenches and one foot beyond each edge of pits. If an existing pavement joint or cracked area is within two feet outside of a designated sawcut line shown on the Drawings, removal and resurfacing shall be to that joint, and/or shall include the crack or cracked area, unless otherwise approved by Architect.

F. Contractor shall pothole at all identifiable crossings of existing utilities prior to any trenching operations and provide Architect with a survey of the top elevations (and bottom elevations, if applicable), of possible interferences so that an evaluation of necessary adjustments to the current profile or alignment may be made. Additionally, Architect shall be given the opportunity to view possible conflicts in the field prior to providing revised designs.

G. Provide a minimum cover from grade of 3 feet for water mains and gas mains. Storm drains and sewers shall be to the depths indicated. Where settlements greater than the tolerance allowed herein for grading occur in trenches and pits due to improper compaction, excavate to the depth necessary to rectify the problem, then backfill and compact the excavation as specified herein and restore the surface to the required elevation.

H. Keep excavations free from water while construction is in progress.

I. Notify the Owner immediately in writing if it becomes necessary to remove rock or hard, unstable, or otherwise unsatisfactory material to a depth greater than indicated. Excavate large rock, boulders, and other unyielding material to an overdepth at least 6 inches below the bottom of the pipe, conduit, duct and appurtenances, unless otherwise indicated or specified. Over-excavate soft, weak, or wet excavations to an overdepth at least 6 inches below the bottom of the pipe, conduit, duct or appurtenances unless otherwise indicated or specified.

J. Excavate trenches to indicated slopes, lines, depths, and invert elevations.

K. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, except where sloping of sides is allowed. Sides of trenches shall not be sloped from the bottom of the trench up to the elevation of the top of the pipe. See plans for detail.

L. At the option of the Contractor, the excavations may be cut to an overdepth of not less than 4 inches and refilled to required grade as specified.

M. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove stones and sharp objects to avoid point loading.

1. For pipes or conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.

3. Dig bell holes and depressions for joints after trench has been graded. Dimension of bell holes shall be as required for properly making the particular type of joint to ensure that the bell does not bear on the bottom of the excavation.

3.9 APPROVAL OF SUBGRADE

A. Notify Architect when excavations have reached required subgrade.

B. If and when Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired roller to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction**,** repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph (5 km/h).
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

D. Unforeseen additional excavation and replacement material will be paid for according to Contract provisions for Changes in Work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.10 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.11 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.12 SOIL TREATMENT

A. All chemical applications used for soil treatment are subject to the approval of the Owner.

B. Recommended termiticide: Chlorpyrifos " Dursban TC", or Permetrin "Torpedo" or "Dragnet", or district approved equal.

C. Do not apply soil treatment solution until excavating, filling and grading operations are completed and prior to any membrane being placed beginning concrete placement or other construction activities.

D. To ensure penetration, do not apply soil treatment to excessively wet soils or during inclement weather. Comply with handling and application instruction of soil toxicant manufacturer.

E. Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under foundations.

F. Apply soil treatment solution at rates recommended by soil toxicant manufacturer.

G. Allow not less than 12 hours for drying after application, before beginning concrete placement or other construction activities

H. Reapply soil treatment solution to areas disturbed by subsequent excavation or other construction activities following application.

3.13 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Acceptance of construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.14 UTILITY TRENCH BACKFILL AND COMPACTION

A. Backfilling of exterior utility trenches shall not be undertaken until geotechnical engineer has received 24-hours notice, until required tests and inspections have been completed, and until as-built location notes have been furnished. Remove uninspected backfill in accordance with requirements of this specification. Use hand-operated, plate-type, vibratory, or other suitable hand tampers in areas not accessible to larger rollers or compactors. Avoid damaging pipes and protective pipe coatings.

B. Place backfill material in accordance with Section 306-1.3.2 of the Reference Specifications and achieve at least 90% of the maximum density. The top 12 inches of backfill in the building or paved areas shall be compacted to 90% of maximum density.

C. Compaction by ponding or flooding will not be permitted.

D. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

E. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18 inches of footings. Place concrete to level of bottom of footings

F. Provide 4-inch-thick concrete base slab support for piping or conduit less than 2'-6" below surface of roadways. After installation and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway base.

G. Place and compact initial backfill of satisfactory soil material or base material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.

1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

3.15 FILL

A. Preparation: Scarify and remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.
1. The scarified ground shall be brought to optimum moisture, mixed as required, and compacted as specified. If the scarified zone is greater than 12 inches in depth, the excess shall be removed and placed in lifts restricted to six inches.
2. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use base materials
4. Under building slabs, use base materials
5. Under footings and foundations, use drainage fill materials.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.16 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
    a. Stockpile or spread and dry removed wet satisfactory soil material.

3.17 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 6 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure. Keep rollers and other heavy equipment at least 18 inches from footings, foundations, piers and walls of buildings and accessory construction. Use mechanical and hand tampers weighing at least 90 pounds with a maximum face area of 48 inches square to compact backfill within 18 inches of construction and where access is restricted.

C. Percentage of Maximum Dry Density Requirements: Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. For general site fills, compact each layer of backfill or fill material at 90 percent maximum dry density.

2. Under structures, building slabs, and steps, scarify and recompact top 24 inches below footing or slab and each layer of backfill or fill soil material at 95 percent maximum dry density.
3. Under walkways and paving, scarify and recompact top 12 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent maximum dry density.
4. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent maximum dry density.

3.18 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
3. If necessary, the Contractor's selected equipment and construction procedure shall be altered, changed or modified in order to meet the specified compaction requirements. Flooding and water jetting is prohibited.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 0.10 foot, unless otherwise indicated.
2. Concrete Walks: Plus or minus 0.025 foot.
3. Pavements:
    a. Concrete: 0.025 foot minus, with no high spots.
    b. Asphalt: 0.05 foot minus, with no hight spots.

C. Grading inside Building Lines: Finish subgrade to a tolerance of ½ inch when tested with a 10-foot straightedge.

3.19 SUBSURFACE DRAINAGE

A. Subdrainage Pipe: Specified in Division 33 Section "Storm Draiange."

B. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches x12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 90 percent of maximum dry unit weight

C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 90 percent of maximum dry unit weight
2. Place and compact impervious fill over drainage backfill in 6-inch thick compacted layers to final subgrade.

3.20 BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place base course under pavements and walks as follows:

1. Compact base courses at optimum moisture content to required grades, lines, cross sections and thickness to not less than 95 percent of ASTM D 4254 relative density.

2. Shape base to required crown elevations and cross-slope grades.

3. When thickness of compacted base course is 6 inches or less, place materials in a single layer.

4. When thickness of compacted base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

3.21 PAVEMENT REPAIR

A. Repair or patch asphalt pavement as specified in Section 321216 ASPHALTIC CONCRETE PAVING. Repair or patch concrete pavement, curbs and gutters as specified in Section 32`1313 PORTLAND CEMENT CONCRETE PAVING. Do not repair pavement until trench has been backfilled and compacted as herein specified. As a minimum, maintain one-way traffic on roads and streets crossed by trenches.

3.22 FIELD QUALITY CONTROL

A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
   1. Perform field in-place density tests according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2937 (drive cylinder method), as applicable.
      a. Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D 3017
      b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect.

B. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

C. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2,000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.

D. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.

E. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.23 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact at optimum moisture content to the required density.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.24 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 31 22 19

Finish Grading

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following:
   1. Weeding.
   2. Finish grading of lawn and planting areas.

B. Related Sections include the following:
   1. 32 90 00 Section: Landscape Planting
   2. 32 80 00: Irrigation System
   3. 31 20 00: Earthwork

1.3 DEFINITIONS

A. Finish grading: finish grading shall consist of adjusting and finishing soil surfaces with site or imported topsoil, raking grades to a smooth, even, uniform plane. Remove and legally dispose of all extraneous matter off site. Facilitate natural run-off water and establish grades and drainage indicated as part of the contract work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil:
   1. Refer to Section 32; Landscape Planting.

B. Obtain imported topsoil from approved local sources.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of conditions: Prior to commencing the finish grading, review the installed work of other trades and verify that their work is complete.
   1. Rough Grading: Grading in planting areas (except raised planter areas) shall be established to within plus or minus 0.10 foot prior to beginning of finish grading.

B. Import topsoil only when necessary to supplement site soil to achieve grades shown on drawings, or if site soil is unsuitable for planting.

3.2 PREPARATION

A. Weeding: Before finish grading, weeds and grasses shall be dug out by the root or sprayed with an herbicide and disposed of off-site. This procedure is outlined under the Landscape Planting Section.

B. Debris: Remove stones and debris 1 inch in diameter and greater and clumps of earth that do not break up. Dispose of off-site.

3.3 INSTALLATION

A. General: When rough grading and weeding have been completed, and the soil has dried sufficiently to be readily worked, lawn and planting areas shall be graded to the elevations indicated on the Drawings.
   1. Grades indicated on Drawing are grades that will result after thorough settlement and compaction of the soil.
   2. Grades not otherwise indicated shall be uniform finish grades and, if required, shall be made at the direction of the Architect.
   3. Finish grades shall be smooth, even, and a uniform plane with no abrupt change of surfaces.
   4. Soil areas adjacent to buildings shall slope away from the building to allow a natural run-off of water, and surface drainage shall be directed as indicated on the drawings by remodeling surfaces to facilitate the run off water at 2% minimum grade.
   5. Low spots and pockets shall be graded to drain properly.

B. Drainage: Finish grade with proper slope to drains.
   1. Flow lines, designated or not, shall be graded and maintained to allow free flow of surface water.
   2. If any drainage problems arise during construction period due to Contractor's work (such as, but not limited to, low spots, slides, gullies and general erosion), the Contractor shall be responsible for repairing these areas to a condition equal to their original condition, and in so doing shall prevent further drainage problems from occurring.

C. Toe of slope: To prevent soil creep or erosion across pavement, where pavement (walk, curb, etc.) is at the toe of a slope, finish grade is to level out or swale slightly at least 6” before reaching pavement.

D. Moisture Content: The soil shall not be worked when the moisture content is so great that excessive compaction occurs, nor when it is so dry that dust may form in the air or that clods do not break readily. Water may be applied, if necessary, to provide moisture content for tilling and planting operations. It is the Contractor’s responsibility to control dust that is spread as a result of grading operations.

E. Grades: The finish grade in areas to be planted with turf shall be 2- inches below grade of adjacent pavement and walks.

F. Compaction: Soils in planted areas shall be loose and friable, yet firm enough that no settling occurs from normal foot traffic or irrigation.

3.4 FIELD OBSERVATION

A. It is the Contractor's responsibility to contact the Architect 48 hours or two working days in advance of each agreed observation or conference.

B. Schedule for On-Site Reviews: at completion of finish grading and prior to any planting operations.

END OF SECTION

SECTION 32 01 00

OPERATION AND MAINTENANCE OF EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes all materials, labor, services, transportation, and equipment necessary to perform the work as described in this specification section.

1.2 RELATED WORK IN OTHER SECTIONS

A. Site Clearing. Section 31 1000
B. Irrigation Systems. Section 32 8200
C. Landscape. Section 32 9300
D. Plant Protection and Pruning. Section 32 9100

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MAINTENANCE

A. All work shall be continuously maintained in all areas within the limit of work during the progress of the job, the 90 day maintenance period and until the final acceptance of the work.

B. The ninety (90) day plant maintenance period shall not commence until written notice of approval of landscape and irrigation installation (see Planting Irrigation Section 32 8400) has been received from the Owner's Representative.

C. Provide the following during the final ninety (90) calendar day maintenance period:
   1. All plants and planted areas shall be kept watered.
   2. Weeds, Dallis, Johnson, Kikuyu, Nut and Bermuda Grass shall be removed.
   3. Grass shall be mowed with a reel type mower equipped with rollers (or approved)
   4. Lawns shall be edged whenever necessary. Keep lawn cut to not less than 5/8" and not more than 1" in height.
   5. Collect grass clippings during mowing operations and remove from site.
   6. The entire project shall be so cared for that a neat and clean condition will be presented at all times to the satisfaction of the Owner's Representative.

D. General Weeding:
   1. Weeding Program: The Contractor shall be responsible for providing a continuous weeding program for all project areas. Weeding shall be done on a weekly basis and shall include any undesirable or misplaced plant.
   2. Shrubs: Weeds shall be removed from beds regularly, no less than once a week, chemically or manually. Bermuda grass and other noxious weeds shall not be allowed to become established.

3. Ground Cover: Weeds shall be removed completely, on a regular basis, chemically or manually, no less than once a week. Weeds may be controlled with pre-emergent herbicides, preferably, but also may be controlled with post-emergent herbicides, and/or by hand pulling.

E. Insect, Disease and Pest Control: The Contractor shall regularly inspect all landscaped areas for presence of disease, insect or rodent infestation. The Contractor shall advise the Owner's representative within four (4) days if disease, insect or rodent infestation is found; he shall identify the disease, insect or rodent and specify control measures to be taken using legally approved materials and methods. Upon written approval of the Owner's Representative, the Contractor shall implement the approved control measures, exercising extreme caution in the application of all spray material, dusts or other materials utilized. The use of any chemicals for insect and disease control shall be done by a state licensed pest control operator who shall follow all guidelines governing his license. Extreme caution shall be used when spraying insecticides and fungicides. Only spray when there is no wind. Owner's Representatives approval must be obtained prior to spraying any insecticides or fungicides. Approved control measures shall be continued until the disease, insect or rodent is controlled to the satisfaction of the Owner's representative. The Contractor shall utilize all safeguards necessary during disease, insect or rodent control operations to ensure safety of the public and the employees of the Contractor.

F. Staking and Guying: Tree stakes, ties and guys shall be checked to prevent bark wounds caused by abrasion and corrected as needed. Ties shall be adjusted to prevent girdling. When trees attain a trunk caliper of approximately 4" consider removing stakes and guys based on the following guidelines. The tree must retain its upright position and this position must be held regardless of moisture content of the soil. Before any stakes are removed, remove tree ties and allow the tree to remain without support for a period of time to observe structural stability of the tree. Remove tree stakes only when tree has been proven to be structurally stable. Any restaking shall be done with originally specified materials. Guying will, over time, stretch or loosen. Adjust as needed to retain a taut position, until such time when guying is removed. Any tree that is damaged due to improper staking or typing shall be replaced at the Contractor's expense.

G. Plant Replacement: Any tree and shrub that appears to have more than one-half (1/2) of its foliage in a declining state shall be brought to the attention Owner's representative immediately. Check plant for over-watering, or drainage problems; and repair the problem prior to replacement. Replacement plants shall be of a size, condition and variety acceptable to the Owner's representative. The Contractor shall replace plant material at no cost to the Owner and subject to acceptance by the Owner's representative.

1. Plants that show signs of failure to grow at any time during the maintenance period, or those plants so injured or damaged as to render them unsuitable for the purpose intended shall be replaced immediately at the expense of the Contractor.
2. Any trees, shrubs or grass that die or loose form and size as originally specified shall be replaced even though they have taken root and are growing after die-back or loss of form and size.

H. Shrub and Vine Care: All shrubbery shall be checked weekly for any breakage or damage, special watering needs, etc., and treated as necessary. All undesirable conditions shall be eliminated as per accepted landscape maintenance practices. All shrubs shall be maintained in a healthy vigorous condition. Remove all spent flowers, flower spikes and remove all leaves and debris from plant areas daily. Hose off all plant material monthly to remove accumulated dirt and soot.

1. Pruning: Pruning shall be performed as a continuous ongoing operation not allowing plants to develop stray, undesirable growth, and shall be done under the direction of a certified Arborist. Trimming, pruning, thinning and training are functions to be done at any time as needed to maintain a pleasing appearance. Accomplish pruning by removing woody stems from inside shrubs on an as-needed basis as directed by the Arborist. Excessive pruning or stubbing back will not be permitted. Top shrubs only when necessary for appearance and after interior selective branch pruning has been completed or as directed by the Arborist. Where trees and shrubs occur in close proximity to walks or parked cars, prune to allow movement without interference from branches and foliage.
    a. Shrub Pruners: Shrubs shall be pruned and thinned using hand-held shrub pruners, Hedge shears and clippers shall not be used.

I. Irrigation Systems Care
1. Irrigation Repair and Operation:
    a. Systems Components Damage: Irrigation system components damaged as a result of Contractor's neglect shall be repaired or replaced by the Contractor at no cost to the Owner. Normal wear and tear of systems, accidental breakage by others, or so-called acts of God, are conditions under which the Contractor is not directly responsible and repairs shall be paid for by the Owner. The Contractor shall notify the Owner's Representative the same day of discovery of damage to irrigation system components caused by acts of God, that do not result from the performance of the work by the Contractor. Upon receipt of the Owner Representative's written authorization, the Contractor shall repair said damage as soon as possible and submit a change order related to the cost of said work to the Owner's Representative. Failure to report any damages will constitute Contractor making repairs at his own expense. Any replacement of irrigation system components under this subparagraph 1. shall be original equipment types. Any substitutions for replacement equipment shall be approved in writing from the Owner prior to doing work.
    b. Replacement includes: sprinkler system laterals (piping), sprinkler mains (pressure lines), sprinkler control valves, sprinkler controllers, sprinkler heads, sprinkler caps, sprinkler head risers, valve covers, boxes and lids, including electrical pull boxes and lids, valve sleeves, quick couplers, and hose bibs.
    c. Automatic Irrigation System Failure: Irrigation shall be done by the use of automatic sprinkler systems, where available and operable; however, failure of the existing irrigation system to provide full and proper coverage shall not relieve the Contractor of the responsibility to provide adequate irrigation with full and proper coverage to all areas in the work site.
    d. Property Damage: Any damages to property resulting from excessive irrigation water or irrigation water runoff due to the Contractor's negligence shall be charged to the Contractor.
    e. Controller and Valve Boxes: The Contractor shall keep controller and valve boxes clear of solids and debris and maintain the irrigation system including the replacement, readjustment, raise or lower, straighten, and any other operation required for the continued proper operation of the system from the water meter throughout the work site. Immediately after planting, apply water to each tree, shrub and vine by means of a hose in a moderate stream in the planting hole until the material around the roots is completely saturated from the bottom of the hole to the top of the ground.

f. Following the planting of ground cover, each plant shall be immediately and thoroughly watered by means of a hose with a slow stream of running water.

g. Apply water in sufficient quantities and as often as seasonal conditions require to keep the ground wet, but not soaking, at all times, well below the root systems of the plants and grass.

2. System Monitoring:
   a. Contractor Monitoring: The Contractor shall inspect the irrigation system for broken and clogged heads, malfunctioning or leaking valves, or any other condition which hampers the correct operation of the system. Authorization must be obtained from the Owner's representative before proceeding with work not covered under normal maintenance work. The malfunctioning sprinkler system landscape area shall be irrigated by a portable irrigation method until all authorized repairs have been completed to the satisfaction of the Owner's representative. Each system shall be checked dailyand all necessary adjustments made to heads which throw onto roadways, walks,windows, or out of intended area of coverage. The Contractor shall clean and adjust sprinkler heads as needed for proper coverage. Each system shall be individuallyoperated and observed on a regular basis.
   b. Suspension of Irrigation Operation: The Contractor shall turn off irrigation systems during periods of rainfall and times when suspension of irrigation is desirable to conserve water while remaining within guidelines of good horticultural acceptable maintenance practices.
   c. System Operation Knowledge: One maintenance person shall have the responsibility of operating and knowing the irrigation systems adjust controllers, observe the effectiveness of the irrigation systems, and making minor adjustments and repairs to systems.

3. Coverage/Application Rate: Generally, watering shall be done at night, between the hours of 12:00 A.M. and 6:00 A.M., unless otherwise approved by the Owner's representative. The Contractor shall operate systems and irrigation heads as seasonal conditions require. During extremely hot weather, extended holiday periods and during or following breakdown of systems, the Contractor shall provide adequate personnel and materials as required to adequately water all landscaped areas. When breakdowns or malfunctions exist, the Contractor shall water manually by whatever means necessary to maintain all plant material in a healthy condition.

4. Ground Cover Trimming: Grass and ground covers are to be neatly trimmed away from sprinkler heads to ensure proper coverage and operation. Weed or turf killer shall not be used. Trim ground covers away from sprinkler heads by tapering away from head. Holes shall not be cut in to ground cover areas. As ground covers grow in height, risers may need to be extended to properly clear top of ground covers.

5. The Contractor shall test the soil and ground cover areas and around trees and shrubs monthly or as necessary with soil probes to determine that the proper amount of water is being applied at all times. This information shall be used to adjust watering times on the controller and supplemental hand or deep watering as necessary.
   a. Soil Probe: The Contractor shall make the soil probe available at all walk-through inspections.

