**Treasure Cove Playground at Jade Street Park**
**4400 Jade Street, Capitola, California 95010**

# PROJECT SPECIFICATIONS

## 100% Construction Document Submittal

07/17/2025

PREPARED BY:

VERDE DESIGN

Project No. 2300300

DOCUMENT 00 01 10

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# SECTION 01 11 00

# SUMMARY OF WORK

## 1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. Work of this Contract consists of installation of new Jade Park playground including, but not necessarily limited to, the following:
   1. Installation of new proposed planting materials
   2. Installation of resilient surfacing.
   3. Perimeter paving, fencing, site furnishing improvements, play structures and utility upgrades.

B. The Work specifically includes all work as represented by the Drawings and Specifications issued for construction and subsequent approved revisions and addenda.

C. If certain features are not fully shown or called for on the Drawings, their construction shall be of the same character, quality and level of performance as for similar conditions that are shown, called for, or reasonably inferred.

## 1.02 RELATED REQUIREMENTS

A. Section 01 42 00 - References.

## 1.03 PROJECT LOCATION

A. 4400 Jade Street, Capitola, California 95010

B. The general nature and extent of the work and the appurtenant facilities are shown on the Drawings under the title: Capitola-Jade St Playground.

C. Perform work within the Limit of Work line indicated on the Drawings and per the discretion of the Owner.

## 1.04 SPECIFICATIONS AND DRAWINGS

A. The General Conditions, Supplementary Conditions, and Division 01 - General Requirements apply to the Work of all Sections.

B. Drawings, such as irrigation plans, utility plans, and other utility Drawings, are diagrammatic. Actual runs indicated on the Drawings shall be followed as closely as coordination with the work of other trades will permit. The exact routing of such improvements and locations of equipment shall be governed by site conditions, obstructions, and locations of other utilities as acceptable to the Owner.

C. In the event that discrepancies arise over dimensions, product references, omissions, or written statements, these conflicts shall be immediately brought to the Owner's attention by the Contractor. If available, this may be accomplished with the use of a "Request for Information" (RFI) form. While awaiting direction or clarification from the Owner, the Contractor shall re-direct work as necessary so as not to cause delay to the project.

D. If discrepancies arise between the Drawings and Specifications, the order of descending precedence shall be:
   1. Specifications.
   2. Details on the Drawings.
   3. Plans on the Drawings.

E. Products, materials, labor, etc., installed or performed without proper clarification, or prior to Owner acceptance shall be the Contractor's sole responsibility and shall be removed, repaired, replaced, and/or reinstalled per the Owner's direction at no additional cost to the Owner or its agents.

1.05 CONTRACTOR'S DUTIES

A. Provide and pay for:
   1. Labor, materials, equipment, tools, construction equipment machinery, and other facilities and services necessary for proper execution and completion of the Contract.
   2. Water and temporary utilities required for construction excluding any metering and connection fees or charges.
   3. Subject to the discretion of the Owners Representative as verified by the Contractor, utilities which are in place and/or are in use by the Owner at the site, excluding telephone, may be utilized by the Contractor, to the extent available, at no cost.
   4. Other facilities and services necessary for proper execution and completion of work to provide a facility capable of operation.
   5. Legally required sales, consumer, and use taxes.

B. Permits:
   1. The Owner shall obtain and pay for the building permits, utility cut-offs and hook-ups including, but not limited to: water, gas, and electrical meters, sanitary and storm sewer connection fees.
   2. The contractor shall obtain and pay for other permits required by Owner, County and other agencies, including but not limited to business licenses and hauling and dumping permits as applicable.
   3. Provisions of required permits and licenses, whether obtained by the Owner's Representative or the contractor, shall become a part of the Contract Documents and shall be adhered to by the contractor.

C. Comply with latest adopted edition of the governing building code and other codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of the work. Nothing in the Drawings or Specifications shall be construed to permit work not conforming to these applicable laws, ordinances, rules, and regulations. In case of conflicts between code requirements, the most restrictive shall apply; except that where the requirements of these Specifications exceed code requirements, the Specifications shall govern.