6. Sub-Surface (Drip) Irrigation: Areas irrigated by sub-surface (drip) irrigation will be adequate moisture within the root zone to promote proper plant growth.

7. Maintenance Work not Included:
   a. Backflow Prevention Device: Testing, certification and service of the backflow prevention shall be done by the Contractor, and it shall be the Contractor's responsibility to notify the Owner'sz Representative should a malfunction occur.

J. Grades: Damage to planting areas through any of the following shall be replaced or repaired immediately by refilling with topsoil and leveling:
   1. Depressions caused by vehicles, bicycles or foot traffic.
   2. Damage caused by gophers and moles.
   3. Erosion due to irrigation runoff.
   4. Unnatural soil settling.
   5. Excessive soil compaction.

K. Walkway Care
   1. Sweeping, Vacuuming and Blowing off Walks: All public walkways shall be swept, vacuumed or blown off once a week. This work shall be coordinated with mowing or other maintenance work in the area. All gutters within the maintenance area shall be kept clean of grass clippings and miscellaneous trash.
   2. All walks shall be kept free of dirt, leaves and other debris from the maintenance by or visiting the site. Debris shall be collected on a daily basis. In general, all areas shall be policed once daily. All paper, trash, etc., shall be disposed of off-site.
   3. Hosing off Walks Option: In general, all public walkways shall be hosed off once a month in place of sweeping or blowing as described above. Care shall be taken so that this does not inhibit or endanger pedestrians utilizing walkways. This work should be scheduled to coincide with mowing or other maintenance work in the area.

L. The Contractor shall be on site once weekly for a minimum of four (4) hours.

M. The Contractor is to work closely with the Owner's maintenance division, and establish a weekly meeting with the Owner's maintenance crew.

N. The Contractor shall replace all annual color as necessary during the maintenance period.

O. The Contractor shall remove dead flower buds.

P. The Contractor shall adjust and maintain the low voltage lighting system in fully operational condition. Maintenance of lighting shall run inclusive with landscape and irrigation maintenance period.

Q. The Contractor may be relieved of the maintenance work when the final (90) calendar day plant establishment work has been satisfactorily completed.

R. Extension of Maintenance Period: Continue the maintenance period at no additional cost to the Owner until previously noted deficiencies have been corrected.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior Portland cement concrete paving for the following:
   1. Curbs and gutters
   2. Walkways
   3. Driveways
   3. Concrete pavement
   4. Concrete wheel stops

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Section 02300: Earthwork for subgrade preparation, grading and base course.
   2. Section 03300: Cast-in-Place Concrete for general building applications of concrete.

1.3 SYSTEM DESCRIPTION

A. Provide concrete pavement according to the materials, workmanship, and other applicable requirements of the following standard specifications:
   1. Reference Specification: Perform all work in accordance with applicable provisions of "Standard Specifications for Public Works Construction", 2009; and City of Beverly Hills Standard drawings. Unless otherwise noted, mention herein of section numbers refers to sections of the Reference Specification. Where Reference Specification refers to "Agency", substitute the word "Owner". Where Reference Specification refers to "Engineer", substitute the word "Architect". Where Reference Specification is in conflict with these Specifications, these Specifications shall govern.
   2. Measurement and payment provisions and safety program submittals included in Reference Specifications do not apply to this Section.

1.4 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.

B. Design mixes for each class of concrete. Include revised mix proportions when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Description of Methods and Sequence of Placement. For each type of specially-finished concrete provide description of methods and sequence of placement.

D. Submit manufacturer's product data for the following:
   1. Form release agent.
   2. Concrete coloring additive.
   3. Prefabricated control joint.
   4. Preformed joint filler.
   5. Sealants.
   6. Slip plane joint.
   7. Concrete mix design.

E. Submit two (2) 12” x 12” mockup samples of colored concrete in colors selected by the Architect.

1.5 QUALITY ASSURANCE

A. Concrete Standards: Comply with provisions of the following standards, except where more stringent requirements are indicated.
   1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
   2. ACI 318, "Building Code Requirements for Reinforced Concrete."
   3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
   4. Standard Specifications for PWC (Green Book) latest edition, section 201-1.

B. Concrete Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

C. Paving work, base course etc., shall be done only after excavation and construction work, which may damage them, have been completed. Damage caused during construction shall be repaired before acceptance.

D. Existing paving area shall, if damaged or removed during the course of this project, be repaired or replaced under this section of the specification. Workmanship and materials for such repair and replacement, except as otherwise noted, shall match as closely as possible those employed in existing work.

E. Pavement, base, or subbase shall not be placed on a muddy subgrade.

F. Provide control joints as required to construct 100 sq. ft. maximum panel sizes. Provide sawcut joints. Note on shop drawings.

G. Concrete Testing Service: Engage a qualified independent testing agency to perform materials evaluation tests and to design concrete mixes.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

1.7 TESTING AND INSPECTION

A. The owner reserves the right to inspect and test paving and associated work.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other acceptable panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
   1. Use flexible or curved forms for curves of a 100-foot or less radius.

B. Form Release Agent: Provide commercial formulation form-release agent with a maximum of 350 g/L volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
      a. Debond Form Coating, L & M Construction Chemicals.
      b. Crete-Lease 880 VOC, Cresset Chemical Company.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars and Tie Bars: ASTM A 615, Grade 40 for #3 bars and Grade 60 for bars larger than #3, deformed.

B. Plain, Cold-Drawn Steel Wire: ASTM A 82.

C. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

D. Dowel Sleeves: Speed Dowel, Aztec Concrete Accessories, Inc.

E. Hook Bolts: ASTM A 307, Grade A bolts, internally and externally threaded. Design hook bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

F. Supports for Reinforcement: Chairs, spacers, dowel bar supports and other devices for spacing, supporting, and fastening reinforcing bars, welded wire fabric, and dowels in place. Use wire bar-type supports complying with CRSI specifications.
   1. Use supports with sand plates or horizontal runners where base material will not support chair legs.

G. Welded wire fabric reinforcement shall conform to the applicable requirements of ASTM A185. Fabric reinforcement shall be furnished in flat sheets. Fabric reinforcement in rolls will not be permitted.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type II
   1. Use one brand of cement throughout Project. Coordinate with Division 03 Section "Cast-In-Place Concrete."

B. Normal-Weight Aggregates: ASTM C 33, Class 4M non-reactive, and as follows. Provide aggregates from a single source.
   1. Maximum Aggregate Size: 1-inch.
   2. Do not use fine or coarse aggregates that contain substances that cause spalling.
   3. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.

C. Water: Potable.

D. Admixtures: Comply with requirements specified in Division 03 Section "Cast-In-Place Concrete."
   1. Do not use admixtures containing calcium chloride or chloride ions.

2.4 COLOR ADMIXTURE

A. Refer to Architectural plans for concrete color.

B. Color admixture shall be suitable for flatwork concrete and shall meet or exceed the requirements set by Portland Cement Association (PCA) and ATSM C 494.

B. Color admixture shall be of a type and quality which will not adversely affect workability, setting, or strength of concrete. Color pigments shall consist of chemically inert, non-fading, alkali-fast mineral oxides, finely ground and specially prepared for the use in both cement and mortar. Admixture shall not contain calcium chloride.

C. Color admixture shall be Chromix admixture, manufactured by L.M. Scofield Company, Los Angles, CA 90040.

D. Mix design shall conform to manufacturer's recommendations, and directions of the Architect to achieve proposed color. Strictly monitor additive / cement ratio throughout job to ensure uniform color.

2.5 CURING MATERIALS

A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

B. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
1. Waterproof paper.
2. Polyethylene film.
3. White burlap-polyethylene sheet.

C. Liquid Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B. Moisture loss not more than 0.55 kg./sq. meter in 72 hours when applied at a rate of 200 sq. ft./gal.
1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.
2. Products: Subject to compliance with requirements, provide one of the following:
   a. L & M Cure R, L & M Construction Chemicals, Inc.
   b. 1100-Clear, W.R. Meadows, Inc.
3. Do not use sodium silicate type curing agents.

D. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. Eucobar; Euclid Chemical Co.
   b. E-Con; L&M Construction Chemicals, Inc.
   c. Confilm; Master Builders, Inc.

2.6 RELATED MATERIALS

A. Bonding Agent: Acrylic or styrene butadiene, complying with ASTM C 1059, Type 2.

B. Top- Surface Retarder: Provide Top-Cast retarder by Grace Top-Cast. Top be applied in strict accordance with manufacturer instructions.

C. Epoxy Adhesive: ASTM C 881, two-component material suitable for dry or damp surfaces. Provide material type, grade, and class to suit requirements.

D. Products: Subject to compliance with requirements, provide one of the following:
1. Bonding Agent:
   b. SBR Latex; Euclid Chemical Co.
   c. Daraweld C; W.R. Grace & Co.
   d. Everbond; L&M Construction Chemicals, Inc.
   e. Acryl-Set; Master Builders Inc.
2. Epoxy Adhesive:
   a. Burke Epoxy M.V., The Burke Co.
   b. Concresive Standard Liquid; Master Builders, Inc.
   c. Rezi-Weld 1000; W.R. Meadows, Inc.

E. Concrete Sealer: Water-based, deep penetrating, non-staining, non-darkening silane micro emulsion.
1. Positive chloride-ion screening, prevents water intrusion, minimizes rebar corrosion and potential concrete spalling, and protects against damaging effects of alkalis and other contaminants.

2. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.

3. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
   a. Pentane WB, L & M Construction Chemicals, Inc. This product is intended to establish the characteristics and level of quality intended for this Project.

D. Expansion and Isolation Joint Fillers: ASTM D 1751, cellulosic fiber.

2.7 CONCRETE MIX

A. Prepare design mixes for each type and strength of normal-weight concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use a qualified independent testing agency for preparing and reporting proposed mix designs.
   1. Do not use the Owner's field quality-control testing agency as the independent testing agency.

B. Proportion mixes according to ACI 211.1 and ACI 301 to provide normal-weight concrete with the following properties:
   1. Compressive Strength (28-Day): 2500 psi for concrete for non-vehicular sidewalks; 3200 psi for concrete for traffic areas, curbs and gutters.
   2. The minimum cement content shall be 5-1/4 sacks per cubic yard.
   3. The maximum concrete slump shall be 3 inches, plus or minus 1/2 inch, for all walks; and 4 inches, plus or minus 1 inch for all other Portland cement concrete paving.
   4. Water/Cement Ratios:
      a. 0.5 maximum for concrete for pavement and site flatwork.
      b. 0.45 maximum for all other concrete.

C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, project conditions, weather, test results, or other circumstances warrant.

D. Admixtures: Comply with requirements specified in Division 03 Section "Cast-In-Place Concrete".

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94.
   1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.9 GROUT

A. Grout shall be mixed in the proportions of one part Portland cement to two parts sand, by volume. Only sufficient water shall be used to enable grout to barely hold its shape when squeezed into a ball in the hand. Sand for grout shall be "Fine Aggregate", conforming to ASTM C 33.

B. Non-shrink grout shall be pre-mixed non-shrinking, high strength grout. Compressive strength in 28 days shall be 5,000 psi minimum, but in no case less than the specified strength of the adjacent concrete. Manufacturer shall provide evidence that the material meets the requirements of the COE CRD-C 621 (558). Grout permanently exposed to view shall be non-oxidizing; metallic grout may be used in other locations.

1. Non-shrink grout shall be one of the following or approved equal:

Manufacturer	Product
Gifford-Hill Co.	Supreme
Master Builders Co.	Embeco
U.S. Grout Corporation	Five Star Grout

2.10 SANDBLASTING MATERIAL

A. Material for sandblasting shall be 16/20 mesh sand.

2.11 HERBICIDE TREATMENT

A. Commercial chemical for weed control, registered by Environmental Protection Agency. Provide granular, liquid, or wettable powder form.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following:
      a. Ciba-Geigy Corp.
      b. Dow Chemical U.S.A.
      c. E.I. Du Pont de Nemours & Co., Inc.
      d. FMC Corp.
      e. Thompson-Hayward Chemical Co.
      f. U.S. Borax and Chemical Corp.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Areas to be paved shall be compacted and brought to subgrade elevation per soils report before work of this section is performed. Final fine grading, filling, and compaction of areas to receive paving, as required to form a firm, uniform, accurate, and unyielding subgrade at required elevations and to required lines, shall be done under this Section.

B. Existing subgrade material which will not readily compact as required shall be removed and replaced with satisfactory materials. Additional materials needed to bring subgrade to required line and grade and to replace unsuitable material removed shall be material conforming to this Section.

C. Subgrade of areas to be paved shall be re-compacted per soils report.

D. Excavation required in pavement subgrade shall be completed before fine grading and final compaction of subgrade are performed. Where excavation must be performed in completed subgrade, base, or pavement, subsequent backfill and compaction shall be performed per soils report.

E. Areas being graded or compacted shall be kept shaped and drained during construction. Ruts greater than or equal to 2 in. deep in subgrade, shall be graded out, reshaped as required, and re-compacted before placing pavement.

F. Materials shall not be stored or stockpiled on subgrade.

G. Disposal of debris and other material excavated under this section, and material unsuitable for or in excess of requirements for completing work of this section shall be disposed of off-site.

H. Prepared subgrade will be inspected by Soils Engineer. Subgrade shall be approved before installation of gravel base course. Disturbance to subgrade caused by inspection procedures shall be repaired under this section of the specification.

I. Proof-roll subgrade or base surface prepared by others to check for unstable areas and verify need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

J. Herbicide Treatment: Apply chemical weed control agent in strict compliance with manufacturer's recommended dosages and application instructions. Apply to compacted, dry subgrade prior to installation of base course.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for paving to required lines, grades, and elevations. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork and screeds for grade and alignment to following tolerances:
1. Top of Forms: Not more than 1/8 inch in 10 feet.
2. Vertical Face on Longitudinal Axis: Not more than 1/4 inch in 10 feet.

C. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

3.3 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for placing and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, or other bond-reducing materials. Where there is delay in placing concrete after reinforcement is in place, bars shall be re inspected and cleaned when necessary.

C. Any bar showing cracks after bending shall be discarded.

D. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

F. After forms have been coated with form release agent, but before concrete is placed, reinforcing steel anchors shall be securely wired in the exact position called for, and shall be maintained in that position until concrete is placed and compacted. Chair bars and supports shall be provided in a number and arrangement satisfactory to the Architect.

3.4 JOINTS

A. General: Construct contraction, construction, and isolation joints true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to the centerline, unless indicated otherwise.
1. When joining existing paving, place transverse joints to align with previously placed joints, unless indicated otherwise.
2. Make joints, including sawed joints, full depth required and from edge to edge of paving.

B. Contraction Joints: Provide weakened-plane contraction joints, sectioning concrete into areas as shown on Drawings. Construct contraction joints for a depth equal to at least 1/4 of the concrete thickness, as follows:

1. Tooled Joints: Form contraction joints in fresh concrete by grooving and finishing each edge of joint with a radiused jointer tool.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into hardened concrete when cutting action will not tear, abrade, or otherwise damage surface and before development of random contraction cracks.
3. Inserts: Form contraction joints by inserting pre-molded plastic, hardboard, or fiberboard strips into fresh concrete until top surface of strip is flush with paving surface. Radius each joint edge with a jointer tool. Carefully remove strips or caps of two-piece assemblies after concrete has hardened. Clean groove of loose debris.

C. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than 1/2 hour, unless paving terminates at isolation joints.
1. Continue reinforcement across construction joints unless indicated otherwise. Do not continue reinforcement through sides of strip paving unless indicated.
2. Provide tie bars at sides of paving strips where indicated.
3. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

D. Isolation Joints: Form isolation joints of preformed joint filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 50 feet, unless indicated otherwise.
2. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface where joint sealant is indicated. Place top of joint filler flush with finished concrete surface when no joint sealant is required.
3. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.
4. Protect top edge of joint filler during concrete placement with a metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

E. Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one half of dowel length to prevent concrete bonding to one side of joint.

F. Where spacing is not shown, locate expansion joints at 10-foot maximum spacing.

G. Where plastic "zip strips" are used to construct concrete joints, cut and remove, as a minimum, the top 1/4 inch of these strips after concrete has cured, and coordinate installation of joint filler, if shown on the Drawings.

3.5 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Moisten subgrade or base to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.

C. Comply with requirements and with ACI 304R for measuring, mixing, transporting, and placing concrete.

D. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

E. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

F. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete complying with ACI 309R.
   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcing, dowels, and joint devices.

G. Screed paved surfaces with a straightedge and strike off. Use bull floats or darbies to form a smooth surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces prior to beginning finishing operations.

H. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete.

I. Cold-Weather Placement: Comply with provisions of ACI 306R and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
   2. Do not use frozen materials or materials containing ice or snow.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

J. Hot-Weather Placement: Place concrete complying with ACI 305R and as specified when hot weather conditions exist.
   1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
   3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 CONCRETE FINISHING

A. Apply Top-Surface retarder- Sand Blast Finish to the all concrete pavements as indicated on the Drawings.

   1. For pedestrian traffic areas, finish shall be a non-slip surface with a minimum static coefficient of friction of 0.6.
      a. For ramps, the static coefficient of friction shall be a minimum of 0.8. Ramps are defined as any sloping path of travel with a slope in the direction of travel of 5.0%, or greater.
   2. Tests for coefficient of friction shall be either ASTM C-1028 (field test) or ASTM D-2047 (laboratory test).

B. Finishing formed surfaces:
   1. Curb forms shall leave a smooth face.
   2. Remove all fins.

C. Provide steel trowel finish on tops of curbs and flow lines of curbs, gutters and integral curb and gutters.

D. Final Tooling:
1. Control joints at colored, top-cast concrete paving shall be saw cut.
2. Tool edges gutters, curbs, and joints formed in fresh concrete with a jointing tool to the following radius. Repeat tooling of edges and joints after applying surface finishes. Eliminate tool marks on concrete surfaces.
a. Radius: 1/4 inch.
b. Radius: 3/8 inch.

F. Finish surfaces to produce a uniform appearance throughout area involved and throughout adjacent areas with the same treatment.

G. Sandblast finish shall be consistent finish throughout and match approved mock-up.

H. Where concrete finishing occurs adjacent to finished metal or other surfaces, particularly where serrated or indented surfaces occur, remove all traces of cement film before allowing to harden.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations of ACI 306R for cold weather protection and ACI 305R for hot weather protection during curing.

B. Evaporation Control: In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before floating.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
1. Moisture Curing: Keep surfaces continuously moist for not less than 7 days with the following materials:
a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with a 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

E. Spray-apply concrete sealer to all concrete pavement. Comply with sealer manufacturer's application instructions.

3.8 CURING COLORED CONCRETE

A. Colored concrete shall not, under any circumstances, be cured using water fog misting or ponding, burlap, plastic sheeting, or other wet covering.

B. Curing material and method shall be in strict conformance with manufacturer's guidelines and recommendations.

C. Only if additional protection is absolutely required, the surface should remain uncovered for at least 4 days, after which time new and unwrinkled non-staining reinforced waterproof kraft curing paper may be used.

3.9 FIELD QUALITY CONTROL TESTING

A. The Owner will employ a qualified testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include the following:
   1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
      a. Slump: ASTM C 143; one test at point of placement for each compressive-strength test but no less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
      b. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test but no less than one test for each day's pour of each type of air-entrained concrete.
      c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
      d. Compression Test Specimens: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless directed otherwise. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
      e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. Test one specimen at 7 days, test two specimens at 28 days, and retain one specimen in reserve for later testing if required.
   2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
   3. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
   4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
   5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

B. Test results will be reported in writing to Architect, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in paving, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day and 28-day tests.

C. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

D. Additional Tests: The testing agency will make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

E. Manufacturer's Field Service: When placing integral colored concrete, arrange for the services of a qualified technical representative of the color pigment manufacturer, equipped with wet-batch color control test devices to ensure concrete of uniform color and matching approved mock-up.

3.10 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective, or does not meet the requirements of this Section. Concrete which is not true to line and plane, which is not thoroughly troweled and properly surfaced as required, which varies in excess of 1/4-inch along a 10-foot straight edge, which is scuffed or has a rough top surface, except where required, or which does not connect properly to adjoining work, does not slope as required for drainage or is not properly cured, will be deemed defective.

1. General: Patch defective areas immediately following form removal. Remove defective concrete to a width and depth necessary for proper patching, but in no case less than 1 inch deep. Make the walls of the cut area perpendicular to the surface and do not feather out the edge. Dampen the patch area and the adjacent area 6 inches around the patch area.
2. Exposed concrete: Prepare a patching mortar of one part Portland cement, adjusted to match the color of the surrounding concrete, and 2-1/2 parts sand with the least water required to produce a workable mass. Re-work this mortar until it is the stiffest consistency that will permit placing. Brush the patch area with a bond of neat cement and water paste and apply patching mortar when the water sheen is off the bond. Strike off the mortar slightly higher than the surrounding surface, let set for 1 hour and finish flush with the surrounding surface.

B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep concrete paving not more than 2 days prior to date scheduled for Substantial Completion inspections.

END OF SECTION

SECTION 32 31 13

MESH FENCES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Chain-Link Fences: Commercial
   2. Gates: swing

B. Related Sections include the following:
   1. Division 3 Section "Cast-in-Place Concrete" for concrete equipment bases/pads**.**

1.03 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide chain-link fences and gates capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Minimum Post Size and Maximum Spacing for Wind Velocity Pressure: Determine based on mesh size and pattern specified, and on the following minimum design wind pressures and according to CLFMI WLG 2445:
      a. Wind Speed: 45 mph.
      b. Fence Height: 6 feet.
      c. Line Post Group: ASTM F 1043.
      d. Wind Exposure Category: B.
   2. Determine minimum post size, group, and section according to ASTM F 1043 for framework up to 10 feet high, and post spacing not to exceed 10 feet.

B. Lightning Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

1.04 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.
   1. Fence and gate posts, rails, and fittings.
   2. Chain-link fabric, reinforcements, and attachments.
   3. Gates and hardware.

B. Shop Drawings: Show locations of fences, gates, posts, rails, tension wires, details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.
   1. For installed products indicated to comply with design loads, include structural analysis data.

C. Samples for Verification: For each type of chain-link fence and gate indicated.
   1. Polymer-coated steel wire (for fabric) in 6-inch lengths.
   2. Polymer coating, in 6-inch lengths on shapes for [posts, rails, wires, and gate framing.

D. Product Certificates: For each type of chain-link fence and gate, signed by product manufacturer.
   1. Strength test results for framing according to ASTM F 1043.

E. Qualification Data: For Installer.

F. Field quality-control test reports.

G. Maintenance Data: For the following to include in maintenance manuals:
   1. Polymer finishes.
   2. Gate operator.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
   1. Engineering Responsibility: Preparation of data for chain-link fences and gates, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
   1. Testing Agency's Field Supervisor: Person currently certified according to NETA ETT, or the National Institute for Certification in Engineering Technologies, to supervise on-site testing specified in Part 3.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for automatic gate operators serving as a required means of access.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

B. Interruption of Existing Utility Service: Do not interrupt utility services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect no fewer than two days in advance of proposed interruption of utility services.

2. Do not proceed with interruption of utility services without Architect's written permission.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Chain-Link Fences and Gates:
      a. Allied Tube and Conduit
      b. Tyco Electrical & Metal Products

2.02 FENCE FABRIC

A. General: Provide fence mesh as manufactured by McNichols (877.884.4653)
model #s shall be as indicated on the drawings.
fabrics shall be metallic (zinc) coated before weaving, especially for fence projects located in corrosive atmospheres.

B. Posts and Rails: Square or Round cold-formed, electric-resistance-welded, steel pipe or tubing, with minimum yield strength of 45,000 psi and with outside dimension, minimum wall thickness, and weight complying with ASTM F 761 or ASTM F 654 for the following fence height and strength and stiffness requirements:

   1. Fence Height: see drawings
   2. Duty Rating: Heavy.
   3. Galvanized
   4. Tube or Pipe Diameter and Thickness: According to ASTM F 761**.**
   5. Tube Size and Thickness: According to ASTM F 654.
      a. Top Rail: 1.315 inches.
      b. Line Post: 1.66 inches.
      c. Terminal Post: 1.90 inches.
      d. Gate Post: 1.90 inches.
      e. Tube or Pipe Thickness: 0.065 inch.
      f. Where square tubes are called out _ See drawings for size

   6. Gate: Comply with ASTM F 654 and the following:
      a. Type: II, double swing frame tubing.
      b. Fabric Height: 2 inches less than adjacent fence height.
      c. Leaf Width: See Drawings

2.03 CAST-IN-PLACE CONCRETE

A. Materials: Portland cement complying with ASTM C 150, Type I aggregates complying with ASTM C 33, and potable water[for ready-mixed concrete complying with ASTM C 94/C 94M].[Measure, batch, and mix Project-site-mixed concrete according to ASTM C 94/C 94M.]
   1. Concrete Mixes: Normal-weight concrete with not less than 3000-psi compressive strength (28 days), 3-inch slump, and 1-inch maximum size aggregate.

B. Materials: Dry-packaged concrete mix complying with ASTM C 387 for normal-weight concrete mixed with potable water according to manufacturer's written instructions.

2.04 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

2.05 FENCE GROUNDING

A. Conductors: Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.
   1. Material above Finished Grade: Copper.
   2. Material on or below Finished Grade: Copper.
   3. Bonding Jumpers: Braided copper tape, 1 inch wide, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.

B. Connectors and Grounding Rods: Comply with UL 467.
   1. Connectors for Below-Grade Use: Exothermic welded type.
   2. Grounding Rods: Copper-clad steel.
      a. Size: 5/8 by 96 inches.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.
   1. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.
   2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.03 INSTALLATION, GENERAL

A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.
   1. Install fencing on established boundary lines inside property line.

3.04 FENCE INSTALLATION

A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
   1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
   2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

C. Line Posts: Space line posts uniformly at 8 feet o.c.

D. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts.
   1. Locate horizontal braces at midheight of fabric 6 feet or higher, on fences with top rail and at 2/3 fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

E. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric.
   1. Top Tension Wire: Install tension wire through post cap loops.
   2. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.

F. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

G. Bottom Rails: Install, spanning between posts.

H. Fabric: Apply fabric to outside of enclosing framework. Leave 1 inch between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

I. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.

J. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at 1 end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

3.05 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

END OF SECTION

SECTION 32 31 26

PLANT SCREENING SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract apply to this Section.

1.2 SUMMARY

A. This Section includes but is not limited to the following:
   1. Standard Plant Screen Systems
   2. Radius Plant Screen Systems
   3. Custom Plant Screen Systems
   4. Plants screen wire and crimps
   5. Miscellaneous Trim, Clips and Fasteners.

B. Products furnished, but not installed, under this Section include the following:
   1. Tube steel supports, weld plates, anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

1.3 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Provide plant screen structure and related metal fabrications that allow for thermal movements that result from the following maximum change (range) in ambient and surface temperatures. Installer shall prevent buckling, opening of joints, overstressing of components, failure of connections, reduced connections and any other effects during installation that is detrimental to the integrity of the planting screen system. Expansion and contraction calculation shall be based on surface temperatures of materials due to both solar heat gain and night time-sky heat loss and calculated by a licensed structural engineer
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.4 SUBMITTALS

A. Shop Drawings: McNICHOLS to show fabrication and installation details for plant screen systems.
   1. Include plans, elevations, sections, and details of plant screen system and relevant connections. Indicate foundation connections.
   2. Provide base weld plates or templates for anchors and bolts specified for installation under other Sections

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1, “Structural Welding Code--Steel.”

1.6 PROJECT CONDITIONS

A. Field Measurements: To be field verified existing before fabrication of plants screen systems. Indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be use established dimensions and proceed with fabricating planting screen system based on reviewed shop drawings. Coordinate wall and other contiguous construction as required to ensure that actual dimensions correspond to established dimensions and the context of the existing conditions.

1.7 COORDINATION

A. McNICHOLS to coordinate installation of weld base plates and system anchor age. Furnish templates, layout drawings and directions for installing anchorage system, including sleeves, concrete inserts, anchor bolts, weld plates and items with integral anchors, that are to be embedded in concrete or masonry.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Provide: McNICHOLS ECO-MESH® Modular Façade and Trellis System as manufactured by McNICHOLS CO., PO BOX 30300, TAMPA, FL, 33630-3300
Telephone: 800-237-3820, Fax: 813-289-7882, sales@mcnichols.com

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated and consistent with the design intent of the system.

2.3 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, cold-formed steel tubing.

C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

2.4 PLANT SCREEN PANELS

A. Standard Panel:
   1. Size: in one-foot increments from 2' wide to a maximum of 6’ wide and 2’ high to a maximum of 8’ high.
   2. Wire diameter: 0.135, 10 gauge
   3. Bridge wire diameter: .105, 12 gauge; .120, 11 gauge; .135, 10 gauge.
   4. Bridge wire spacing: 12”, 18", 24”
   5. Wire centers: 2” x 2”
   6. Weave: Intercrimp is standard
   7. Material: Galvanized (Galvannealed)
   8. Finish: powder coated

2.5 TRIM

A. Edge trim channel shall be the panel width with 1” returns, 16 gauge Carbon Steel, Galvanized, Stainless Steel or Aluminum sheet welded to the wire frame panels with all exterior surfaces ground smooth. Finish to match wire.

2.6 CLIPS

A. All mounting clips shall be fabricated from minimum 12 gauge to 16 gauge, metal to match screen wire. All bending, forming and drilling shall be done prior to powder coat finish. All (2) piece mounting clips are to be joined with 3/8” diameter x 1.5” stainless steel round head hex bolt with nylon lock hex nut and washers.

2.7 POSTS

A. Posts shall be 3" square ASTM A-500 with commercial grade finish to match panels, powder coated. Overall post length should be verified, based on panel size, post spacing, wind load requirements and soil conditions.

2.8 FASTENERS

A. Stainless Steel Fasteners: Provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls.
   1. Provide stainless-steel fasteners for fastening aluminum. Provide fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Round head hexagon bolts, ASTM A 307, Grade A; with nylon lock hex nuts, ASTM A 563; and flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.
   1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized. Size and length of bolts to be varied based on structural requirements.

D. Eyebolts: ASTM A 489.

E. Machine Screws: ASME B18.6.3.

F. Plain Washers: Round, ASME B18.22.1.

G. Lock Washers: Helical, spring type, ASME B18.21.1.

H. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
   1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

I. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
   1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
   2. Material for Anchors in Exterior Locations: Alloy Group 1 (A1) stainless steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.9 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
   1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Galvanizing Repair Paint: High zinc-dust content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

2.10 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32". Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the material.

D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes at 12" o.c. where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
   1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8" by 1-1/2", with a minimum 6" embedment and 2" hook, not less than 8" from ends and corners of units and 24" o.c., unless otherwise indicated.

2.11 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

2.12 FINISHED, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Commercial Grade Finish - all panels, trim, posts, caps plus miscellaneous clips shall be

fabricated, cut, bent and drilled prior to receiving a multi-grade phosphate wash, a thermally set epoxy primer and a thermally set powder paint finish, black (gloss or wrinkle) finish color.

C. Weathered finish

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

A. General: Install framing and supports to comply with requirements of items being supported and requirements indicated on Shop Drawings.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing plant screen structures and panels. Set plant screen structures accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels. Field verify all condition prior to installation.

C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections. At areas of removed finished, provide touch-up finish to match existing.

D. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended, so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

F. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

3.2 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0 mil dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Painting Sections.

END OF SECTION

SECTION 32 32 19

CONCRETE UNIT MASONRY WALLS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Deviations from the plans and specifications shall not be made without the written approval of the architect and/or engineer.

1.2 SUMMARY

A. This Section includes site concrete masonry unit (CMU) retaining walls, fences and enclosures.

B. Related Sections:

1. Division 2 Section "Earthwork" for excavation for site retaining walls.
2. Division 4 Section "Concrete Block Masonry" for decorative concrete masonry units with faces required to match site retaining wall units.

1.3 SCOPE OF WORK

A. Furnish and install concrete masonry units, mortar, grout, and masonry reinforcing steel. Provide equipment necessary for their installation.

B. Install items furnished by others: bolts, anchor bolts, angles, hinges, and built-ins.

C. Arrange for adequate bracing, forming, and shoring required in conjunction with and in the course of constructing the concrete masonry.

D. Advise the general contractor as to the position of all dowels for the masonry. The general contractor shall be responsible for the placement of all dowels in any adjoining construction.

E. Arrange for inspections.

1.4 QUALITY ASSURANCE

A. Submittals
1. Certificates of compliance with all applicable ASTM and UBC standards shall be submitted on all products specified herein.
2. Sample Specimens: Provide one sample specimen of the proposed CMU. Inlcude color, surface treatment, and mortar color.

B. Sample Panel
1. Construct an approximate 6 feet long by 4 feet high mock-up panel for representation of completed masonry, joint tooling, design details, and workmanship.
2. Panel shall not be part of the wall system.

3. Include typical base and cap or finished top construction.

C. Inspections: Non continuous inspection allowed.

D. Tests: Owner shall pay all costs for tests.
1. Concrete masonry units per ASTM C 140.

2. Mortar per UBC Standard 21-6.
3. Grout per ASTM C 1019.
4. Prisms per UBC Standard 21-17.

1.5 PRODUCT HANDLING AND STORAGE

A. Materials of this section shall be protected to maintain quality and physical requirements.

B. All masonry units shall be stored on the jobsite so that they are protected from rain, stored off the ground and kept clean from contamination.

C. Handle units carefully to avoid breakage and damage to finished faces.

D. Glazed and ground faced masonry units shall be stored on pallets on level ground, single stacked only, and covered to protect against inclement weather. Keep protective block face covers on glazed units until installation.

1.6 EXTREME WEATHER CONDITIONS

A. Cold Weather Conditions (40ºF or below):

1. Wet or frozen units shall not be laid. Temperature of units when laid shall not be less than 20ºF.
2. Aggregates and mixing water shall be heated to produce mortar and grout temperatures between 40ºF and 120ºF.

3. Maintain mortar temperature on boards above 32ºF.

PART 2 – MATERIALS

2.1 CONCRETE MASONRY UNITS

A. Load bearing concrete masonry units shall conform to UBC Standard 21-4, Grade N, and ASTM C 90. All units shall be Medium-weight, 1900 net PSI, as manufactured by:
Orco Block and Hardscape (714) 932-7125
   a. CMU Type: Precision, Color: Wheat.
   b. CMU Type: Shot Blast Both sides and exposed sides, Color: Brown.
   (Alternate Cost # 2), see drawings for location

Note: Item(s) indicated above may require manufacturing lead time; contact a Representative for details. Material must be ordered well in advance of anticipated masonry start.

B. Unless otherwise specified on the plans, blocks shall be hollow, load bearing concrete units, conforming to ASTM C-90, grade 'N'. No special inspection required for masonry construction.

C. Block units shall be constructed in running bond. Architectural finish, type of block, color and top course treatment shall match those of existing walls.

D. All Units shall be manufactured with integral water-repellent.

E. Block cells shall be unobstructed and shall have vertical continuity. Cells shall be filled with grout. Maximum height of pour shall be 4 feet.

2.2 ARCHITECTURAL CONCRETE MASONRY UNITS

A. Load bearing concrete masonry units shall conform to UBC Standard 21-4, Grade N, and ASTM C 90. All units shall be Medium-weight, 1900 net PSI, Custom Ultra Burnished Polished Masonry as manufactured by Headwaters Construction Materials (888)464-931

Local Distributor: Orco Block and Hardscape (714) 932-7125

1. Provide solid cap Blocks at top of yard walls as indicated on the Drawings.
   Pattern: Stack Bond and per drawings.
   Color: #700P White Limestone
2. Provide closed-end units at walls and at openings where ends will be exposed in
   finish Work shall be polished;
3. Provide bond beam blocks where horizontal reinforcement is indicated.
4. Provide special shapes and accessory units at locations indicated on Drawings.
5. Provide shell face where indicated on the drawing.
6. Blocks that are exposed shall all be polished finish on both sides and at exposed corners blocks.
7. All Units shall be manufactured with integral water-repellent.
8. Masonry unit shall have been cured for a minimum of 28 days.
9. Masonry unit shall have maximum liner shrinkage or 0.065 percent from saturated to oven dry.
10. Sealant: Apply manufacturer-specified sealer on all burnished units. Recommended.
11. coatings are as follows:
    i. TK-192, waterborne acrylic
    ii. TK Bright Kure and Seal, solvent-borne acrylic.
    iii. VOC content limits shall be maximum 250 grams/liter.
12. Submit two (2) samples of raw burnished block and two (1) samples of sealed blocks for approval.
13. Provide a mockup of 32” high and 32” wide grouted showing flush joints.

Note: Item(s) indicated above may require manufacturing lead time; contact a Representative for details. Material must be ordered well in advance of anticipated masonry start.

B. Unless otherwise specified on the plans, blocks shall be hollow, load bearing concrete units, conforming to ASTM C-90, grade 'N'. No special inspection required for masonry construction.

C. Block units shall be constructed in running bond. Architectural finish, type of block, color and top course treatment shall match those of existing walls.

D. Block cells shall be unobstructed and shall have vertical continuity. Cells shall be filled with grout. Maximum height of pour shall be 4 feet.

2.2 MORTAR

A. Mortar shall be Spec Mix Pre-blended Masonry Mortar, Type S, conforming to the proportion and property specifications of ASTM C 270, as manufactured by E-Z Mix Inc., Sun Valley, CA. or approved equal.

B. Mortar Materials:
    1. Admixtures: Use no admixtures, air-entraining agents, plasticizers, salts, or antifreeze compounds unless specified and approved in advance by the Structural Engineer and E-Z Mix, Inc. or approved equal manufacturer.
    2. Water: Use clean, potable and free of deleterious amounts of acids, alkalies or organic materials.
    3. Exterior tuckpointing grout for glazed masonry units shall use Laticrete 1776 Grout Admix Plus full strength in lieu of mixing water, or approved equal.

2.3 GROUT

A. Pre-blended Grout: PRE-MIX Products, Spec Concrete 30/70, 2000 PSI. minimum. Grout Mix manufactured by E-Z Mix Inc. may be used per manufacturer's specifications.

B. Grout shall conform to UBC Standard 21-19 or ASTM C 476, proportions per UBC Table 21-B.

C. Use of fine or course grout shall be per UBC Table 21-C.

D. Minimum compressive strength shall be 2000 PSI.

E. Grout shall be of fluid consistency with an 8 inch to 10 inch slump.

F. Admixtures: PRE-MIX Products Grout Additive. Use per manufacturer's specifications.

2.4 REINFORCING STEEL

A. Joint Reinforcement shall conform to UBC Standard 21-10.

B. Metal Ties and Anchors shall meet the requirements of UBC Section 2102.2.7.

C. All metal reinforcement shall be free from loose rust and other harmful matter or coatings.

D. Reinforcing steel shall be ASTM A-615, grade 40 for smaller than #5 bars, and grade 60 for #5 and large bars.

E. Unless otherwise noted on the plans, bar splices shall be 48 bar diameter, and shall be staggered where possible.

F. Where heights of wall make impractical to have a continuous bar extending upward from the footing, a 48 diameter splice may be provided at that point.

G. Top horizontal stem bars shall be continuous through bends and corners.

H. Horizontal stem bars shall be placed from the bottom course to the maximum specified spacing. Double bars shall be provided where indicated.

I. Reinforcing bends and standard hooks shall conform to applicable code.

J. No field welding of reinforcement shall be allowed without permitting agency approval

PART 3 - EXECUTION

3.1 PREPARATION

A. Materials

1. Masonry units shall be sound, dry, and clean from all foreign matter when placed in the wall.
2. Reinforcement bars shall be free of kinks or bends, except for bends detailed in the drawings.

B. Layout and Foundation

1. All footings shall be poured against undisturbed natural soil or certified compacted fill. Any over excavation and backfill shall be inspected by the field geotechnical engineer.

2. All excavation, backfill and bearing strata shall be inspected and approved by the field geotechnical engineer.
3. Temporary shoring or another approved construction method is required for excavations, which remove the lateral support from a public way or existing structure. Separate temporary shoring approval is required.

4. Retaining portion of wall shall be drained as detailed on the plans. Swales and minors drainage devices shall be constructed per the grading and drainage plan.

5. If site conditions or layout is in any way improper, masonry work shall not begin until cleared by the governing authority.

6. Foundation shall be level and at correct grade so that the initial bed joint shall not be less than 1/4 inch nor more than 1 inch.

7. Surface of foundation shall be clean and free of deleterious materials. Surface shall be roughened to a full amplitude of 1/16 inch.

8. If a foundation dowel must be bent to align with a vertical cell, it shall not slope more than 1 inch horizontally to 6 inches vertically.