D. Attend pre-scheduled on-site job conference meetings and/or any special meetings as may be required by the Owner's Representative.

E. Promptly submit written notice to the Owner's Representative of any observed variance in Contract Documents from legal requirements. Appropriate modifications to Contract Documents will be performed by the Owner's Representative to incorporate such necessary modifications.
   1. Contractor shall assume responsibility for work performed and known to be contrary to such requirements.

F. Enforce strict discipline and good order among the contractor's or sub-contractor's employees per the discretion of the Owner's Representative.

G. The Contractor shall be held to have examined the site and to have compared it with the Drawings and Specifications, to have carefully examined all of the Contract Documents and to have satisfied itself as to the conditions under which the work is to be performed before entering in this Contract.
   1. No allowance shall subsequently be made on behalf of the Contractor on account of an error on its part or its negligence or failure to acquaint itself with the conditions of the site.

H. Examine site and verify that site conditions are acceptable to begin any work. Verify that work specified elsewhere has been completed to an appropriate stage to begin any applicable work. This includes, but is not limited to, lines, grades and surfaces prepared by others. Notify the Owner's

Representative in writing of any irregularities or unacceptable conditions. Start of work by Contractor shall indicate Contractor's acceptance of site conditions.

I. Throughout the job the Contractor shall be responsible for the general safety of the public and shall take appropriate means at no extra cost to Owner to provide a safe and secure job site to the satisfaction of the Owner's Representative.

J. Verify all measurements, materials and systems taken from the Drawings and Specifications. Contractor shall be responsible for all investigations, field measurements layouts, and coordination necessary to properly fit, install and complete the work required, including integration of new work into, and with existing.

K. Contractor shall deliver, receive, store, protect, install and apply materials in accordance with manufacturer's and/or industry specifications and instructions unless specifically modified and shown otherwise in the Contract Documents. Installations shall be tight, smooth, level, straight, true to line, and secure.

1.06 PROTECTION OF PROPERTY, MATERIALS AND WORK

A. Contractor shall be held responsible insofar as its operations are concerned for the care, protection, and preservation of the adjoining premises, buildings, trees, landscaping, utilities, walks, streets, and adjacent properties from damage resulting from or incidental to this Contract.

B. Protect existing structures, planted areas and improvements not designated for removal. Damage to existing structures including asphalt paving, utilities, and fixtures shall be replaced to an "as was" or better condition, at Contractor's expense, to the satisfaction of the Owner's Representative.

C. Materials and equipment, both before and after installation, shall be properly protected by the contractor from the weather and other hazards and kept in a clean and orderly manner.

D. Utility piping and conduit stub-outs, and parts or equipment left unconnected shall be capped, plugged, or otherwise properly protected by the contractor to prevent damage or the intrusion of dirt or other foreign matter.

E. Materials and equipment damaged or containing defects developed before acceptance of the work shall be replaced with new at the Contractor's expense.

1.07 WORK SEQUENCE AND SCHEDULE

A. The sequence and scheduling of the work to be performed by the Contractor shall be subject to review and acceptance by the Owner's Representative. The Contractor shall submit a Submittal Progress Log and Schedule in accordance with Section 01 33 00 - Submittal Procedures prior to starting work. Project schedules shall conform to Specification Section 01 33 00.

1.08 CONTRACTOR'S USE OF PREMISES

A. Confine operations to areas immediately within the proposed project sites.
   1. Develop and utilize construction access and haul routes as per the rules and regulations pertaining to the locale in which the work is to be performed and in accordance with the discretion of the Owner's Representative.
   2. Do not encumber site with materials or equipment.

B. Limit use of premises for work and construction operations to allow for work by other contractors.
   1. Conduct operations so as not to cause unnecessary delay or hindrance to other contractors.
   2. Conduct, adjust, correct, and coordinate work with others to prevent project discrepancies and/or delays.

C. Assume full responsibility for protection and safekeeping of products stored on premises and work performed until Final Acceptance of the work.