9. All footings shall be poured against undisturbed natural soil or certified compacted fill. Any over excavation and backfill shall be inspected by the field geotechnical engineer.

10. All excavation, backfill and bearing strata shall be inspected and approved by the field geotechnical engineer.

11. Temporary shoring or another approved construction method is required for excavations, which remove the lateral support from a public way or existing structure. Separate temporary shoring approval is required.

12. Retaining portion of wall shall be drained as detailed on the plans. Swales and minors drainage devices shall be constructed per the grading and drainage plan.

3.2 MIXING OF MORTAR

A. Spec Mix Pre-blended Mortar

1. Mix in a mechanical batch mixer with the minimum amount of water to produce a workable consistency.

2. Mortar may be re-tempered once to maintain plasticity and workability. Re-tempering on mortar boards shall be done by adding water within a basin formed within the mortar. Rework the mortar into the water. No mortar shall be used beyond 2 1/2 hours from the time it was originally mixed.

3.3 MIXING OF GROUT

A. Water content of the grout shall be adjusted to provide proper fluid consistency to enable placement under existing field conditions without segregation of the constituents.

B. Do not use grout more than 1 1/2 hours after initial mixing.

C. Pre-blended Grout

1. Mix in mechanical mixer until workable, but not to exceed 10 minutes.

3.4 INSTALLATION OF MASONRY UNITS

A. General
1. All masonry shall be laid true, level, plumb, and in accordance with the plans.
2. Units shall be laid in running bond unless otherwise shown on the drawings.
3. Cutting of units shall be neat, true, and made by masonry saw.
4. Concrete masonry units shall not be wetted unless otherwise approved.
5. Construction supports shall not be attached to the wall except where specifically permitted by the architect or engineer.

B. Protection
1. Extreme care shall be taken to prevent grout or mortar stains on exposed surfaces. Any mortar or grout contact shall be cleaned immediately.
2. Tops of all unsheltered walls and partially completed walls shall be covered when work is not in progress.

3.5 JOINTS

A. Mortar Joints
1. Initial bed joint shall not be less than 1/4 inch nor more than 1 inch in thickness. All cells to be filled with grout shall be kept free from mortar droppings so the grout will make full contact with the foundation.

2. Head and bed joints of hollow units shall be filled with mortar for the thickness of the face shell. Solid units shall have full head and bed joints.

3. Horizontal joint reinforcement shall be fully embedded in mortar with a minimum 5/8 inch cover between joint reinforcement and exposed face. Mortar joints with wire

reinforcement shall be at least twice the thickness of the wire diameter.

4. All mortar joints on exposed walls, unless otherwise specified, shall be concave and double struck to produce a dense, slightly concave surface well bonded to the surface of the masonry unit.

5. Flush cut or sacked joints shall be used where surface is to be plastered.

6. If an installed unit is moved, it shall be removed from the wall, cleaned, and set in fresh mortar.

7. For glazed masonry units, rake back exterior mortar joints a minimum of 1/4 inch and tuckpoint with an approved water-resistant grout.

8. Tuckpoint scored joints of glazed masonry units with an approved water-resistant grout.

B. Control Joints

1. Control Joints control cracks by providing a vertical stress-relieving joint in the masonry wall while maintaining adequate shear strength for lateral wall stability.
2. Control joints shall be installed at 24 feet on center, unless noted otherwise in the drawings.
3. Control joints shall be constructed as detailed in the drawings.
4. PVC Masonry Control Joint: Use those classified by ASTM D 2287-81. The material shall meet or exceed the minimum requirements when tested in accordance with the stated test methods.

5. Synthetic Rubber Masonry Control Joint: Use those classified by ASTM D 2000-92. The material shall meet or exceed the minimum requirements when tested in accordance with the stated test methods.

3.6 INSTALLATION OF REINFORCING STEEL

A. Reinforcement shall be placed as detailed on the drawings and secured against displacement at intervals not to exceed 200 bar diameters.

B. Tolerance for placement:

1. In flexural elements shall be ± 1/2 inch for d equal to 8 inches or less, ± 1 inch for d equal to 24 inches or less but more than 8 inches, ± 1 1/4 inches for d greater than 24 inches. (d is the distance from compression face of flexural member to the centroid of tensile reinforcement.)

2. Longitudinal location shall be ± 2 inches.

C. Reinforcing bars, except joint reinforcement, shall be completely embedded in mortar or grout and have a minimum cover, including the masonry unit, of at least 3/4 inch, 1 1/2 inches when exposed to weather, and 2 inches when exposed to soil.

D. Clear distance between surface of reinforcing bar and any surface of a masonry unit

shall not be less than 1/4 inch for fine grout and 1/2 inch for course grout.

1. Horizontal reinforcement bars may rest on the cross webs of hollow masonry units.

E. Reinforcing bars and wire joint reinforcement shall be lapped as indicated on the drawings.

3.7 GROUTING

A. General

1. Reinforcement bars shall be in place and secured prior to grouting.

2. All cells and areas where grout is to be placed shall be free from mortar fins greater than 1/2 inch, droppings, and foreign materials that would prevent the wall from being properly grouted.

3. Grout shall completely fill all designated spaces, and shall be confined to those spaces.

4. Segregation of grout materials and damage to the masonry shall be avoided during the grouting process.

5. Grout shall be consolidated before loss of plasticity.
    a. Grout pours 12 inches or less may be puddled.
    b. Grout pours greater than 12 inches shall be consolidated and reconsolidated by mechanical vibration using a low velocity vibrator with a maximum head diameter of 3/4 inch.

6. Stop grout pours 1 1/2 inches below top of wall. Where bond beams occur, stop grout a minimum of 1/2 inch below.

7. Structural masonry walls shall be solid grouted unless otherwise specified. Anchor bolts shall be solidly grouted in place with 1 inch minimum of grout between the bolt and the masonry.

8. Spaces around all metal door frames and other built-in items shall be solidly grouted.

B. Low Lift Grouting

1. Grout pours shall not exceed 5 feet. Cleanouts are not required.

C. High-Lift Grouting:

1. Cleanout holes shall be provided at the bottom of all cells containing vertical reinforcement in hollow unit masonry, but spaced not more than 32 inches on center. Grout shall be placed in lifts not to exceed 6 feet. The full height in each wall section shall be poured in 1 day with no interruption greater than 1 hour.

3.8 WALL CLEANING AND PROTECTION

A. Minimize any mortar or grout stains on the wall during construction. Any stains that occur shall be removed immediately.

1. For burnished concrete masonry units, immediately remove any green mortar smears or soiling with a damp sponge.

2. For glazed masonry units and ground face units with heat-treated acrylic finish, remove green mortar smears with a dry cloth. Do not allow mortar lumps or smears to harden on the finished surfaces.

B. The tops of all unsheltered walls and partially completed walls shall be covered when work is not in progress.

C. Where atmosphere is dry, a light fog spray may be applied to masonry surfaces for three days after construction.

D. At the conclusion of the masonry work, remove all scaffolding and equipment used during construction, and remove all debris, refuse, and surplus masonry material from the site.

E. Walls of ground face units with heat-treated acrylic finish, when completed, and after final cleaning, shall receive a field coat application of Trendcoat T1 acrylic, from Trenwyth Industries, Inc., or approved equal, per manufacturer's instructions.

F. Retaining walls shall not be backfilled until materials have attained design strength.

3.9 CONSTRUCTION TOLERANCES

A. Variation from Level: For bed-joint lines along walls, do not exceed 1-1/4 inches in 10 feet, 3 inches maximum.

B. Variation from Indicated Wall Line: For walls indicated as straight, do not vary from straight line by more than 1-1/4 inches in 10 feet.

4.0 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Comply with requirements in Division 2 Section "Earthwork" for field quality control.

C. In each compacted backfill layer, perform at least 1 field in-place compaction test for each 100 feet or less of site retaining wall length.

D. In each compacted backfill layer, perform at least 1 field in-place compaction test for each 24 inches of fill depth and each 50 feet or less of site retaining wall length.

4.1 ADJUSTING

A. Remove and replace site retaining CMU wall construction of the following descriptions:

1. Broken, chipped, stained, or otherwise damaged units. Units may be repaired if Architect approves methods and results.

2. Site retaining walls that do not match approved Samples and mockups.

3. Site retaining walls that do not comply with other requirements indicated.

B. Replace units so site retaining wall matches approved Samples and mockups, complies with other requirements, and shows no evidence of replacement.

END OF SECTION 32 32 19

SECTION 32 82 00

IRRIGATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 WORK INCLUDED

A. Provide all labor, materials and equipment required to complete the irrigation sprinkler work indicated on the drawings and specified herein.

1.3 EXAMINATION OF DRAWINGS AND SITE

A. Drawings: Drawings are diagrammatic. Avoid conflicts between irrigation systems, planting, architectural features and utilities. Install plumbing in planting areas wherever possible.

B. Fittings: Drawings do not indicate all offsets, fittings, sleeves, etc. which may be required by structural and finished conditions. Provide fittings required to meet these conditions.

C. Field Conditions: Provide written notification to Owner's's Representative of field conditions such as obstructions, grade differences or discrepancies in dimensions. Start of irrigation work shall indicate acceptance of field conditions encountered and acceptance of responsibility for revisions necessary because of field conditions.

D. Grading: Verify that grading has been completed before starting irrigation work.

E. Utilities: When working near existing utilities excavate in such a manner as to prevent damage to said utilities. Repair damage to utilities caused by irrigation work as approved and at Contractor's expense. Check existing utility drawings for locations.

1.4 SITE REVIEWS

A. Construction Reviews: Provide at least 48-hour advance notification for the following reviews:

1. Pressure supply line installation and testing.
2. System layout and materials review.
3. Coverage tests: Prior to landscape planting.
4. Final review.

1.5 SUBMITTALS

A. List of Materials: Submit for approval a complete list of materials with manufacturers' names and numbers and descriptive literature marked for each item, including but not limited to the following:

Hose swivels	Valve box, cap and sleeve	
Wire and connectors	Remote control valves	Pipe and fittings

Sprinkler heads	Quick coupling valves
Couplers	Type of pipe solvent
Check valves	Drip tubing

B. Test Data: Submit written, dated certification that PVC pipe and fittings have passed the following tests:

1. Acetone Test: Immersion in 72.4 degrees F, 90% pure, anhydrous acetone for 20 minutes with no evidence of flaking or delamination on the inner or outer walls of the pipe. Softening or swelling shall not constitute failure.

2. Flattening: Flatten sample between parallel plates of a press to 40% of the pipe outside diameter with no evidence of cracking, splitting or breaking.

C. Controller Chart

1. Approval: Secure approval of chart prior to final review of irrigation system.

2. System Chart: Submit chart. Reduce blackline print of approved record drawing to 7" x 91/2" to fit on controller door.

3. Valve Identification: Identify area of coverage of each remote control valve with a distinctly different pastel color marked over entire area of coverage.

4. Sealing: Seal approved chart hermetically between two layers of 20 mil-thick plastic sheet.

D. Operating and Maintenance Manual

1. Manuals: Provide six (6) manuals detailing operation and maintenance requirements for irrigation system ten (10) days prior to completion of work, with sufficient detail to permit maintenance personnel to understand, operate and maintain the equipment.

2. Content

a. Index sheet, with irrigation installer's name, address, telephone number and name of contact person.

b. Equipment list with the following information for each item installed:

1) Manufacturer's name.

2) Make and model number.

3) Name and address of local manufacturer's representative.

c. Spare parts list.

d. Detailed operating and maintenance instructions for equipment.

E. Record Drawings: Provide record drawings of the irrigation system.

PART 2 PRODUCTS

2.1 PLASTIC PIPE AND FITTINGS

A. Polyvinyl Chloride (PVC) Pipe: ASTM D1784 or ASTM D2241 solvent weld type, virgin PVC compound, 2000 psi hydrostatic design stress rate, schedule 40, marked with manufacturer's name, size, class rating, date extruded, and NSF seal of approval.

B. Fittings: Schedule 40, injection molded, ASTM D1784 PVC, with injection molded thread and side-gated tees and ells.

C. Threaded Nipples and Risers: Schedule 80 PVC, with molded threads.

2.2 JOINTS CEMENT AND JOINT PRIMER

A. 100% active solvent, blue.

2.3 ELECTRICAL WIRING

A. Low Voltage Conductors: Direct burial, type UF, No. 14 AWG wire, for connections between controller and remote control valves. Use different color wire for each control valve.

B. Splice Connectors: Rainbird, Pen-Tite or equal.

C. Neutral (Common) Wires: White.

2.4 VALVES

A. Hose Bibbs: As noted on drawings.

B. Check Valves

1. Swing check valves up to 2" on non-pressure lines: Bronze or plastic, 100 psi SWP.
2. Antidrain Valve: Plastic, with soft composition disc and stainless steel internal parts; spring tension adjustable from 4 psi to 15 psi.

C. Remote Control Valves: Spring loaded, packless diaphragm activated, normally closed type with bleeder valve.

1. Valve solenoid: 24 a.c., 4.5 watt maximum 500 milliamp maximum surge, corrosion proof stainless steel construction, epoxy encapsulated as a single integral unit.

2.5 DRIP IRRIGATION: As noted on drawings.

2.6 SPRINKLERS: As noted on drawings.

2.7 VALVE BOXES:

A. Valve boxes shall be fabricated from a durable plastic material resistant to weather, sunlight and chemical action of soils, with black covers. For hardscape installation, reinforced concrete material.

B. Remote control valves, flow sensors, and master control valves shall be installed in rectangular boxes, Ametek or approved equal, with bolt down hinged covers.

C. Quick coupling valves and flush-out assemblies shall have 10 inch round plastic boxes with exterior as required to properly protect valve, Ametek or approved equal.

2.8 OPERATING AND MAINTENANCE TOOLS

A. Wrenches: Two, for disassembly and adjustment of each type of sprinkler head supplied.

B. Hose Bibb Key

C. Valve box keys: Three.

D. Soil probe: 36" long, 1" diameter, heavy duty stainless steel, with integral handle. Oakfield Model B, or equal (no known equal).

2.9 AUTOMATIC CONTROLLER: As noted on drawings.

2.10 BACKFLOW PREVENTION ASSEMBLY: As noted on drawings

PART 3 - EXECUTION

3.1 MATERIALS HANDLING: Load, unload, handle and store material to avoid damage. Transport so lengths of pipe lie flat. Do not install dented or damaged pipe.

3.2 WATER SERVICE CHANGEOVER: Make cold taps to existing line as indicated on the drawings.

3.3 TRENCHING AND BACKFILLING

A. General: Perform trenching and backfilling as specified in Section 02210. Maintain bottom of trenches flat to permit piping to be supported on an even grade continuously for full run.

B. Coverage Above Pipe: Provide the following depth of cover:

1. Pressure supply lines 2 1/2" and smaller: 18".
2. Non-pressure lines: 12".
3. Control wire: 18".

C. Line Clearances: Provide 4" clearance between irrigation lines and 6" clearance between lines of other trades. Do not install parallel lines directly over any other line.

D. Backfilling: Fill trenches with clean, fine, granular material free of stones. Compact to a dry density equal to adjacent undisturbed soil. Restore to adjacent grade, free of dips, depressions, humps or other irregularities.

3.4 INSTALLATION

A. Plastic Pipe and Fittings: Install in accordance with manufacturer's printed instructions.

B. Plastic Pipe and Threaded Fittings: Assemble by applying teflon tape to male threads only.

C. Connections

1. Adapters: Use schedule 40, PVC, threaded male adapter for connection to threaded joints.
2. Change of depth: Use 45 degree fittings at changes in depth of pipe.
3. Steel to PVC Connections: Work steel connections first. Use non-hardening pipe dope on threaded steel to PVC joints. Apply light wrench pressure.
4. PVC Nipple: Use 4" minimum length.

D. Open ends of pipe: Tape during installation to prevent entry of foreign matter into the system.

E. Quick Coupling Valves: Locate valves within 12" of hardscape.

F. Remote Control Valves: Locate in shrub area outside spray of valve system, whenever possible.

G. Sprinkler Heads: Locate approximately as indicated on drawings to provide best coverage with no throw onto buildings and minimum overthrow onto paving. Do not exceed maximum or minimum spacing indicated by manufacturer.

H. Valve Boxes: Stencil identification number on each remote control valve box in 2" high letters and numbers, with epoxy-resin based paint, colors as selected by Owner's Representative. Do not stencil boxes until identification system has been approved.

K. Low Voltage Wiring
1. Place wiring in the same trench and routing as the pressure supply lines unless otherwise approved. Install wiring prior to main line.
2. Tape wires together, except in sleeves under paving, and tape bunch to side of main line at 12 feet on center maximum. Provide a 12" expansion loop at every 100 feet and at each connection and directional change. Provide a continuous wire without splices between controller and remote control valves.
3. Make connections at valves. Do not splice the wires except within an approved box..
4. Encase wires passing under paving in a Schedule 40 PVC sleeve.

3.5 FLUSHING

A. Main Lines: Flush underground mains and lead-in connections to sprinkler system thoroughly before connecting to control valves. Flush mains using a flush out assembly at lowest elevation.

B. Lateral Pipes: After all sprinkler pipe lines and risers are in place and connected and prior to installation of sprinkler heads, thoroughly flush all lines with a full head of water. Do not install heads until lines have been flushed and approved.

3.6 SYSTEM ADJUSTMENT:

A. Adjust valve flow controls for correct operation. Adjust sprinkler heads for alignment or change nozzles for coverage and minimum overthrow. Make adjustments prior to any planting.

3.7 COVERAGE TESTS:

A. Provide notification of readiness to perform coverage tests. Perform coverage tests after sprinkler system is completed, but prior to any planting. Test system to assure that all planting areas are watered completely and uniformly. Make necessary adjustments, including realignment of heads, to provide required coverage.

3.8 PRESSURE TESTS:

A. Provide notification of readiness to perform pressure tests. Test pressure supply lines under 150 psi hydrostatic pressure for a period of 2 hours. Do not backfill over any line more than necessary for testing until line has been inspected, tested and approved. Center load only. Leave pipe connections uncovered. Install remote control valves, quick couplers and other valve assemblies after testing has been approved.

3.9 ACCEPTANCE

A. Sprinkler Heads: Clean and adjust heads at end of landscape maintenance period. Refer to Section 02900.

B. Training: Make arrangements to train Owner's's maintenance personnel in the correct operations of the irrigation system and equipment.

3.10 CLEAN UP:

A. Upon completion of the work, restore ground surfaces to required elevations and remove excess materials, debris and equipment from the site.

3.11 MAINTENANCE: 90 Days.

END OF SECTION

SECTION 329100
TREE PROTECTION AND PRUNING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Protect existing plant material specified on the drawings during the duration of the construction period in a healthful state, free from damage or harm as the result of any work performed.

1.2 JOB CONDITIONS

A. Prior to construction of any nature on the site, Contractor shall call for a site meeting with the University's Representative. The purpose of the meeting shall be to establish the conditions of all existing plant material to be preserved upon receipt of the site by the Contractor. Failure to call for said meeting implies acceptance by the Contractor of plant material to be preserved in its existing condition.

B. An irrigation system and/or quick coupler valve will be fully operational so that plant material can be regularly watered.

C. Coordinate and cooperate with other work to enable the work to proceed as rapidly and efficiently as possible.

1.3 WORK INCLUDED

A. The work of this section includes all labor, materials, equipment, transportation and services necessary to complete the work in this section as shown on the drawings and as specified herein, including but not necessarily limited to, the following:

1. Protection and welfare of all existing plant material within the Contract Limits which is noted to remain, including trimming, cabling, and repair of such plant material as necessary and all labor, materials and equipment necessary.

2. Perform all pruning operations.

3. Submit plant material maintenance plan before commencing landscape work for review by the University's Representative.

1.4 RELATED WORK

A. Irrigation. Section 32 8200

B. Landscape. Section 32 9300

C. Operation and Maintenance. Section 32 0100

1.5 DEFINITIONS

A. "Injury" is defined, without limitation, as any bruising, scarring, tearing, or breaking of roots, branches, or trunk.

B. "Dripline" is defined as the outermost limits of the tree or shrub canopy.

C. "Certified Arborist" is a consulting arborist certified by the International Society of Arboriculture.

1.6 QUALITY ASSURANCE

A. Reference Standards:

1. International Society of Arboriculture (ISA) “Guide for Plant Appraisal” prepared by the Council of Tree and Landscape Appraisers (CTLA).

2. “Cabling, Bracing and Guying Standards for Shade Trees”, as published by the National Arborist Association (NAA), 174 TR 101, Bedford, New Hampshire.