D. Move stored products under Contractor's control which interfere with operations of the Owner.

E. Obtain and pay for use of additional storage or work areas needed for construction operations.

1.09 WORK HOURS AND WORK DURING ONGOING ACTIVITIES

A. Carry on the work as quietly as possible to prevent possible annoyance to adjacent properties. Avoid unnecessary noise at all times. Comply with local noise regulations or requirements. No work, delivery of equipment or materials shall take place between the hours of 5:00 PM and 8:00 AM, or during non-working hours and days without written authorization by the Owner's Representative.

B. When connecting new utilities to existing, and similar operations, the contractor shall time and coordinate with Owner's Representative, facility operators, and utility companies such operations to minimize interference with existing activities and operations.

1.10 MATERIALS

A. Unless otherwise noted or scheduled, materials and equipment specified and used in the work of this Contract shall be new, in first class condition, and suited to the intended use.

B. Materials shall be delivered to the site and stored in original containers sheltered from the elements, but readily accessible for inspection by the Owner's Representative until installed.

C. Materials of the same general type shall be of the same make and quality throughout the work to provide uniform appearance, operation, and maintenance ease.

D. Equipment specified by manufacturer's number shall include all controls and accessories listed in catalog as standard equipment. Furnish optional or additional accessories as specified.

E. Where no specified make of material or equipment is specified, any product by a reputable manufacturer which conforms to the requirements of the Contract Documents may be used with the Owner's Representative's acceptance.

F. Materials and equipment shall be current products by manufacturers regularly engaged in the production of such products.

G. Equipment items shall be supported by service organizations, which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the Specified Warranty Period.

1.11 NUISANCE WATER

A. The Contractor shall protect the work, at all times, from damage and shall take measures to prevent delays in the progress of the work caused by nuisance water, such as rainfall, irrigation water and groundwater.

B. The Contractor shall dispose of nuisance water using appropriate mechanical means at their sole expense and without adverse effects upon the Owner's, or any other property.

C. The Contractor shall comply with all applicable non-point source pollution regulations required by the Owner.

1.12 REFERENCE POINTS

A. The Contractor shall leave existing stakes and reference points in their existing locations unless directed or authorized otherwise by the Owner's Representative. The Contractor shall set additional stakes and reference points as necessary to properly establish horizontal and vertical controls required for the work.

1.13 COORDINATION

A. The Contractor shall coordinate all items of its work to assure efficient and orderly sequence of installation of construction elements.
   1. The Contractor shall make provisions for accommodating items installed by the Owner or under separate contracts.
   2. The Contractor shall coordinate and cooperate fully with all other agencies, sub-contractors, or utility company personnel furnishing labor, materials, or services, so that the work, as a whole, shall be executed in the most efficient manner and without conflict or delay.

B. The Contractor shall verify that characteristics of interrelated operating equipment are compatible and coordinate work having interdependent responsibilities for installing of mechanical, irrigation, or electrical work, which may be indicated diagrammatically on Drawings.

C. The Contractor shall coordinate space requirements and installation of work, which is indicated diagrammatically on Drawings.
   1. Follow routing shown for pipes and conduits as closely as possible, run lines parallel with lines of construction edges whenever possible.
   2. Utilize spaces efficiently for other installations, for maintenance, and for repairs.
   3. Work out all conditions involving work of all trades in advance of installation. If necessary, and before work proceeds in areas with constricted clearances, prepare supplementary drawings for Owner's Representative review, showing all work in "tight" areas. Provide supplementary drawings and additional work necessary to overcome spatially constricted conditions.

D. Differences or disputes concerning coordination, interference or extent of work between divisions shall be decided by the Owner's Representative.

E. Access Doors and Panels: Coordinate access door and panel requirements with each trade installing work to which access must be available to the Owner's Representative from time to time.

1.14 CUTTING AND PATCHING

A. Contractor shall be responsible for all cutting, fitting, or patching of work which may be required to make its several parts come together properly and fix it to receive or be received by work of other trades.