B. Qualification of Workman:

1. Trimming and pruning of trees shall be performed only under the direction of a certified Arborist.

C. Tree Protection Guidelines:

1. Contractor shall follow all guidelines set forth with in the City of Pasadena Tree Ordinance.

1.7 SUBMITTALS

A. Pruning materials

B. Fencing materials.

C. Maintenance plan.

1.8 GUARANTEE

A. During the Guarantee to Repair Period specified in the General Conditions the Contractor shall be liable for damages to all trees covered by the provisions of this Section. Compensation to the University shall be as outlined in section 3.04.

B. Contractor will not be held responsible for damages due to vandalism or freak acts of nature during the guarantee period. Immediately report such conditions to the University's Representative.

PART 2 - PRODUCTS

2.1 FENCING MATERIALS

A. Fencing-11 gauge galvanized 6' high chain-link fence with galvanized steel posts at 10' o.c. minimum.

2.2 PRUNING MATERIALS

A. Pruning materials shall be in accordance with current horticultural practices.

B. Pruning sterilant shall be Physan 20 Fertilome Type A, or diluted bleach.

PART 3 – EXECUTION

3.1 FENCING

A. Fencing-A continuous 6' high temporary chain-link fence will be erected around trees with a caliper of 4” or larger at the dripline, in order to prevent soil compaction, limb damage, or the

accidental introduction of toxic materials into the root zone. Fence can be erected around groups of adjacent trees where possible. Otherwise, fence to be erected around individual tree.

B. The fence will be removed only at the end of construction, as approved by the University's Representative.

3.2 PLANT MATERIAL PROTECTION

A. Provide protection for all plant materials designated to be retained. Contractor is responsible for replacing damaged plant life with approved equivalent.

B. New and existing plant materials shall not be allowed to deteriorate and shall be maintained in a healthy and vigorous condition during the course of construction and maintenance period.

C. During the course of construction the Contractor shall take all necessary precautions, as outlined herein, to protect existing plant materials to be preserved from injury and death. Protection shall be given to the roots, trunk, and foliage.

D. The Contractor shall conduct operations continually to completion, unless weather conditions are prohibitive.

E. Provide ample water supply of potable quality and sufficient quantity for all operations required under this Section.

F. Trees subject to the provisions of this Section, which have been injured, shall be repaired immediately by a certified Arborist. Repairs shall include removal of rough edges, sprung bark and severely injured branches as directed by the Arborist.

G. Necessary measures shall be taken to maintain healthy living conditions for existing plant materials to be preserved. Such measures shall include monthly washing of leaves for the removal of dust, regular irrigation, root feeding, etc.

H. Tree protection fencing shall be installed for the protection of existing trees to be preserved. No construction, demolition, or work of any nature will be allowed within the fenced area without prior written approval by the University's Representative.

1. Approval by the University's Representative for work within the fenced area shall not release the Contractor from any of the provisions specified herein for the protection of existing trees to be preserved.

2. During the course of construction of approved work within the fence area, no roots shall be cut without prior written approval by the University's Representative.

I. During construction, the existing site surface drainage patterns shall not be altered within the area of the drip line of existing plant materials.

J. Contractor shall not alter the existing water table within the area of the drip line of existing plant materials.

K. Do not permit the following within the drip line of any existing tree or shrub to be preserved:

1. Storage or parking of automobiles or other vehicles.

2. Stockpiling of building materials, refuse or excavated materials.

3. Skinning or bruising of bark.

4. Use of trees as support posts, power poles, or signposts; anchorage for ropes, guy wires, or power lines; or other similar functions.

5. Dumping of poisonous materials on or around plant materials and roots. Such materials include but are not limited to paint, petroleum products, dirty water, or other deleterious materials.

6. Cutting roots by utility trenching, foundation digging; placement of curbs and trenches, and other miscellaneous excavation without prior written approval by the University's Representative.

7. Damage to the trunk, limbs, or foliage caused by maneuvering vehicles or stacking material or equipment to close to the plant.

8. Compaction of the root area by movement of trucks or grading machines; storage of equipment, gravel, earth fill, or construction supplies; etc.

9. Excessive water or heat from equipment, utility line construction, or burning of trash under or near shrubs or trees.

10. Damage to root system from flooding, erosion, and excessive wetting and drying resulting from watering and other operations.

L. Excavation Around Trees

1. Excavation within the drip lines of trees shall be done only where absolutely necessary, under the direction of a Certified Arborist and with prior approval from the Owner's Representative.

2. Where trenching for utilities is required within driplines, tunneling under and around roots shall be by hand digging. Main lateral roots and taproots shall not be cut. Smaller roots that interfere with installation of new work may be cut with prior approval from certified Arborist.

3. Where excavation of new construction is required within drip line of trees, hand excavation shall be employed to minimize damage to root system. Roots shall be relocated in backfill areas wherever possible. If large, main lateral roots are encountered, they shall be exposed beyond excavation limits as required to bend, and relocate without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, roots shall be cut approximately 6 inches back from new construction under the direction of a certified Arborist.

4. Exposed roots shall not be allowed to dry out before permanent backfill is placed. Temporary earth cover shall be provided, or roots shall be packed with wet peat moss or four layers of wet, untreated burlap and temporarily supported and protected from damage until permanently relocated and covered with backfill. The cover over the roots shall be wetted to the point of run off daily.

5. Branching structure shall be thinned in accordance with National Arborists Association "Pruning Standards and Principles" to balance loss of root system caused by damage or cutting of root system. Thinning shall not exceed 30 percent of existing branching structure.

3.3 TREE TRIMMING

A. A Certified Arborist, shall be engaged to direct removal of branches from trees if necessary to protect the health of the tree or if required to clear for construction.

B. In company with the University's Representative, University and a certified Arborist, ascertain the limbs and roots which are to be trimmed. Clearly mark them to designate the approved point of cutting.

C. Dead and damaged trees that are determined by the Certified Arborist to be incapable of restoration to normal growth pattern shall be removed.

D. Cut evenly, using proper tools and skilled workmen, to achieve neat severance with the least possible damage to the tree.

E. In the case of root cuts, apply wet burlap or other protection, approved as noted herein, to prevent drying out, and maintain in a wet condition as long as necessary for temporary protection.

3.4 REPAIR COMPENSATION

A. Damage:

1. Damage to existing tree crowns or roots over 1" in diameter shall be immediately reported to the University's Representative.

2. A Certified Arborist shall direct all repairs to trees. Repairs shall be made promptly after damage occurs to prevent progressive deterioration of damaged trees. Repairs shall be at the Contractor's expense.

B. Irreparable Damage: Any tree to be protected which is irreparably damaged owing to the Contractor's negligence or failure to provide adequate protection, shall be compensated for in accordance with the following schedule of values using the "tree caliper" method (greatest trunk diameter, measured 18 inches above the ground):

1. For trees with diameters up to and including 6 inches, compensation shall be the actual cost of replacement with item similar in species, size, and shape, including:

a. Actual cost of item boxed out of the ground.

b. Transportation or delivery of boxed item to site.

c. Planting and staking.

d. Maintenance, including watering, fertilizing, pruning, pest control, and other care to bring replacement to same general condition of original item.

2. For trunks up to:

7".....$ 1,200
8"..... 1,700
9"..... 2,200
10"..... 2,600
11"..... 3,100
12"..... 3,600
13"..... 4,100
14"..... 4,600
15"..... 5,000
16"..... 5,500
17"..... 6,000

18" and over, add for each caliper inch.... $600

3.5 MAINTENANCE

A. Plant material will be maintained throughout the duration of the construction period in a healthful manner. Plant material identified which requires special pruning, insect control, fertilization or

other remedial health action will be treated during this period. Methods and rates of pesticide and fertilizer application will be reviewed by the University's Representative prior to approval.

B. Watering: Plant materials will be watered on a regular basis, at a rate consistent with their particular requirements. Verification of the proposed watering schedule shall be reviewed by the University's Representative prior to commencement of the maintenance.

1. The maintenance of the plant materials shall comply with standard horticultural practice for the correct watering, fertilizing, pruning and spraying of the specimen boxed trees.

2. The maintenance and quality of the plant materials shall be subject to monthly checks. The dates of these checks shall be outlined in the University's Representative's field notification relating to the establishment of the plant maintenance period. Additional checks shall be scheduled as determined by the University's Representative.

3. Contractor shall be responsible for performing periodic inspections of existing plant materials to be protected and relocated throughout the construction period, and submit written proposals to the University's Representative for additional maintenance work as may be required to ensure the health and general well-being of the plant material. Contractor shall retain, at the direction of the University's Representative additional specialists as may be required to perform this work.

C. Contractor shall keep plant material free from weeds and debris at all times.

3.6 FIELD QUALITY CONTROL

A. General: The Contractor guarantees the protection of all plant material included as part of this work, in a healthful manner during the duration of the construction period. Destruction of, or significant damage to, any or all of the plant materials to be protected, as determined by the University's Representative, will result in compensation by the Contractor of 3-36" box trees, installed on the site, for each existing tree damaged.

END OF SECTION

SECTION 32 91 13
DECOMPOSED GRANITE

PART 1 GENERAL

1.01 SUMMARY

A. Provide decomposed granite paving, complete and as specified.

1.02 QUALITY ASSURANCE

A. Coordination: Be responsible for the proper installation of all other work by other trades which are all or in part embedded, built in, abutted to or covered over by the crushed stone paving. Insure that such work is completed by them in ample time that the progress of the work is not delayed.

1.03 SUBMITTALS

A. Submit one 2ft. by 2ft. x 4" thickness shown on drawings mock up sample for approval by Owner's Representative.

1.04 GUARANTEE

A. Defective Work
   1. All work and/or materials which are determined by Architect to be defective or deficient in quality or workmanship shall be remedied or removed and replaced by Contractor in manner reasonably satisfactory without expense to the District.
   2. The Contractor shall bear all expenses and shall make good all work of other contractors destroyed or damaged by removal or replacement of defective work.
   3. Neither final acceptance of the Work, nor payment therefore, nor any provision in Contract Documents shall relieve the contractor of responsibility for defective or deficient materials or workmanship, unless otherwise expressly specified.

PART 2 -PRODUCTS

2.01 WEED CONTROL FABRIC:

A. Typar # 3401 thermally spunbonded polypropylene, non woven, think geotextile weed control fabric, 4.0oz/lin. Yard weight. Needle punched material is not acceptable.

2.02 DECOMPOSED GRANITE WITH STABILIZER:

A. Color to be approved by the Architect. Provide bed of 3/8" sieve lay pre mixed decomposed granite with integral stabilizer by KRC Rock 1(800) 572-7625.

2.03 WATER:

A. Fresh, potable.

PART 3-EXECUTION

3.01 SUBGRADE PREPARATION

A. Verification of Subgrades: Verify that subgrades have been rough graded to lines and grades within 0.10 ft. to final depth shown on drawings.

B. Compaction: Compact subgrade to minimum of 90 %.

3.02 WEED CONTROL FABRIC

A. Fabric shall be installed between the compacted subgrade and crushed aggregate screenings to prevent weeds from growing up through the crushed stone trail; pre emergent chemicals may not be used. Place fabric across the entire width of surface to receive aggregate; overlap ends of rolls to a minimum of 6 inches.

3.03 SOIL STABILILZER

A. Thoroughly pre-blend stabilizer with the 1/4" minus crushed aggregate screenings at the rate of 10 lbs of stabilizer per ton of aggregate screenings prior to placing of stabilized mix. The stabilizer be mixed thoroughly and uniformly through the crushed aggregate screenings. Blend by truck mounted mixer for a minimum of 15 minutes prior to placing on subgrade.

B. Drop spreading of Stabilizer over raked crushed aggregate screening and mixing Stabilizer by rototilling is not acceptable.

C. soil stabilizer shall not be supplied during, just prior to, or immediately following rainfall.

3.04 PLACING CRUSHED AGGREGATE SCREENING:

A. After pre-blending, place the Stabilized crushed aggregate screening (CAS) on prepared subgrade, and rake smooth using a steel tine rake to desired grade and cross section. Place to avoid segregation, in one layer of 2 inches minimum thickness. Do not apply CAS deeper than 2 inches on one lift. Ex: For a 4 inch thickness, apply CAS in two lifts. Install all stabilized crushed stone work true to grade, properly coinciding with adjacent work and elevations. Provide a finished surface uniform in texture and appearance. Do not permit finished work to vary more than 1/8 inch in 10 ft. from true profile and cross section.

3.05 INSTALLATION

A. Subbase: Thoroughly clean subbase of all debris, loose dirt and other extraneous materials before installing decomposed granite. Do not install decomposed granite when subbase is wet or muddy.

B. Compacting: Thoroughly compact to 90% by approved method.

C. Contamination: Do not permit mixture to contaminate planting areas. Clean up immediately any mixture spilled onto adjacent paving.

D. Application: Apply to a depth shown on Construction Documents, wet thoroughly and compact. Use a vibrating plate or roller (in areas of potential erosion use a vibrating plate). Apply decomposed granite again, wet and compact. Final depth should be as shown on drawings. Not more than 1-1/2 hours shall elapse between the time the water is added to the aggregates and cement, and the time of completion of final trimming and compaction.

E. Grading: When adjacent surfaces have been rolled and it becomes necessary to add a thin layer of material to bring the surface to grade, the previously filled or compacted area shall be raked to provide a bond with the added material.

F. Finish Paving Surface: Provide a uniform texture and color and without a cement mortar film on the exposed surface.

3.05 CLEAN UP

A. Keep areas of work clean, neat and orderly at all times. Keep all adjacent paving and planting areas clean during operations.

B. Remove from the premises all surplus materials, tools, equipment, rubbish and debris resulting from the work at no additional cost to the District.

END OF SECTION

SECTION 32 93 00

LANDSCAPE

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes all services, labor, materials, transportation and equipment necessary to perform the work indicated on the Drawings and as specified.

B. Reference ANSI A300 (Best Management Practices)

1.2 SUBMITTALS

A. Contractor shall submit list of soil amendments, fertilizers, plant materials, topsoil, with quantities of each, along with the source of the supplier and results of (2) phases of agronomy tests taken both prior to amending soil and after soil has been amended per 1.9. Planting recommendations may be revised based on soil tests.

B. Plants shall be subject to observation and preliminary acceptance by owner's representative at place of growth or upon delivery to job site. Such observation shall not impair the right of observation and rejection during progress of the work. Tagging of plant material is for conformance w/ design intent only, and does not constitute the landscape architect's approval of plant materials in regards to their health. The health and vigor of plant material is solely the responsibility of the contractor.

C. Submit written reports by certified arborists for all trees to be planted on site, that such trees meet the criteria of arboricultural health, as established by the International Society of Arboriculture (ISA). Arboricultural reports shall be provided at cost of Landscape Contractor.

D. Submit documentation to the owner's representative within 75 calendar days of award of contract to the General Contractor that all plant material is available. The contractor shall be responsible for procuring all the material listed on the planting legends.

1.3 GUARANTEES AND REPLACEMENTS

A. Plant Materials: Shrubs shall be guaranteed to remain healthy and vigorously growing for one year. Groundcovers shall be guaranteed to remain healthy and vigorously growing for 6 months.

B. Trees: See above

C. Plant Replacement: Plants found to be dead or not in a vigorous condition, or if root balls have been damaged, within the Installation, Maintenance and Guarantee Periods, shall be replaced within fourteen (14) days from date of discovery. Contractor shall include, at his expense, a timely written diagnosis of plant health by a certified Arborist, should a dispute arise. Arborist's report shall indicate reason for lack of vigor, potential remedies, if any, and estimate of time required to regain vigor and specified size.

D. Plant Replacement: Plants used for replacement shall be same kind and size as specified and shall be furnished, planted and fertilized as originally specified. Cost of all repair work to existing improvements damaged during replacements shall be borne by the Contractor.

1.4 SITE OBSERVATION

A. Site observations herein specified shall be made by the Owner's Representative. The Contractor shall provide a minimum of three (3) working days notice before Observation is required.

B. Site observation will be required for the following parts of the work:
1. Pre-Job Meeting: Explain Owner Representative's role to Contractor.
2. Incorporation of soil conditioning and fertilizing into the soil, after approval of first soil report.
3. Application of pre-emergent herbicide.
4. Soil preparation for approval to plant, after approval of second soils report.
5. Upon the completion of grading prior to planting.
6. Irrigation coverage test
7. Confirmation of corrected finish grades.
8. Approval of samples of plant materials.
9. Approval of tree & shrub locations for planting, prior to planting holes being excavated.
10. Plant installation: Check size of planting holes and backfill mix.
11. Observation after completion of planting, and all other indicated or specified work. Written approval to commence maintenance period by client representative is required and shall establish beginning of the maintenance period.
12. Maintenance observation after thirty (30) days to coincide with fertilizer application.
13. Final Observation at the completion of the ninety (90) day Maintenance Period. This observation shall establish the beginning date for the one (1) year guarantee of all trees.

C. Upon completion of the Final Observation and the work of this section, the Contractor will be notified in writing: (1) whether the work is acceptable; (2) of any requirements necessary for completion and acceptance.

D. Contractor shall be on the site at the time of each observation. Contractor shall speak English.

E. No site visits shall be made unless all items in previous observation reports are either completed or remedied, unless owner has waived in writing such compliance. Landscape Contractor shall be responsible for reimbursement to the Client for Architect's time incurred in making untimely site visits at Architect's current billing rates.

F. Construction observation visits shall be made in proper sequence of the installation of the work. No visits will be made until all soil submittals have been made and approved. Out of sequence construction visits shall make the Landscape Contractor responsible for reimbursement of the Architect at current billing rates.

1.5 MAINTENANCE

A. The Maintenance Period begins on the first day after all landscape work on this project is complete, checked, accepted and written approval from the Owner's Representative is given to begin the Maintenance Period and shall continue thereafter for no less than ninety (90) continuous calendar days.

B. The Contractor shall continuously maintain all involved areas of the Contract during the progress of the work and during the Maintenance Period until the Final Acceptance of the work.

C. Regular planting maintenance operations shall begin immediately after each plant is planted. Plants shall be kept in a healthy, growing condition and in a visually pleasing appearance by watering, pruning, mowing, rolling, trimming, edging, fertilizing, re-staking, pest and disease controlling, spraying, weeding, cleaning up and any other necessary operation of maintenance. Landscape areas shall be kept free of weeds, noxious grass and all other undesired vegetative growth and debris. All plants found to be dead or in an impaired condition shall be replaced within seven (7) days. Maintenance operations shall also include:

1. Filling and replanting of any low areas which may cause standing water.
2. Adjusting of sprinkler head height and watering pattern.
3. Filling and re-compaction of eroded areas.
4. Weekly removal of trash, litter, clippings and foreign debris.

D. The Contract completion date of the Contract Maintenance Period shall be extended when, in the opinion of the Owner's Representative, improper maintenance and/or possible poor or unhealthy condition of planted material is evident at the termination of the scheduled Maintenance Period. The Contractor shall be responsible for additional maintenance of the work at no change in price until all of the work is completed and acceptable.

E. When in the opinion of the Owner's Representative, improper maintenance, possible poor or unhealthy condition of plant materials, or unestablished lawns are evident or when maintenance work is not being performed, the Contractor shall be responsible for additional maintenance of the work at no charge to the Owner until Final Completion is delivered.

F. The Contractor shall provide protection of all planting areas against traffic or other damage by erecting fencing or temporary twine immediately after planting is completed. Warning signs and barricades shall be placed in various high traffic areas. Damaged areas shall be repaired immediately by the Contractor.

G. Watering by hand will be required when soil moisture is below optimum level for best plant growth or when ordered by the Owner's Representative. Hand watering may be required when high or hot wind conditions exist, or to promote vigorous root growth.

H. Plants shall be inspected by the Contractor at least twice per week and needed maintenance shall be performed promptly.

I. At conclusion of maintenance period an observation shall be made by the Owner's Representative, to determine the acceptability of work, including maintenance. The Contractor will be notified by the Owner's Representative of all deficiencies revealed by the observation before acceptance. Owner must accept all maintained areas, in writing, prior to end of maintenance period.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with installation of underground irrigation system utilities, piping and watering heads.

1.7 LAYOUT OF WORK

A. The Contractor shall employ, at his own expense, a registered Civil Engineer or licensed Land Surveyor to lay out the work of the project, to establish all reference points set for construction and the certification of finish grades with Civil Engineer drawings.

1.8 GENERAL REQUIREMENTS

A. The term "Planting Area" shall mean all areas to be planted with trees, shrubs, groundcovers, seed and sod.

B. Actual planting shall be performed during those periods when weather and soil conditions are suitable in accordance with locally accepted horticultural practice. California Natives are to be planted in the fall.