B. Costs incurred by defective or poorly timed work shall be borne by the responsible party, as determined by the Owner's Representative. Contractor shall not endanger any work, persons or construction by cutting, digging, or otherwise, and shall not alter the work of any other contractor except as acceptable to the Owner's Representative.

C. Patching of openings for new installations and openings resulting from the removal or relocation of an installation shall be done with material of the same type adjoining openings and as acceptable to the Owner's Representative.

1.15 CLEANING DURING CONSTRUCTION

A. Execute weekly cleaning operations to keep the work, site, streets, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris resulting from construction operations.

B. Provide on-site containers for the collection of waste materials, debris and rubbish.

C. Remove hazardous waste materials, debris, and rubbish from the site periodically and properly dispose of such materials at legal disposal areas.
   1. Location of legal disposal sites and all costs incurred from waste disposal and transportation shall be the responsibility of the contractor.
   2. Waste material or debris shall not be buried or burned on the site.

D. The Owner's Representative may, at any time during construction, order general clean-up of the site at no additional cost to the Owner.

1.16 PROJECT COMPLETION

A. Conform to Section 01 77 00 - Contract Closeout.

B. The Contractor shall, at completion of the project, leave the installed work properly operating and in a thoroughly clean condition.

C. Thoroughly instruct the Owner's Representative and any applicable operation and maintenance personnel in the contents of the "operations and maintenance manual." Refer to Section 01 33 00 – Submittal Procedures.

END OF SECTION

# SECTION 01 25 00

# SUBSTITUTION PROCEDURES

## 1.01 SUMMARY

A. Section Includes: Specific requirements for submission and approval of products other than those specified or noted on the Drawings.

B. Related Requirements:
   1. Section 01 33 00 – Submittal Procedures
   2. Other applicable Sections of the Specifications

## 1.02 DEFINITIONS

A. Substitutions - General: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

B. Substitutions for Cause: Changes proposed by Contractor that are required due to changed project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

C. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

## 1.03 INTENT OF SPECIFICATIONS – PRODUCT SELECTION

A. When a material, article, or process is indicated or specified by trade, patent, proprietary name, or name of manufacturer, the Specification shall be deemed to be followed by the words "or equal, as accepted in writing by the Owner's Representative" and a request for substitution shall be submitted as specified in this Section. Provide only the named product or products where products are specified followed by the words "no substitution." Substitutions are not allowed.

B. The naming of more than one manufacturer in a Section does not imply that all products produced by the listed manufacturers are acceptable for use on the project. Where more than one proprietary name, process, and product is specified, the Contractor may provide materials or equipment of any one of the manufacturers specified if it is in full compliance with the Contract Documents and is acceptable to the Owner's Representative.

C. Costs incurred due to requests, changes or revisions resulting from substitutions requiring Drawings or services of the Owner's Representative or Project Consultants to facilitate purchase, installation or erection of any portion of the work shall be borne by the Contractor. A flat hourly rate, as agreed upon, shall be paid by the Contractor whether the change is accepted or not. This fee shall be deducted, and paid, from Contract moneys due to the Contractor as determined by the Owner's Representative.

## 1.04 ACTION SUBMITTALS

A. Procedures: In accordance with Section 01 33 00 – Submittal Procedures.

B. Substitution Requests:
   1. Include sufficient data, drawings, samples, literature, and other detailed information which demonstrates to the Owner's Representative that the proposed substitute is equal in quality, operating efficiency, and durability of the material specified.

2. Substitution Request Form: [Facsimile of form provided in Project Manual]. [As mutually agreed upon by Architect and Contractor.]
3. Documentation:
   a. Submit a detailed side-by-side comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
   b. Sufficient data, drawings, samples, literature, and other detailed information which demonstrates to the Owner's Representative that the proposed substitute is equal in quality, operating efficiency, and durability of the material specified.
   c. Statement indicating why specified product, fabrication, or installation cannot be provided, if applicable or requested.
   d. Samples for review, if applicable.
   e. Certificates and qualification data.
   f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
   g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
   h. Research reports evidencing compliance with building code in effect for Project, from [ICC-ES.] [_____.]
   i. Cost information, including a proposal of change, if any, in the Contract Sum.
   j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
   k. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

C. Submittal Timing:

1. Prior to Bidding:
   a. A request for substitutions will be considered if received within 10 calendar days from the bid opening date.
   b. Approval of substitutions shall be accepted or denied by the City at least 3 calendar days before bid opening.
   c. If a decision on use of a substitute cannot be made within these time limits, the product specified shall be used.
2. Following Award of Contract:
   a. Substitutions for Cause: Submit requests immediately on discovery of need for change, but not later than 15 working days prior to time required for preparation and review of related submittals.
   b. Substitutions for Convenience: Submit within 20 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

## 1.05 CONSIDERATION OF SUBSTITUTIONS

A. General:
1. Materials and equipment for the work shall be the standard product of a manufacturer regularly engaged in the production of such materials and equipment. Product options or substitutions shall not be the basis for any price increase above the original Contract Sum.
2. Substitutions which are equal in quality, efficiency, durability and utility to those specified will be permitted, subject to the following conditions.
3. The Owner's representative shall review such proposed substitutions and determine if a substitution is acceptable. If the following conditions are not satisfied, Owner's Representative will return requests without action, except to record noncompliance with these requirements.

4. Failure of the Contractor to submit proposed substitutions for review in the manner specified shall be sufficient cause for rejection by the Owner's Representative of any substitutions otherwise proposed.
5. Failure to place orders for specified equipment or material sufficiently in advance of the scheduled date of installation shall not be considered a valid reason upon which the Contractor may base a request for any substitutions or for any deviations from the Contract Documents.

B. Substitutions for Cause: Owner's Representative will consider Contractor's request for substitution for cause when the following conditions are satisfied. If the following conditions are not satisfied, Owner's Representative will return requests without action, except to record noncompliance with these requirements:
1. Substitution request is fully documented and properly submitted.
2. Requested substitution will not adversely affect the Project Construction Schedule.
3. Requested substitution has received necessary approvals of authorities having jurisdiction, if applicable.
4. Requested substitution provides specified warranty.
5. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

C. Substitutions for Convenience: **[**Not allowed, except as otherwise specified**]** Owner's Representative will consider Contractor's request for substitution for convenience when, in addition to the conditions specified for a substitution for cause, under the following conditions.
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.

D. Action by Owner's Representative:
1. Substitutions shall be favorably reviewed and accepted by the Owner's representative in writing prior to implementation. Favorable review shall not relieve the Contractor from complying with the requirements of the Contract Documents, and the Contractor shall be responsible for all expenses for any changes resulting from acceptable substitutions which affect other parts of the work.
2. If necessary, Owner's Representative will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution.
3. Owner's Representative will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
4. Forms of Acceptance: Change Order, Construction Change Directive, or Supplemental Instructions for minor changes in the Work.

E. The first or only named manufacturer is the basis for the project design and the use of alternative-names, second-names, or unnamed manufacturer's products may require modifications in the project design and construction.
1. Costs incurred due to requests, changes or revisions resulting from substitutions requiring drawings or services of the Owner's representative or project consultants to facilitate purchase, installation or erection of any portion of the work, shall be borne by the contractor. A flat hourly rate, as agreed upon, shall be paid by the contractor whether the change is accepted or not. This fee shall be deducted, and paid, from Contract moneys due to the contractor as determined by the Owner's representative.

F. Contractor shall furnish full information concerning the material or articles being proposed for substitution.

1. Testing of a proposed substitute material to assure compliance with the Specifications may be required by the Owner's representative at the contractor's expense.
2. Samples shall be submitted for review as specified in Section 01 33 00 – Submittal Procedures.
3. Equipment, material, and articles installed or used by the contractor without required review, shall be at the contractor's risk.