C. All rock, gravel and other growth or debris accumulated during construction of the project shall be removed from the site. Soil areas used for construction clean-up, washing, debris, stockpiling.

D. Conservation of Topsoil: Contractor shall identify and protect areas of arable topsoil to stockpile during construction for re-use during landscape construction activities. Top soil shall be defined as top 6” of undisturbed soil only, in accordance with these specifications.
   1. Maintain the topsoil stockpile tree from debris, trash, and contamination in a manner in which will not obstruct the natural flow of drainage.
   2. Keep the sampled or tested stockpiled topsoil separate from other topsoil.
   3. Keep the stockpiled topsoil damp to prevent dust and drying out.
   4. Procure approval of Owner or Landscape Architect for topsoil material and storage conditions at time of the stockpile.

E. Prior to excavation for planting or placing of plant materials, locate all underground utility lines still in use and take proper precautions to avoid damage to such improvements. In the event of a conflict between such lines and plant locations, notify the Owner’s Representative who shall arrange for the relocation of one or the other. The Contractor assumes all responsibility for making any and all repairs for damages from work as herein specified.

F. Grading, planting and soil preparation work shall be performed only during the period when beneficial and optimum results may be obtained. If the moisture content of the soil should reach such a level that working it would destroy soil structure, spreading grading operations shall be suspended until the moisture content is increased or reduced to acceptable levels and the desired results are likely to be obtained.

G. All scaled dimensions are approximate. Before proceeding with any work, carefully check and verify all dimensions and immediately inform the Owner’s Representative of any discrepancy between the drawings and/or specifications and actual conditions.

H. Quantities for plant materials are shown for convenience only, and not guaranteed. Check and verify count and supply sufficient number to fulfill intent of drawings. Notify the Owner’s Representative of discrepancies between quantities and symbols shown prior to installation.

I. Adequately stake, barricade and protect all irrigation equipment, manholes, utility lines and other existing property during all phases of the soil amending and grading operation.

J. Tree Selection: Not used

K. Shrub and Tree Samples: Typical samples, three each of all varieties and sizes (5 gallon and under - shrubs, 15 gallon and under - trees) of all plant materials shall be submitted for inspection approval at the site a minimum of fifteen (15) working days prior to planting operations. Approved samples shall remain on the site and shall be maintained by the Contractor as standards of comparison for plant materials to be furnished. Samples will be incorporated into the work.

L. Rejection and Substitution: All plants not conforming to the requirements herein specified shall be considered defective and such plants, whether in place or not, shall be marked as rejected and be immediately removed from the site of the work and replaced with acceptable plant materials. The plant materials shall meet all applicable inspections required by law. All plants shall be of the species, variety size, age, flower color and condition as specified herein and/or as indicated on the Drawings. Plants with buried root flares, girdled roots, poor branch attachment, evidence of poor pruning, significant trunk scars, or with pest or diseases are unacceptable. Under no condition will there be any substitution of plant species, variety or reduced sizes for those listed on the accompanying Drawings, except with the written consent of the Owner's Representative.

M. All utilities (water and electricity) used during the installation of the landscaping and irrigation systems for this project shall be paid for by the Owner. During the ninety (90) day Maintenance Period, the Owner shall be responsible for the payment of the utilities.

1.9 INVOICING OF PLANT MATERIAL

A. After installation of plant materials but prior to the pre-maintenance inspection, the Owner's Representative, with the heretofore specified signed copies of the required certificates, trip slips and invoices for the plant materials and related items, shall invoice such material comparing the total area and/or the amounts specified. If the minimum amounts have not been furnished, the contractor shall install additional materials to fulfill the minimum requirements specified.

B. Upon delivery of materials and/or completion of all soil conditioning and grading, but prior to initiating planting operations, the Owner's Inspector on site with the heretofore specified signed copies of required certificates, trip slips and invoices for soil preparation materials, shall require Owner's Inspector on site to compare the total quantities of each material furnished against the total area required to each operation. If the minimum rates of application have not been met, the Contractor will be required to distribute additional quantities of these materials to fulfill the minimum application requirements specified.

1.10 SOIL PREPARATION AND SOIL PREPARATION CONFORMANCE TEST

A. Conform to Wallace Laboratories, LLC report recommendations Date November 7,2014

1.11 NURSERY STANDARDS

A. Trees shall be selected from qualified tree farms which conform to the professional standards of the California Association of Nurseries, meet all standards for arboricultural health, and which have certified arborists on staff.

B. Landscape Contractor pretag all trees from reputable tree nurseries. Pretagged trees shall have appropriate form and specifications. The nursery's certified arborist shall provide written confirmation to the Owners authorized representative that the trees meet arboricultural standards. Written confirmation shall include Arborist's Certification number and name. If nursery does not have a Certified Arborist on staff, the Landscape Contractor shall contract with an independent Certified Arborist to review all trees at the tree nurseries and provide confirmation of the above, at Landscape Contractor's sole expense.

C. No trees will be accepted without written confirmation of the tree's health, including but not limited to the following: Trees shall have exposed root flares, shall be pest free, free of trunk scars, have excellent branch attachment, and shall be free of girdled roots.

D. Contractor shall submit photographs of all pretagged trees to OAR and Landscape Architect, along with written confirmation by certified arborist, for review and approval. Landscape architect may elect, at Landscape Architect's discretion, to make trip to tree nursery to review trees 36" box size or over. In the event that the trees show evidence of arboricultural flaws, including those listed above, the landscape architect reserves the right to reject the trees and require the Landscape contractor to select trees from other nurseries.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: Fertile, agriculturally acceptable, clean and on-site topsoil from within the top 6" of undisturbed site, with imported topsoil accepted by the Client Representative. Supply topsoil for all plants to bring finished grades to 2 inches below tops of curbs, sidewalks and driveways. Topsoil shall not be used for planting operations while in a muddy condition.

B. In the top 30" of on site soil, no subsoil, soil from construction excavation operations, soil from beneath previously paved areas, or soil from other sites shall be used in any planting area. Should any question about the quality of the topsoil arise the contractor shall provide soil test to determine suitability of topsoil before installation.

C. Imported Topsoil: Fertile, agricultural sandy loam, typical for locality, capable of sustaining vigorous plant growth, taken from drained site, free of subsoil, clay, rocks, impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0. Salinity shall not exceed 6 (SAR).

D. Structural Soil: Not used

E. Native soil mix shall be composed of approved amended soil mixed at a ratio of 1 part amended soil to 5 parts soil.

F. Container Planting: To be specified

G. Soil Amendment and Fertilizer: Soil Conditioner shall contain a special blend of organic fractions to supply several degrees of breakdown rate, a portion of inorganic amendment that resists further breakdown, a long-lasting form of iron, pH of 5.5 to 6.0, salinity of 1.75, organic matter (dry weight basis) more than 90%, non-ionic wetting agent and total nitrogen content of 0.5%. (Loamex, Organo Life, Forest Humus or equal).

H. Gypsum: Gypsum shall be commercially processed and packaged gypsum (CaSo4, 2H2O) with minimum 80% grade containing 14% minimum combined sulfur.

I. Iron Sulfate: Ferric sulfate or ferrous sulfate in pellet or granular form containing not less than 18.5% iron expressed as metallic iron. Registered as an agricultural mineral with the State Department of Agriculture in compliance with Article 2, "Fertilizing Materials", and Section 1030 of the Agriculture Code.

J. Soil Sulphur: 99% of approved quality by Owner's Representative.

K. Pre-Plant Fertilizer: (10-10-10) shall be a combination of natural organic and inorganic granular fertilizers, free flowing, and shall contain the following minimum available percentage by weight of plant food:

Nitrogen	1.0% minimum

Phosphoric Acid	10.0% minimum
Potash	10.0% minimum

L. Post-Plant Fertilizer: (7-9-4) shall be a long-lasting, organic and controlled release plastic-coated, uniform in composition, free flowing and shall contain the following minimum available percentages by weight of plant food:

Nitrogen	7% minimum
Phosphoric Acid	9% minimum
Potash	4% minimum

M. Planting Tablets: Planting tablets shall be Agriform (20-10-5) or equal (no known equal) as reviewed by the Owner's Representative.

N. Planting soil mix ratio for bidding purposes only: Thoroughly blended mixture of topsoil and soil amendments at the following ratio:

Soil amendment per approved soils test	1 Part
Accepted Topsoil	2 Parts
Iron Sulphate	2 Lbs. Per Cu. Yd. of Mix
Gypsum	10 Lbs. Per Cu. Yd. of Mix
Pre-plant Fertilizer	4 Lbs. Per Cu. Yd. of Mix

O. Container Planting Backfill – Not used

2.2 STAKING MATERIALS

A. Tree Staking: Stakes shall be of lodge pole pine. These shall be straight shafts, shaved and cut clean and bare of branches and stubs, of uniform thickness with a minimum diameter of 2 inches, free of loose knots, splits or bends. Stakes shall be no less than ten feet in length, treated with copper napthenate.

B. Tree ties shall be flexible, non-deteriorating, self-fastening, black vinyl tree ties of sizes required to adequately support trees.

2.3 GUYING MATERIALS

A. Guy wires shall be of pliable, zinc-coated steel of No. 12 gauge.

B. Anchors (deadman) for holding guy wires shall be of 4 inches x 4 inches solid lumber, 1-foot-6 inches in length.

C. Hose for covering wire shall be of 2-ply reinforced rubber, used or new, garden hose type of at least 1/2 inches in diameter.

D. Flags, to be attached to guys, shall be of surgical tubing, 1/8 inch diameter and 4 feet long, of uniform thickness.

E. Tree ties shall be Bordon Cinch-Tie or equal (no known equal).

2.4 PLANT MATERIALS

A. Nomenclature: The scientific and common names of plants herein specified conform with the approved names given in "A Checklist of Woody Ornamental Plants of California",

published by the Owner of California, College of Agriculture, Manual 32 (1963). See list of plant material on Drawings.

B. All material provided shall be well branched and proportioned, with respect to width-height relationship.

C. Labeling: Materials shall be clearly labeled as to species and variety. All patented plants (cultivar) shall be delivered with a proper plant patent attached.

D. Quality and size of all plants shall be of No. 1, of Pinto Tag stock. They shall be vigorous, of normal growth, free from disease, insects, insect eggs and meet or exceed the measurements specified. Pinto Tags must be submitted to the Owner's Representative. Tree trunks shall be sturdy and well "hardened off", self-supporting. Plants shall have well-developed branch systems, vigorous and fibrous root systems not root or container bound.

E. Container stock (1 gal., 5 gal., 15 gal. boxes) shall have grown in containers for at least six (6) months, but not over two (2) years. No container plants that have cracked or broken balls of earth, when taken from the container, shall be planted, except upon special approval. No trees with damaged roots or broken balls shall be planted.

F. Pruning shall not be done, prior to delivery, except by written approval by the Owner's Representative.

G. Inspection of plant materials shall be a responsibility of the Contractor and where necessary the Contractor shall have secured permits or certificates prior to delivery of plants to site.

H. Protection: Plants shall be handled, stored and maintained to prevent drying out, wind burn, wilting or root or stem damage. Evidence of these conditions will be grounds for plant replacement.

I. Plants shall be subject to inspection and approval or rejection at the project site at any time before or during the progress of work for size, variety, condition, latent defects and injuries. Rejected plants shall be removed from the project site immediately.

J. Substitutions will not be permitted except that if proof is submitted that any plant specified is not obtainable, a proposal will be considered for use of the nearest equivalent size or variety and cost. All substitutions subject to Owner Representative's written approval.

K. Quantities shall be furnished as needed to complete work as shown on Drawings.

L. The Owner's Representative reserves the right to inspect root condition of any species, particularly those grown from seed, and if found defective, to reject the plants represented by the defective sample.

M. Identify plant species or varieties correctly on legible, weather-proof labels attached securely to the job site. There shall be a minimum of one labeled plant for each five plants in a lot.

N. Groundcover plants shall be healthy, vigorous rooted cuttings grown in flats until transplanting.

O. Hydroseed/Stolon Material: Not used

P. Pre-emergence herbicide shall be Surflan, Treflan, Dymid or equal.

Q. Weed contact spray shall be Phytar 560, Broadside, Round-Up or equal.

2.5 BARK MULCH

A. All shrub and groundcover areas shall be covered with fine-size nitrolized fir bark, 2 inches minimum deep, as designated on plans. Fir bark shall be screened bark. Mulch shall contain no Eucalyptus. Mulch to be Forest Blend from Tierra Verde.

B. All shrub and groundcover areas shall be covered with fine-size nitrolized fir bark, 3 inches minimum deep, for mulch that contains Eucalyptus as designated on plans, Fir bark shall be screened bark. Mulch to be Forest Blend from Tierra Verde.

2.6 JUTE MATTING

Not used.

2.7 CONCRETE MOWCURBS

Not used

2.8 TREE STAND PIPES

A. Tree stand pipes shall be 4 inches rigid, perforated PVC pipe wrapped with filter fabric and placed upright in augured hole surrounded with gravel; one per tree. Keep stand pipe free of gravel to facilitate monitoring of water level at bottom of pit and cover with black plastic.

2.9 STRUCTURAL SOIL

A. Gravel:

B. Soil:

2.10 FILTER FABRIC

A. Filter fabric at drain pipe shall be non-woven polypropelene with a weight of 4.5 ounces per square yard, grab strength of 120 pounds, tensile elongation of 55%, burst strength of 210 PSI, tear strength of 50 pounds and puncture strength of 70 pounds.

2.11 ROOT BARRIERS

A. Biological root control device as manufactured by Biobarrier: 1-800-352-6776, or equal (no known equal). Width shall be 19.5 inches.

2.12 TREE GRATES: As per plan.

2.13 DECOMPOSED GRANITE

A. Provide 3” min. of material of 1/4” minus fines, light brown to gold in color. Decomposed granite shall conform to R-value test of 73 min., and sand equivalent test of 30 min.

PART 3 - EXECUTION

3.1 PREPARATION

A. Beginning of installation indicates Contractor’s acceptance of existing conditions.

B. Clearing and Grubbing: Prior to tillage operations, vegetation growth shall be grubbed, raked and cleared from the site. The ground surface shall be cleared of material which might hinder grading, tillage, planting and maintenance operations and be disposed of off the site.

3.2 SOIL CONDITIONING, FERTILIZING AND ROTOTILLING

A. Grade shall ensure positive drainage of site, directing surface drainage toward curbs, gutters, swales and drains; away from building foundations, free of irregularities and depressions. Provide a minimum of 2% slope over planted areas and 1% slope over hardscape. Provide a minimum of 2% slope away from all building foundations.

B. Finish grade below adjacent paving, curbs, or headers shall be 2-inches in shrub or ground cover areas.

C. After rough grading, prior to adding soil amendments, the Contractor shall provide analysis of imported and existing soil obtained from three (3) soil samples each from locations as approved by Owner's Representative. The samples shall be analyzed by an approved testing laboratory and amendments applied as outlined in the soils report. The contract prices shall be adjusted to reflect any differences between the amendments as specified in the agronomy test.

D. After the areas have been graded, all planting areas shall be conditioned and amended in accordance with soil test analysis recommendations. Soil conditioning and amendment materials shall be evenly spread over all planting areas and shall be thoroughly scarified to an average depth of 6 inches by rototilling a minimum of 2 alternating passes: (The following quantities and reates are for bid purposes only.)

Soil Conditioner	4 Cu. Yd.	Per 1,000 Sq. Ft.
Soil Sulphur	20 Lbs.	Per 1,000 Sq. Ft.
Iron Sulphate	20 Lbs.	Per 1,000 Sq. Ft.
Gypsum	100 Lbs.	Per 1,000 Sq. Ft.
Pre-Plant Fertilizer	20 Lbs.	Per 1,000 Sq. Ft.

E. Contractor shall procure new soil analysis from approved soil testing laboratory, from (3) location on site to be approved by client representative. Contractor shall reapply amendments and conditioners, or leaching, or any other action as recommended by soil test laboratory's recommendations.

F. Fertilizer (pre-plant) shall be incorporated into the top 6 inches of finish grade. Fertilizer shall be applied after leaching operation.

*Caution: Iron Sulphate will stain concrete, granite and other paved surfaces. Avoid contact between these surfaces and any soil mix containing iron sulphate. After iron sulphate application, broom all surfaces free of material before any water application, including impending rains.

G. Soil Preparation Procedure for all Landscaped Areas:
1. After landscape areas have been graded, compacted and sloped to drain as shown and specified, Contractor shall accept the areas for landscape soil preparation.
2. Areas that have not been graded and will be planted shall be thoroughly irrigated for a minimum of two weeks or until weeds germinate and vigorous weed growth is evident. Apply contact herbicide per manufacturers specifications. Repeat process if required by Owner's Representative until weed kill is achieved.

3. All areas shall be deep ripped to a depth of 12 inches and all rocks 1 inch or larger, construction debris, soil from previously paved areas shall be removed from the top 8 inches of soil. The thoroughness of rock removal shall be approved by the Owner's Representative prior to incorporation of amendments. Accepted topsoil shall be imported to equal volume of rock removed. (See Topsoil Specification).
4. Incorporate Agricultural Gypsum and soil sulphur to a depth of 8-12 inches.
5. Deep Water Leaching: Due to the type of soil in the site, it is mandatory that soils be leached and that the soil be re-tested for suitability prior to incorporating nutritional amendments. All areas shall be leached two times to a depth of 8 inches each time. Soil test must be approved by an approved, reputable soil laboratory and meet the following requirements prior to planting:

   ECe - maximum 3.1
   pH - maximum 7.50 - minimum 6.00
6. Soil testing labs: Agri Service Soil and Plant Lab, 2142-B Industrial Court, Vista, CA 92083, (619)727-5451; Soil and Plant Laboratory, 421 South Lyon Street, Santa Ana, CA 92107; Wilbur Ellis, 7982 Irvine Boulevard, East Irvine, CA 92650,(800) 792-5983 or (714) 551-0363, or equal.
7. Reapplication of soil amendment, conditioning and leaching or other actions shall be required by the Contractor if tests so recommend. Expense of test, reapplication of soil amendment and leaching operation shall be borne by the Contractor.
8. Add nutritional amendments to a depth of 6 inches. The thoroughness and completeness of the rototilling and incorporation of the soil conditioners/amendments shall be as approved by the Owner's Representative. Slopes 2:1 and steeper, or as per the Drawings, omit soil conditioner application of tilling.
9. Deep water leaching shall be done prior to the application of the commercial fertilizer 1-10-10.
10. Grades: Planting areas which have been soil conditioned and/or graded shall be maintained in a true and even condition prior to planting. Contractor shall include repairs to previously graded areas, if disruption of these areas should occur prior to end of Maintenance Period.
11. Settling of Soil: When grading, deep ripping, topsoiling, addition of soil conditioning and tilling have been accomplished, areas shall be compacted and settled by heavy irrigation to a minimum depth of 12 inches without causing erosion or sloughing of soils. Soil tests will be required after leaching to assure conformance to soil test results.
12. Final Grading of Planting Areas: Planting areas shall be free of rocks larger than 1 inch with no more than 5% by volume of rocks smaller than 1 inch. All depressions, voids, erosion, settled trenches and excavations shall be filled with approved topsoil or amended soil and/or removed by the Contractor leaving a smooth, even finish grade. Final grade shall be as shown and specified, and in conformance the following directives:
    a. Drainage away from buildings shall be maintained.
    b. Molding and rounding of grades shall be provided at all changes in slope. Blend slopes into level areas.
    c. Grades shall be 2 inches below adjacent paved areas and sidewalks and flush with valve boxes, mowing strips, clean-outs, drains, manholes, etc., and shall have a minimum slope of 1% to drains.
    d. Maintain grades within a tolerance of +/- 0.1 foot of grades shown on the Civil Engineering plans. Open lawn areas may be within +/- 0.5 foot of grades shown on Civil plans.
    e. No planting shall be installed until approval has been given by the Owner's Representative.

f. Contractor shall install accepted topsoil to bring finish grades to 2” below tops of curbs sidewalks and driveways, sloped in accordance with grading and drainage specifications.
g. Care shall be taken that the rate of application of water does not cause erosion or sloughing of soils.
h. All depressions, voids, erosion scars and settled trenches generated by the deep watering shall be filled with approved topsoil or amended soil and brought to finish grade.

3.3 FINISH GRADING

A. Finish grades shall be indicated on Civil drawings.

B. Finish grades shall be measured as the final water compacted and settled surface grades and shall be within +/- 0.1 foot of the spot elevations and grade lines indicated.