G. Substitutions shall comply with or exceed all requirements of size, function, structure, durability, and appearance without exception.
   1. Use of accepted substitutions shall in no way relieve the contractor from responsibility for compliance with the Contract Documents after installation.
   2. The contractor shall assume all extra costs caused using such substitutions where they affect other work or trades.

1.06 SUBSTITUTION REQUEST FORM

A. For proposed substitutions, the Contractor shall complete the following Substitution Request Form, attach substantiating back-up literature, and submit to the Owner's representative within time limit specified.

*(Remainder of this Page is Blank)*

**SUBSTITUTION REQUEST FORM**

DATE: _____

TO: OWNER'S REPRESENTATIVE

PROJECT NAME: _____

_____

_____

SPECIFIED ITEM: Section_____ Page _____ Item Number _____ Paragraph _____

DESCRIPTION:

_____

_____

_____

_____

S A M P L E

_____

_____

_____

The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: (put N/A where not appropriate)

Manufacturer: _____ Color: _____

Model Number: _____ Material: _____

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the requests; applicable portions of the data are clearly identified.

Attached data also includes description of changes to Contract Documents which the proposed substitution requires for proper installation.

The undersigned states that the following paragraphs, unless modified on attachments, are correct:

1. The proposed substitution does not affect dimensions shown on Drawings. If, in fact, it does affect dimensions, the contractor shall provide shop drawings, accurately showing changes to documents.
2. The undersigned shall pay for changes to the design, including engineering design, detailing, and construction costs caused by the requested substitution.

3. The proposed substitution shall not adversely affect other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts are locally available for the proposed substitution.

The undersigned further states that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified item.

Submitted by:

Signature: _____ Title: _____

License Category: _____ License Number: _____

Firm: _____ Phone No.: _____

Address: _____ Fax No.: _____

Telephone: _____

**OWNER'S REPRESENTATIVES REVIEW:**

☐ NO EXCEPTIONS TAKEN ☐ EXCEPTIONS TAKEN (SEE ATTACHED COMMENTS)

☐ FURNISH AS CORRECTED ☐ REVISE AND RESUBMIT

By: _____ SAMPLE

Date: _____

Comments:

_____

_____

_____

_____

Attachments:

END OF SECTION

# SECTION 01 33 00

# SUBMITTAL PROCEDURES

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Procedures to be followed in preparing and submitting the following supplementing and superseding those included in the General Conditions.
      a. Photographic documentation.
      b. Construction Schedule.
      c. Submittal Schedule.
      d. Project directory.
      e. Product list.
      f. Shop drawings.
      g. Design-build engineering design and drawings.
      h. Product data.
      i. Samples.
      j. Procedures for:
         1) Action Submittals.
         2) Informational submittals.
         3) Deferred submittals.
         4) Delegated design services.
      k. Colors and patterns submittals.
      l. Operating and maintenance manuals.
      m. Field samples and mockups, including on-site review of materials, colors, and textures.
      n. Requests for Information (RFI's).
   2. Final distribution of submittals.

B. Related Requirements:
   1. Section 01 25 00 - Substitution Procedures.

### 1.02 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Owner's Representative's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.

B. Informational Submittals: Written and graphic information and physical samples indicated in individual Specification Sections as informational submittals that do not require Owner's Representative's responsive action.

C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

### 1.03 GENERAL

A. Comply with the requirements specified in addition to submittal review procedures and requirements of the General Conditions.

B. Do not commence any portion of the Work requiring submission of a shop drawing, product datum, or sample until the submittal has been reviewed by Owner's Representative and appropriate consultant. Such portions of the Work shall be in accordance with reviewed submittals.

C. Shop drawings, product data, samples and supporting data shall be prepared by Contractor or its suppliers but shall be submitted to Owner's Representative by Contractor as the instruments of the Contractor.
   1. Contractor shall check the drawings of its suppliers as well as its own drawings before submitting them to Owner's Representative.
   2. Contractor shall ascertain that shop drawings, product data, and samples meet all requirements of the Contract Documents and also conform to the structural and space conditions. If shop drawings, product data, and samples show variations from Contract Documents, whether because of standard shop practice or other reasons, Contractor shall make special mention thereof in its letter of transmittal and describe the reasons why there are variations.
   3. Contractor shall be fully responsible for observing the need for and making changes in arrangement and manner of installation of piping, connections, wiring, and similar items that may be required by equipment it proposes to supply, both as pertains to its own work and work affected under other parts, headings, or Divisions of the Contract Documents.
   4. Prior to submittal to Owner's Representative, each shop drawing, product datum, and sample submitted for review shall be stamped, dated, and signed by Contractor, verifying that it has been checked by Contractor to be in accordance with the Contract Documents. Submittals not signed by Contractor will be returned without review by the Owner's Representative.

D. Miscellaneous systems not specifically specified but installed to meet code requirements or for other reasons are subject to Owner's Representative's review prior to installation.

1.04 COORDINATION OF SUBMITTALS

A. Prior to submittal, use all means necessary to fully coordinate all material, including, but not necessarily limited to:
   1. Determine and verify all interface conditions, catalog numbers and other data.
   2. Coordinate with other trades as required.
   3. Clearly indicate all deviations from requirements of the Contract Documents.
   4. Verify that each item and the submittal conform in all respects with the requirements of the Contract Documents.

B. The following products do not require further review except for interface within the Work, unless indicated otherwise:
   1. Products specified by reference to standard specifications such as ASTM and similar standards.
   2. Products specified by manufacturer's name and catalog model number.

C. By affixing the Contractor's signature to each submittal, the Contractor certifies that this coordination has been performed.

1.05 GROUPING OF SUBMITTALS

A. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
   1. Partial submittals may be rejected as not complying with the provisions of the Contract.
   2. The Contractor may be held liable for delays so occasioned.

1.06 IDENTIFICATION OF SUBMITTALS

A. Consecutively number all submittals.

1. When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
2. On resubmittals, reference the original submittal number.

B. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.

C. On at least the first page of each copy of each submittal, and elsewhere as required for positive identification, clearly show the submittal number in which the item was included.

D. Maintain an accurate submittal log for the duration of the Work, showing current status of all submittals at all times. Make the submittal log available to the Owner's Representative for review.

E. Quality Control Set: Maintain returned final set of submittals at project site, in suitable condition and available for quality control comparisons by Owner's Representative.

1.07 TIMING OF SUBMITTALS

A. Make submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, necessary approvals, possible revisions, resubmittals, and for placing orders and securing delivery.

B. In scheduling, allow for review by the Owner's Representative in a timely manner following receipt of the submittal by the Owner's Representative.

C. Delays caused by tardiness in receipt of submittals will not be an acceptable basis for extension of the Contract completion date.

1.08 SUBSTITUTIONS

A. Substitution requests shall be written, timely and submitted in accordance with the procedures specified in Section 01 25 00 - Substitution Procedures.

PART 2 - SUBMITTALS

2.01 PROJECT DIRECTORY

A. After execution of the Contract but prior to commencement of Work, Contractor shall submit to Owner's Representative a Project Directory listing subcontractors and vendors on the Project and giving a brief description of their scope of work, firm name, contact person, address, phone number, and fax number.

2.02 SUBMITTAL SCHEDULE

A. Contractor shall prepare and submit to Owner's Representative a "Submittal Schedule" when required by the General Conditions showing scheduled dates of submittals and date required for return of submittals to Contractor.

B. Contractor shall provide in schedule a minimum of 10 working days for Owner's Representative to review and check submittals as may be necessary provided it is not a deferred approval item. Based on the number and complexity of submittals at any one time, Owner's Representative's review period may be longer than 10 days.

C. Dates on "Submittal Schedule" shall be agreed upon by both Owner's Representative and Contractor.

2.03 PRECONSTRUCTION PHOTOGRAPHS

A. Before commencement of work on the site, take digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by the Owner's Representative.

B. Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as cracking or other damage caused by demolition, site preparation, and building construction operations.