C. Finish grades shall be measured at the top surface of surface materials.

D. Molding and rounding of the grades shall be provided at all changes in slope.

E. All undulations and irregularities in the planting surfaces resulting from tillage, rototilling and all other operations shall be leveled and floated out before planting operations are initiated.

F. The Contractor shall take every precaution to protect and avoid damage to sprinkler heads, irrigation lines and other underground utilities during his grading and conditioning operations.

G. Final finish grades shall insure positive drainage of the site with all surface drainage away from buildings, walls and toward roadways, drains and catch basins.

H. Final grades shall be acceptable to the Owner’s Representative before planting operations will be allowed to begin.

I. Planting surfaces shall be graded with no less than two (2) percent surface slope for positive drainage.

J. Areas shown on plans as turf areas to receive soil preparation and conditioning (amend and fine grade soil) shall have all stones removed from the surface of the lawn bed.

3.4 PLANTING

A. The layout of locations for plants and outlines of groundcover to be planted shall be approved on the site by the Owner’s Representative prior to their planting. All such locations shall be checked for possible interference with existing underground piping prior to excavation of holes. If underground construction or utility lines are encountered in the excavation of planting areas, other locations for the planting may be selected by the Owner’s Representative. Damage to existing utilities shall be the responsibility of the Contractor.

B. Planting Trees and Shrubs:
1. All excavated holes shall have vertical sides with roughened surfaces and shall be of the minimum sizes indicated on drawings. Holes shall be, in all cases, large enough to permit handling and planting without injury or breakage of root balls or roots. Center of planting pit shall not exceed depth of soil on container, measured from exposed root flare of plant to bottom of container.

2. Excavation shall include the stripping and staking of all acceptable soil encountered within the areas to be excavated for plant pits and planting beds. Protect all areas that are to be trucked over and upon which soil is to be temporarily stacked pending its reuse for the filling of holes, pits and beds.
3. Remove nursery stakes and ties from all container stock. Maintain side growth on all trees.
4. Loosen roots and soil at edges of root ball of plant being installed and mix with native soil.
5. Excess soil generated from the planting holes shall be spread on the site as approved by the Owner's Representative.
6. All used cans shall be removed to the storage area or from the site daily.
7. The plants shall be planted at approved locations with the heretofore specified soil planting backfill & amended soils.
8. The plants shall be placed in the planting pits on the backfill material which has been hand-tamped and water settled to the root ball base levels prior to the placement of the plants. After setting the plants, the remaining backfill material shall be carefully tamped and settled around each root ball to fill all voids.
9. Each tree and shrub shall be placed in the center of the hole and shall be set plumb and held rigidly in position until the planting back fill has been tamped from around each root ball.
10. All plants shall be set at such a level, that after settling, the root flare shall be set as specified on the contract documents.
11. Planting tablets shall be placed in each planting hole at the following rates:

    One (1)-5 gram tablet per liner and flat size plant.
    One (1)-21 gram tablet per gallon container.
    Three (3)-21 gram tablets per 5 gallon container.
    Four (4)-21 gram tablets per 15 gallon container.
    One (1)-21 gram tablet per each 4 inch of box size.
12. No plant will be accepted if the root ball is broken or cracked, either before, during or after the process of installation.
13. All plants shall be thoroughly watered into the full depth of each planting hole immediately after planting, and shall be watered by hand as required to promote establishment.
14. All trees, 15 gallon and larger, shall be staked with two wood stakes, driven into the ground. The stakes shall be driven in plumb and secure. Special care shall be taken that the driving in of the stakes does not damage the tree root ball. Tree ties shall be fastened to each tree and stake by looping figure eights with the inside diameter of the tie at two or three times the diameter of the tree and by tacking the back of the tie to the stake (See Detailed Drawings).
15. The staking method shall be accomplished in such a manner as to insure the proper and healthy growth and the safety of the plants, property and public.
16. Plants shall not be placed within 12 inches of sprinkler heads.
17. Shrubs shown in plant areas shall be under planted with groundcover shown by adjacent symbol to within 12 inches of main plant stem.
18. The Contractor shall be responsible for all surfaces and subsurface drainage required which may affect his guarantee of the trees, shrubs and vines.
19. Pruning after planting shall be required on all trees and shrubs when necessary to provide the specified or approved standard shapes, form and/or sizes characteristic to each plant. Pruning may include thinning, topping and/or cutting and shall be as approved by the Owner's Representative. Cuts over 3/4 inch in diameter shall be painted with an approved tree sealant.
20. All trees 24 inches box and larger shall be spotted in place prior to digging of the hole.
21. Install vines as per plans and details.

C. Groundcovers:

1. Groundcovers shall be planted in the areas indicated on the Drawings. The groundcover plants shall be rooted cuttings grown in flats and shall remain in those flats until transplanting.
2. All groundcover plants shall be planted with soil around roots in staggered rows, evenly spaced at the intervals called out on the Drawings.
3. The groundcover plants shall be planted sufficiently deep to cover all roots and shall be immediately watered after planting until the entire area is soaked to the full depth of all holes.
4. The groundcover planting areas shall be hand-smoothed after planting to provide an even, smooth final finish grade. All groundcover areas to receive 2 inches layer fir bark mulch.

3.5 CONCRETE MOWCURB

A. Concrete mow curbs shall be installed as per plan and details.

3.6 STANDPIPES AT TREES

A. Install PVC standpipe at all trees. Wrap standpipes with filter fabric and cap standpipe with plastic drain grate, spot glue to pipe to reduce vandalism.

3.7 FREE ZONE

A. Contractor shall install a planting and irrigation "Free Zone" at the base of all buildings to minimize water contact with the building.

3.8 HERBICIDE APPLICATION

A. Pre-emergence herbicide shall be applied to groundcover areas only and in accordance with manufacturer's specifications. Do not apply in lawn or hydroseed areas. Owner’s Representative shall be notified and present at the time of application.

3.9 BARK MULCH

A. Install 2 inches layer in all shrub and groundcover areas. Do not install on slope areas 3:1 or greater.

3.10 JUTE MATTING

A. Not used.

3.11 ROOT BARRIER

A. Install root barriers for all trees located within six (6) feet of paving. Install root barrier along the edge of paving for a distance of ten (10) feet in each direction from the tree for a total of twenty (20) feet per tree. Where trees are closer than twenty feet apart a single continuous piece of root barrier shall be used. Overlap root barrier a minimum of twelve (12) inches at splices. Root barriers shall be installed at a minimum depth of (30) inches. Top of root barriers shall be set at 2” below adjacent paved surfaces.

3.12 CLEAN UP

A. As project progresses, Contractor shall maintain all areas in a neat manner and remove unsightly debris as necessary. After completion of project, Contractor shall remove all debris and containers used in accomplishing work. The Contractor shall sweep and clean all sidewalks, asphalt and concrete areas adjacent to plantings.

3.13 TREE GRATES Per manufacturer's specifications.

3.14 STRUCTURAL SOIL

A. As shown on plans.

END OF SECTION

SECTION 33 10 00

Water Distribution

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes piping and specialties for combined potable and fire protection water service outside the building.

B. Related Sections include the following:
1. Section 31 20 00 - Earthwork for trench excavation and backfill.
2. Drawings for potable and fire protection piping inside the building.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Minimum Working Pressures: The following are minimum pressure requirements for piping and specialties, unless otherwise indicated:
1. Combined Potable Water and Fire Protection Water Service: 200 psig (1380 kPa).

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data: For the following:
1. Pipe, joint restraints and fittings.
2. Valves and covers
3. Backflow preventer
4. Fire Department Connection

C. Purging and Disinfecting Reports: As specified in "Cleaning" Article in Part 3.

1.5 QUALITY ASSURANCE

A. Comply with NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances," for materials, installations, tests, flushing, and valve and hydrant supervision.

B. Comply with NSF Standard 61, “Drinking Water System Components”, for material, installation, and testing requirements.

C. Comply with City of Newport Beach requirements for tapping of water mains.

D. Comply with City of Newport Beach standards for potable water-service piping for testing and disinfections.

E. Comply with City of Newport Beach Fire Department installation and testing requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves according to the following:
1. Do not remove end protectors, unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

1.7 PROJECT CONDITIONS

A. Verify existing utility locations and meters. Contact utility locating service.

B. Verify that it is possible to install water service piping to comply with original design and referenced standards.

C. Site Information: Reports on subsurface condition investigations made during design of Project are available for informational purposes only; data in reports are not intended as representations or warranties of accuracy or continuity of conditions between soil borings. Owner assumes no responsibility for interpretations or conclusions drawn from this information.

D. Obtain necessary connection permits with local water company as required.

E. Obtain necessary street excavation and encroachment permits from the City of Newport Beach Dept. of Public Works.

1.8 SEQUENCING AND SCHEDULING

A. Coordinate piping materials, sizes, entry locations, and pressure requirements with building water distribution piping.

B. Coordinate piping materials, sizes, entry locations, and pressure requirements with building fire-protection water piping.

C. Coordinate with other site utility work.

PART 2 - PRODUCTS

2.1 PIPES AND TUBES

A. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.

B. PVC Plastic, Socket Fittings: ASTM D 2466, Schedule 40.

C. PVC Plastic, Fire Service Pipe: UL 1285 and AWWA C900, Class 200. Include elastomeric seal according to ASTM F 477.

D. Pipe sizes up to 2 inches shall be copper water tubing, Type K hard, ANSI H23.1, ASTM B 88, IAPMO IS. Muller Brass, Cambridge-Lee Halstead, or equal. an approved protective wrap shall be used to completely isolate and protect all underground copper tubing and extend past the surface a minimum 12 inches. The excess wrapping shall be trimmed down and taped to copper tubing with 10 mill PVC pipe tape at grade level of concrete or asphalt.

B. Ductile-Iron, Push-on-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include rubber compression gasket according to AWWA C111.

2.2 PIPE AND TUBE FITTINGS

A. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.

B. Copper Fittings: ASME B16.22; wrought-copper, solder-joint pressure type.

C. PVC Plastic, Socked Fittings: ASTM D2466, Schedule 40.

D. Ductile-Iron, Push-on-Joint Fittings: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and rubber compression gaskets according to AWWA C111.

2.3 JOINING MATERIALS

A. General: Applications of the following piping joining materials are indicated in Part 3 "Piping Applications" Article.

B. Solder Filler Metal: ASTM B 32, Alloy Sn95, Alloy Sn94, or Alloy E, with 0.10 percent maximum lead content.

C. Primers for PVC Piping Solvent-Cement Joints: ASTM F 656.

D. Solvent Cement for PVC Piping Solvent-Cement Joints: ASTM D 2564.

2.4 PIPING SPECIALTIES

A. Dielectric Fittings: Assembly or fitting with insulating material isolating joined dissimilar metals to prevent galvanic action and corrosion.
   1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld-neck end types and matching piping system materials.
   2. Dielectric Unions: Factory-fabricated union assembly, designed for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C). Include insulating material isolating dissimilar metals and ends with inside threads according to ASME B1.20.1.
   3. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum pressure to suit system pressures.
   4. Dielectric-Flange Insulation Kits: Field-assembled companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
      a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure to suit system pressures.
   5. Dielectric Couplings: Galvanized-steel couplings with inert and non-corrosive thermoplastic lining, with threaded ends and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).

6. Dielectric Nipples: Electroplated steel nipples with inert and non-corrosive thermoplastic lining, with combination of plain, threaded, or grooved end types and 300-psig (2070-kPa) working pressure at 225 deg F (107 deg C).

2.5 POLYETHYLENE ENCASEMENT

A. Polyethylene Encasement for Ductile-Iron Piping: ASTM A 674 or AWWA C105, PE film, 0.008-inch (0.20-mm) minimum thickness, tube or sheet.

2.6 VALVES

A. All Gate Valves, 4-Inch NPS (DN80) and Larger in size shall conform to AWWA Standard Specifications C500. All valves, including those over 12”, shall be rated to a minimum working pressure of 200 psi. All valves shall be iron body, bronze mounted, double-disk, parallel scat gate valves. All valves shall open by turning the stem counterclockwise. Buried valves shall be non-rising type with O-ring seal equipped with 2 inch square operating nut, and shall be bituminous coated. End connections shall be flanged or mechanical joint as required for the type of pipe used. Buried valves shall have stem extensions to place operating nut within 6” of top of valve box.

B. Valve Boxes shall be precast concrete with cast iron traffic rated cover with lettering "WATER”, bottom section with base of size to fit over valve and barrel approximately 5 inches (125 mm) in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.
1. Provide steel tee-handle operating wrench with each valve box. Include tee handle with one pointed end, stem of length to operate valve, and socket-fitting valve-operating nut. After installation of valve box cover and after installation of adjacent paving, if any, covers shall be sandblasted or wire-brushed as necessary and painted with bituminous black paint, unless another color is required by the Architect.

C. Indicator Posts: UL 789, FM-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve. Posts above and including connection to riser shall be sandblasted, if necessary, after installation and painted red, unless another color is required by the Architect.

D. Tapping Sleeve and Tapping Valve: Complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. Use sleeve and valve compatible with tapping machine.
1. Tapping Sleeve: Cast- or ductile-iron, 2-piece bolted sleeve with flanged outlet for new branch connection. Sleeve may have mechanical-joint ends with rubber gaskets or sealing rings in sleeve body. Include sleeve matching size and type of pipe material being tapped and of outlet flange required for branch connection.

2.7 BACKFLOW PREVENTERS

A. General: Manufactured backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated.

B. Working Pressure: 200 psig (1380 kPa) minimum, unless otherwise indicated.

C. 2-Inch NPS (DN50) and Smaller: Bronze body with threaded ends.

D. Interior Lining: AWWA C550, epoxy coating for backflow preventers with cast-iron or steel body.

E. Interior Components: Corrosion-resistant materials.

F. Strainer on inlet if strainer is indicated.

G. Hose-Connection Vacuum Breakers: ASSE 1011, nickel plated, with nonremovable and manual drain features, and ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet. Units attached to rough-bronze-finish hose connections may be rough bronze.

H. Reduced-Pressure-Principle Backflow Preventer: ASSE 1013, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include test cocks and pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves for continuous-pressure application.
1. Pressure Loss: 12 psig (83 kPa) maximum through middle third of flow range.
2. Double Detector Check Assembly: 15 psi (103.75 kPa) entry loss.

I. Exterior Finish: Red or yellow (as directed by Water Purveyor or local Fire Department) alkyd-gloss enamel paint. Entire device above and including connection to riser shall be sandblasted, if necessary, after installation and re-painted.

Manufacturer	Model	Size
Cia-Val	RP-LEX	2",2 1/2",3",4",6",8",10"
Cia-Val	RP-2	3/4",1",1-1/4",1-1/2"
Cia-Val	RP4	6 "
Febco	825YD2	2-1/2",3",4",6",8",10"
Febco	825Y	3/4",1",1-1/4",1-1/2",2"
Febco	825YA	3/4",1",1-1/2",2"
Febco	845	3/4",1"
Mueller	H-9506	4",6",8",10"
Orion	80-0069	1-1/2"
Orion	BRP	3/4,1",3",4"
Orion	9-2929	2 "
Rain Bird	RPA-075-R	3/4"
Rain Bird	RPA-100-R	1"
Rain Bird	RPA-125-R	1-1/4"
Rain Bird	RPA-150-R	1-1/2"
Rain Bird	RPA-200-R	2"
Rain Bird	RPA-250-R	2-1/2"
Rain Bird	RPA-400-R	4 "
Rain Bird	RPA-600-R	6"
Rain Bird	RPA-800-R	8"
Rain Bird	RPA-1000-R	10"
Watts	909 PCQT	3/4"-2"
Watts	909HWQT	3/4",1",1-1/4",1-1/2",2"
Watts	909 PCRW	2-1/2"-10"
Watts	909 RW Bronze	2-1/2",3"
Watts	009QT	3/4",1",1-1/4",1-1/2",2"
Watts	009SSQT	3/4",1",1-1/4",1-1/2",2"
Wilkins	575A	3/4",1
Wilkins	575	3/4",1",1-1/4",1-1/2",2"
Wilkins	575 (MOD-III)	2-1/2",3",4",6"
Wilkins	575M	8" (4"x4"x8" manifold)
Wilkins	575M	10" (6"x6"x10" manifold)

2.7 FIRE DEPARTMENT CONNECTIONS

A. Exposed Fire Department Connections: UL 405, cast-brass body, with thread inlets according to NFPA 1963 and matching local fire department hose threads, and threaded bottom outlet.

Include lugged caps, gaskets, and chains; lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch- (460-mm-) high brass sleeve; and round escutcheon plate.

1. Connections: Two 2-1/2-inch NPS (DN65) inlets and 6-inch NPS (DN150) outlet.
2. Inlet Alignment: Inline, horizontal.
3. Finish Including Sleeve: Polished chrome-plated.
4. Escutcheon Plate Marking: "AUTO SPKR."

2.8 ANCHORAGES

A. Concrete Reaction Backing: Portland cement concrete mix, 2000 psig (13.8 MPa).
   1. Cement: ASTM C 150, Type I.
   2. Fine Aggregate: ASTM C 33, sand.
   3. Coarse Aggregate: ASTM C 33, crushed gravel.
   4. Water: Potable.

2.9 IDENTIFICATION

A. Refer to Division 2 Section "Earthwork" for underground warning tape materials.

B. Arrange for detectable warning tapes made of solid blue film with metallic core and continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

C. Nonmetallic Piping Label: Engraved, plastic-laminate label at least 1 by 3 inches (25 by 75 mm), with caption "CAUTION--THIS STRUCTURE HAS NONMETALLIC WATER-SERVICE PIPING," for installation on main electrical meter panel.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Section 312000 "Earthwork" for excavation, trenching, and backfilling.

B. Refer to Section 321216 "Asphaltic Concrete Paving" for cutting and patching of existing paving.

C. Refer to Section 321313 "Concrete Paving" for cutting and patching of paving.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications:

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.

C. Do not use flanges or keyed couplings for underground piping.

D. Fire-Protection Water-Service Piping: Use the following:

E. 1. 4- to 8-Inch NPS (DN100 to DN200): UL 1285 and AWWA C900, Class 200. Include elastomeric seal according to ASTM F 477.

3.3 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
   1. Underground Valves, 3-Inch NPS (DN80) and Larger: AWWA, gate valves, non-rising stem, with valve box.

2. Underground Valves, 4-Inch NPS (DN100) and Larger: UL/FM, gate valves, non-rising stem, with indicator post.

3.4 JOINT CONSTRUCTION

A. Ductile-Iron Piping, Gasketed Joints for Fire-Service Piping: According to UL 194 and AWWA C600.

B. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, OD, and system working pressure. Refer to "Piping Systems - Common Requirements" Article below for joining piping of dissimilar metals.

3.5 PIPING SYSTEMS - COMMON REQUIREMENTS

A. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Install piping as indicated, unless deviations to layout are approved in advance by the Architect or USC.

B. Install components with pressure rating equal to or greater than system operating pressure.

C. Install piping free of sags and bends.

D. Install fittings for changes in direction and branch connections.

G. Piping Connections: Unless otherwise indicated, make piping connections as specified below:
1. Install dielectric fittings to connect piping of dissimilar metals.

3.6 SERVICE ENTRANCE PIPING

A. Extend water-service piping and connect to water-supply source and building water piping systems at outside face of building wall in locations and pipe sizes indicated.
1. Terminate water-service piping at building wall until building water piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building water piping systems when those systems are installed.

B. Sleeves and mechanical sleeve seals are specified in Drawings.

C. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

3.7 PIPING INSTALLATION

A. Make connections larger than 2-inch NPS (DN50) with tapping machine according to the following:
1. Install tapping sleeve and tapping valve according to manufacturer's written instructions.
2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
3. Install gate valve onto tapping sleeve. Comply with AWWA C600. Install valve with stem pointing up and with cast-iron valve box.
4. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.

B. If hot tap is not possible, install cut-in tee with C-110 fittings.

C. Comply with NFPA 24 for fire-protection water-service piping materials and installation.

D. Install ductile-iron piping according to AWWA C600.
1. Encase piping with PE film according to ASTM A 674 or AWWA C105.

2. Install encasement per manufacturer's written instructions. Close seams and overlaps in the polyethylene tubes with polyethylene compatible adhesive tape. The tape shall be approximately two inches wide and shall have the ability to bond securely to a metal surface and the polyethylene material. Repair all rips, tears and other damage with suitable adhesive tape.