C. Submit digital file as specified for Construction Photographs.

D. Submit before Work begins.

2.04 CONSTRUCTION PHOTOGRAPHS

A. Provide digital photographs taken weekly of site and construction from beginning of demolition to completion of exterior work. Photographs shall be produced by the contractor in a manner deemed acceptable to Owner's Representative.

B. Photographs shall:
   1. Provide factual presentation.
   2. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

C. Views:
   1. Provide non-aerial photographs from four cardinal views at each specified time until date of Substantial Completion.
   2. Consult with Owner's Representative for instructions on views required.
   3. View and location for each orientation shall be maintained throughout Project.

D. Digital File:
   1. File Format: Joint Photographic Experts Group (JPEG), unless otherwise directed by Owner's Representative.
   2. Minimum Resolution: 2400 x 3000 pixels.
   3. Provide digital date/time information in each image file (EXIF metadata).
   4. Digital images shall be exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

2.05 CONSTRUCTION SCHEDULE

A. In accordance with the General Conditions, prepare a comprehensive schedule of basic operations of the entire Project in the form of a Critical Path (CPM) network or other appropriate method acceptable to Owner's Representative.
   1. Indicate critical dates for submission of specified shop drawings, product data, samples, and certificates. Provide in Schedule a minimum of 10 working days for Owner's Representative to review and check submittals as may be necessary. No extension of time will be granted because of Contractor's failure to make submittals to allow for review and processing by Owner's Representative in accordance with the accepted milestones. Specific submittals considered by the Contractor to be on the "critical path" shall be indicated on the Schedule.
   2. Include decision dates for products specified by allowance and for selection of colors/finishes.

B. The schedule shall be the basis for establishing starting and completing dates of Work for the Project.

C. Conform to accepted schedule, and arrange work in such a manner that it will be installed in accordance with the schedule.

D. Establish a program to reevaluate and update the schedule periodically in accordance with requirements of the Project. Submit first schedule 2 weeks after Notice to Proceed.

E. Coordinate letting of subcontracts, material purchases, delivery of materials, sequence of operations, and similar activities to conform to accepted schedule, and furnish proof of conformance as may be required by Owner.

F. In case Owner determines, after consultation with Owner's Representative, that Contractor fails or refuses to take appropriate and necessary measures to complete the Work in accordance with the accepted schedule or within time to which such completion may be extended, the Contract, or any part thereof, may be terminated under the provisions of the General Conditions.

G. Submit to the Owner's Representative for review, within 45 calendar days after date of the Contract or as allowed by the Schedule, all submittals for equipment, fabrications, and specialty items as listed in each Section of the Specifications.

2.06 SHOP DRAWINGS

A. Shop drawings shall be drawn to a scale, be completely dimensioned, and be sufficiently large to show all pertinent aspects of the item and its method of connection to the Work, or as specifically indicated elsewhere in other Sections of these Specifications.

B. Entitle shop drawings with name of the Project and list applicable divisions, sections, article, or reference on each sheet.

C. Submit separate items on separate sheets.

D. The reproduction of any Contract Documents for use in a shop drawing submittal is not permitted.
   1. If the Contractor requires, it may request drawings/backgrounds from the Owner's Representative to use in its preparation of shop drawings. The Owner's Representative will send drawings, via e-mail, only after the following is completed:
      a. Contractor to complete a "CAD Release & Indemnity Agreement," or similarly named document, to be provided by Owner's Representative. Sign and return to the Owner's Representative.
      b. Requests for drawings prepared by consultant of Owner's Representative shall be directed to the office of the respective consultant and are subject to each consultant's firm policies.
   2. Review comments of the Owner's Representative or it's consultants will be shown on the copy returned to the Contractor. The Contractor shall make and distribute additional copies as are required for its purposes.
   3. The Owner shall be provided with a copy of shop drawing transmittals only if requested.

2.07 PRODUCT DATA

A. Manufacturer's standard drawings shall be modified to delete information which is not applicable and shall be supplemented to provide additional information where so required.

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