E. Bury piping with depth of cover over top at least 30 inches (750 mm) and according to the following:
   1. Under Driveways: With at least 36 inches (900 mm) cover over top.
   2. If trenching before rough grading is completed would result in a lesser depth of cover than specified above, then trenching for water piping installation shall not be done until the specified minimum cover depth can be effected. If construction traffic will be allowed to pass over completed water piping installations prior to finish paving, then a protective pavement blanket at least equivalent to the final pavement and base thickness shall be constructed within the vehicle access area for a minimum distance of three feet on either side of the pipe. As an alternative to the temporary pavement blanket, the water pipe shall be installed at a minimum of two (2) feet deeper than specified within construction traffic areas.

3.8 ANCHORAGE INSTALLATION

A. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
   1. Gasketed-Joint, Ductile-Iron, Potable-Water Piping: According to AWWA C600.
   2. Fire-Service Piping: According to NFPA 24.

B. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

3.9 VALVE INSTALLATION

A. General Application: Use mechanical-joint-end valves for 3-inch NPS (DN80) and larger underground installation. Use non-rising-stem UL/FM gate valves for installation with indicator posts.

B. AWWA-Type Gate Valves: Comply with AWWA C600. Install underground valves with stem pointing up and with cast-iron valve box.

C. UL/FM-Type Gate Valves: Comply with NFPA 24. Install underground valves and valves in pits with stem pointing up and with vertical cast-iron indicator post.

3.10 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install fire department connection of type and features indicated.

3.11 IDENTIFICATION INSTALLATION

A. Install continuous plastic underground warning tape during back-filling of trench for underground water-service piping. Locate 6 to 8 inches (150 to 200 mm) below finished grade, directly over piping.

3.12 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2 hours.
   1. Increase pressure in 50-psig (350-kPa) increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to 0 psig (0 kPa). Slowly increase again to test pressure and hold for one more hour. Maximum allowable leakage is 2 quarts (1.89 L) per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within above limits.

C. Prepare reports for testing activities.

3.13 CLEANING

A. Clean and disinfect water distribution piping as follows:
   1. Purge new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
   2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities, use procedure described in AWWA C651 or as described below:
      a. Comply with NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
         1) Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine. Isolate system or part thereof and allow to stand for 24 hours.
         2) Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
         3) Following allowed standing time, flush system with clean, potable water until chlorine does not remain in water coming from system.
         4) Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports for purging and disinfecting activities.

END OF SECTION

SECTION 33 31 00

Sanitary Sewer Distribution

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Sanitary drainage piping, fittings and accessories.

B. Connection of building sanitary sewer drainage system to site sewer systems

C. Cleanout access.

1.2 REFERENCES

A. ASTM D2751 - Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.

B. ASTM D3034 - polyvinyl chloride (PVC), SDR 35, for solvent-cemented or gasketed joints.

C. ASTM C700 - Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated

D. SSPWC - Standard Specifications for Public Works Construction, latest Edition.

1.3 REGULATORY REQUIREMENTS

A. Conform to Section 306, Standard Specifications for Public Works Construction, for materials and installation of Work of this Section.

1.4 SUBMITTALS

A. Shop drawings indicating dimensions, locations and elevations of manholes, cleanouts and sub-surface structures.

B. Product data for pipe and pipe accessories.

C. Inspection and test reports specified

1.5 PROJECT RECORD DOCUMENTS

A. Accurately record location of existing and proposed pipe runs, connections, manholes, cleanouts and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 - PRODUCTS

2.1 SEWER PIPE MATERIALS

A. Gravity-Flow, Nonpressure Plastic Pipe: Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: ASTM D 3034, SDR 35, for gasketed joints. Gaskets: ASTM F 477, elastomeric seal.

B. PVC pipe is for outside conditions.

C. Vitrified Clay Pipe (VCP) - pipe shall be “extra strength VCP” and shall comply with Section 207-8 of the Standard Specifications for Public Works Construction. Pipe shall be manufactured in accordance with ASTM C-700 and installed in accordance with ASTM C-12. Joints for Vitrified Clay Pipe shall comply with Section 208-2.3 of SSPWC and manufactured in accordance with ASTM C-425. All VCP pipe, fittings and couplings shall be clearly marked at an interval not to exceed 5 feet as follows:
   1) Nominal pipe diameter.
   2) VCP classification.
   3) Company, plant, shift ASTM, and date designation.
   4) Service designation or legend.

D. Reinforced Concrete Pipe and Fittings: ASTM C76 (ASTM C76M), Class III, Wall B, for gasketed joints.

   1) Gaskets: ASTM C443 (ASTM C443M), rubber.

E. Hub and Spigot, Cast-Iron Soil Pipe and Fittings: ASTM A74, Service class, gray cast iron for gasketed joints. Include ASTM C564, rubber compression-type gaskets.

F. Backwater Valves: Gray iron.

G. Cleanouts: PVC.

H. Corrosion-Protection Piping Encasement: LLDPE film.

I. Manholes: Standard precast concrete.
   1. Resilient pipe connectors.
   2. Reinforced-concrete grade rings.
   3. Protective coating.
   4. Manhole frames and covers, with protective coating.
   5. Manhole cover inserts.

2.2 PIPE ACCESSORIES

A. Pipe Joints: Mechanical clamp ring type, stainless steel expanding and contracting sleeve, neoprene ribbed gasket for positive seal.

B. Fittings: Same material as pipe, molded or formed to suit pipe size and end design, in required "T", bends, elbows, cleanouts, reducers, traps and other configurations required.

C. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D3034, SDR 35, for solvent-cemented or gasketed joints.

   1. Gaskets: ASTM F477, Elastomeric seals.
   2. Primer: ASTM F 656.
   3. Solvent Cement: ASTM D 2564

2.3 CLEANOUTS

A. Lid and Frame: Cast iron construction, removable lid, closed checkerboard grill lid design; nominal lid and frame diameter as required for pipe sizes. [SPPWC 204-2]

B. Manholes: SPPWC Standard Drawing 200-3

2.4 FILL MATERIAL

A. Bedding and Fill: As specified in Section 31 20 00 “Earthwork”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that trench cut or excavation base is ready to receive work, excavations, dimensions and elevations are as indicated on Drawings.

B. Beginning of installation means acceptance of existing conditions.

C. Verify that existing invert elevations on site will allow proper tie in to new work with proper positive slope. Ascertain accuracy prior to trenching and installation of sanitary sewer system.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with approved fill material.

B. Remove large stones or other hard matter that could damage sewer pipe or impede consistent backfilling or compaction.

3.3 INSTALLATION - PIPE

A. Prior to commencing Work, Contractor shall pothole existing utilities at points of connection. Notify Architect in event of discrepancies.

B. Install pipe, fittings and accessories in accordance with Section 306, SSPWC and manufacturer's instructions. Seal joints watertight.

C. Concrete Pipe and Fittings: Install according to ACPA “Concrete Pipe Handbook”. Provide the following seals:

1. Round Pipe and Fittings: ASTM C443 (ASTM C443M), rubber gaskets.
2. Elliptical Pipe: ASTM C877 (ASTM C877M), Type I, sealing bands.
3. Arch Pipe: ASTM C877 (ASTM C877M), Type I, sealing bands.

D. Due to corrosive soils on-site, all below grade piping consisting of ferrous metals shall be given a high-quality protective coating, such as 18-mil plastic tape, extruded polyethylene, coal-tar enamel, or Portland cement mortar. Below-grade metals should be electrically insulated

(isolated) from above-grade metals by means of dielectric fittings in ferrous utilities and/or exposed metal structures breaking grade.

E. Place pipe on bedding as specified in Section 31 23 33.

F. Lay pipe to slope gradient noted on Drawings with maximum variation from true slope of 1/8 inch in 10 feet.

G. Do not displace or damage pipe when compacting.

H. Connect to site sewer outlet system through installed sleeves.

I. Do not cover joints until lines have been tested and approved.

3.4 INSTALLATION - CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Establish elevations and pipe inverts.

C. Mount lid and frame level in grout secured to top cone section to elevation indicated.

3.5 PROTECTION

A. Protect pipe cover from damage or displacement until backfilling operation is in progress.

3.6 TESTING

A. After installation, test each sanitary drain and/or sewer and each section between successive manholes for either infiltration or exfiltration. Test shall be conducted in accordance with Section 306 - Underground Conduit Construction of the Standard Specifications for Public Works Construction.

B. Where excessive ground water is encountered test the pipeline for infiltration.

C. When infiltration or exfiltration exceeds allowable amounts as set forth in the Section 306 formula, perform repairs or replacements as necessary to comply with the required limits.

END OF SECTION 33 31 00

SECTION 33 41 00

Storm Drainage

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Reference Specification: Perform all work in accordance with applicable provisions of "Standard Specifications for Public Works Construction", 2012 Edition. Unless otherwise noted, mention herein of section numbers refers to sections of the Reference Specification. Where Reference Specification refers to "Agency", substitute the word "Owner". Where Reference Specification refers to "Engineer", substitute the word "Architect". Where Reference Specification is in conflict with these Specifications, these Specifications shall govern.

1.2 SUMMARY

A. This Section includes gravity-flow, non-pressure storm drainage pipe and drainage structures outside the building.

1.3 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Non-pressure, Drainage-Piping Pressure Rating: At least equal to system test pressure

1.4 SUBMITTALS

A. Product Data for the following:

1. Pipe and fittings
2. Storm water quality devices: catch basin insert filters
3. Drains inlets

B. Shop drawings for pre-cast concrete structures. Include frames, covers, and grates.

C. Shop drawings for infiltration swale. Include filter media, piping, overflows, planter soil materials and layering.

D. Shop drawings for cast-in-place concrete or field-erected masonry structures. Include frames, covers, and grates.

E. Reports and calculations for design mixes for each class of cast-in-place concrete.

F. Coordination drawings showing structures, pipe sizes, locations, and elevations. Include details of underground structures and connections. Show other piping in same trench. Indicate interface and spatial relationship between piping and proximate structures.

G. Inspection and test reports specified in the "Field Quality Control" Article.

1.5 QUALITY ASSURANCE

A. Environmental Agency Compliance: Comply with regulations pertaining storm drainage systems.

B. Utility Compliance: Comply with regulations pertaining to storm drainage systems. Include standards of water and other utilities where appropriate.

C. Product Options: Drawings indicate sizes, profiles, connections, and dimensional requirements of system components and are based on specific manufacturer types indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Section "Product Requirements."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic structures in direct sunlight.

B. Do not store plastic pipe or fittings in direct sunlight.

C. Protect pipe, pipe fittings, and seals from dirt and damage.

D. Handle precast concrete manholes and other structures according to manufacturer's rigging instructions.

1.7 PROJECT CONDITIONS

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations. Notify architect of potential utility conflicts prior to installation of pipe system.

B. Locate existing structures and piping to be closed and abandoned.

C. Prior to commencing construction in public right-of-way and connecting to any public storm drain systems, contractor shall contact the agency of authority and obtain necessary permits.

C. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted under the following conditions and then only after arranging to provide acceptable temporary utility services.

1. Notify Architect not less than 48 hours in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without receiving Architect's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 PVC PIPE AND FITTINGS

A. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 35, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.

B. PVC Sewer Pipe and Fittings, NPS 18 and Larger: ASTM F 679, T-1 wall thickness, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.

C. PVC Sewer Pipe and Fittings: Schedule 40 ASTM D 1785 and D 2665 with solvent cement joints conforming to ASTM D 2564.

2.3 REINFORCED CONCRETE PIPE AND FITTINGS

A. Reinforced Concrete Pipe: Comply with Section 207-2 of the Standard Specifications for Public Works Construction.

B Tongue and Groove Piping: ASTM C76 (ASTM C76M), Class III, Wall B, for gasketed joints.

C. Gaskets: ASTM C443 (ASTM C443M), rubber.

2.4 NONPRESSURE-TYPE PIPE COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:
   1. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
   2. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
   3. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Unshielded Flexible Couplings: Elastomeric sleeve with corrosion-resistant-metal tension band and tightening mechanism on each end.
   1. Manufacturers:
      a. Dallas Specialty & Mfg. Co.
      b. Fernco Inc.
      c. Logan Clay Products Company (The).
      d. Mission Rubber Company; a division of MCP Industries, Inc.
      e. NDS Inc.
      f. Plastic Oddities, Inc.

D. Shielded Flexible Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
   1. Manufacturers:
      a. Cascade Waterworks Mfg.
      b. Dallas Specialty & Mfg. Co.
      c. Mission Rubber Company; a division of MCP Industries, Inc.
      d. Any equivalent manufacturer.

E. Ring-Type Flexible Couplings: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.
   1. Manufacturers:
      a. Fernco Inc.
      b. Logan Clay Products Company (The).
      c. Mission Rubber Company; a division of MCP Industries, Inc.

d. Any equivalent manufacturer.

2.5 SUB-DRAINAGE MATERIALS

A. Filter Fabric: Supplied by prefabricated drainage structure manufacturer, 4.5 oz/sq. yd. min.

B. Waterproof Sheeting: Polyvinylchloride sheeting, minimum 20 mils thick, with waterproof adhesive supplied or recommended by sheeting manufacturer.

C. Perforated Subdrain Plastic Pipe:

1. Acrylonitrile-Butadiene-Styrene (ABS) Pipe: ASTM D 2751, with a maximum SDR of 35.
2. Polyvinyl Chloride (PVC) Pipe: ASTM D 3034, with maximum SDR of 35 and with flexible elastomeric seal joint.
3. Perforations: Perforations in ABS and PVC pipe shall be circular, not more than 5/16" or less than 3/16" in diameter, and arranged in rows parallel to the longitudinal axis of the pipe. Perforations shall be approximately 3 inches center-to-center, along rows. The rows shall be approximately 1-1/2" inches apart and arranged in a staggered pattern so that all perforations lie at the mid-point between perforations in adjacent rows. The rows shall be spaced over not more than 90 degrees of circumference. The spigot or tongue end of the pipe shall not be perforated for a length equal to the depth of the socket and perforations shall continue at uniform spacing over the entire width of the pipe. Manufacturer's standard ABS or PVC pipe essentially meets these requirements and may be substituted upon approval. Wall thickness as required for earth loads and as approved by Soils Engineer, 4" diameter, Schedule 80, minimum.
4. Acrylonitrile-butadiene-styrene (ABS) pipe shall be joined using solvent cement or elastomeric joints and shall be in accordance with ASTM D 2751.
5. Polyvinyl Chloride (PVC) pipe joints shall be in accordance with ASTM D 3212.
6. Furnish subsoil drainage pipe prewrapped or wrap pipe with Mirafi 140N Filter Fabric, or Bidim C22 or C28 fabric manufactured by Monsanto; or equal.

2.6 MANHOLES

A. Standard Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
1. Diameter: 48 inches minimum, unless otherwise indicated.
2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
4. Riser Sections: 4-inch minimum thickness, and of length to provide depth indicated.
5. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
6. Joint Sealant: ASTM C 990 bitumen or butyl rubber.
7. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
8. Steps: Individual FRP steps, FRP ladder, or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
9. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.

10. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover.
11. Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch-minimum width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording "STORM DRAIN."
    a. Material: ASTM A 536, Grade 60-40-18 ductile iron or ASTM A 48, Class 35 gray iron, unless otherwise indicated.

2.7 CONCRETE

B. General: Cast-in-place concrete according to ACI 318/318R, ACI 350R, and the following:
1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

C. Ballast and Pipe Supports: Portland cement design mix, 3250-psi minimum, with 0.45 maximum water-cementitious materials ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

2.9 CATCH BASINS

A. Standard Precast Concrete Catch Basins: ASTM C 913, precast, reinforced concrete, of depth indicated, with provision for sealant joints. Precast units shall meet H-20 traffic loading condtions.
1. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
2. Top Section: Eccentric-cone type unless flat-slab-top type is indicated.
3. Joint Sealant: ASTM C 990, bitumen or butyl rubber.

B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16 (heavy traffic) structural loading unless otherwise indicated. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter flat grate with small square or short-slotted drainage openings, unless otherwise indicated.
1. Grate Free Area: Approximately 50 percent, unless otherwise indicated.

C. Triton Catch Basin Insert filters by Contech Stormwater Solutions Inc.

2.10 CLEAN OUTS

A. Cleanout Covers: Alhambra Foundry Company, Inc. Model No. A-1240 or A1242, heavy duty lamp pole frame and cover, or equal approved.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section "Earthwork."

3.2 IDENTIFICATION

A. Materials and their installation are specified in Section "Earthwork." Arrange for installation of green warning tapes directly over piping and at outside edges of underground structures.
   1. Use warning tapes or detectable warning tape over ferrous piping.
   2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.3 PIPING APPLICATIONS

A. General: Include Silt tight joints, except where water tight and soil tight joints are indicated.

B. Pipe Couplings: Use where indicated and where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods. Pipe couplings and fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
   1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure storm drain piping, unless otherwise indicated.
      a. Shielded flexible couplings for same or minor difference OD pipes.
      b. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

3.4 PIPING INSTALLATION

A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of underground sewerage and drainage systems piping. Location and arrangement of piping layout take into account many design considerations. Install piping as indicated, to extent practical.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed. Verify existing elevations prior to extensive excavating and notify Architect of any discrepancies. Contractor shall be liable for any premature construction which must be modified due to unforeseen existing conditions.

C. Install gravity-flow-systems piping at constant slope between points and elevations indicated. Install straight piping runs at constant slope, not less than that specified, where slope is not indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install manholes for changes in direction if shown on plan, otherwise use fittings. Use fittings for branch connections unless direct tap into existing storm drain is indicated.

F. Extend drainage piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.

G. Install gravity-flow, nonpressure drainage piping according to the following:
   1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
   2. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
   3. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
   4. Install Concrete Pipe and Fittings according to ACPA “Concrete Pipe Handbook” with the following seals. Concrete round pipe and fittings per ASTM C443 (ASTM C443M), rubber gaskets. Elliptical and Arch pipe: ASTM C877 (ATM C877M), Type I, sealing bands.

H. Clear interior of piping and manholes of dirt and superfluous material as work progresses.

3.5 PIPE JOINT CONSTRUCTION

A. General: Join and install pipe and fittings according to the following.

B. Install with top surfaces of components, except piping, flush with final finished surface.

C. Polyvinyl Chloride (PVC) Plastic Pipe and Fittings: As follows:
   1. Join solvent-cement-joint pipe and fittings with solvent cement according to ASTM D 2855 and ASTM F 402.
   2. Join pipe and gasketed fittings with elastomeric seals according to ASTM D 2321.
   3. Join profile pipe and ribbed drain pipe and gasketed fittings with elastomeric seals according to ASTM D 2321 and manufacturer's written instruction.
   4. Install according to ASTM D 2321.

D. System Piping Joints: Make joints using system manufacturer's couplings, except where otherwise specified.

E. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and fit both systems' materials and dimensions.

3.6 TRENCH DRAINAGE SYSTEM INSTALLATION

A. Assemble and install components according to manufacturer's written instructions and as indicated.

B. Assemble and install components according to manufacturer's written instructions, ASME A112.3.1, and as indicated.

C. Install with top surfaces of components, except piping, flush with final finished surface.

D. Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.

E. Embed channel sections and appurtenances in a 4-inch (100-mm) minimum depth of concrete around bottom and sides.

F. Fasten grates to channel sections if indicated.

G. Assemble trench sections with flanged joints.

H. Embed trench sections and appurtenances in a 4-inch (100-mm) minimum depth of concrete around bottom and sides.

I. Make piping connections and install stainless-steel piping with gasketed joints between system components.

3.7 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants according to ASTM C 891.

C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere, unless otherwise indicated.

3.8 CATCH BASIN INSTALLATION

A. Set frames and grates to elevations indicated. Ensure catch basin walls are properly sealed at the drain pipe penetrations.

3.9 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping to building's storm building drains specified in Division 15 Section "Storm Drainage Piping."

B. Make connections to existing piping and underground manholes.
   1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3250 psi.

3.10 FIELD QUALITY CONTROL

A. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to requirements of authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
   4. Submit separate report for each test.
   5. Hydrostatic Tests: Test storm drain according to requirements of authorities having jurisdiction and the following:
      a. Allowable leakage is maximum of 50 gal./inch of nominal pipe size per mile of pipe, during 24-hour period.
      b. Close openings in system and fill with water.
      c. Purge air and refill with water.
      d. Disconnect water supply.
      e. Test and inspect joints for leaks.
   6. Option: Test ductile-iron piping according to AWWA C600, "Hydrostatic Testing" Section. Use test pressure of at least 10 psig.
   7. Air Tests: Test storm drainage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
      a. Option: Test plastic gravity sewer piping according to ASTM F 1417.

B. Leaks and loss in test pressure constitute defects that must be repaired.

C. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION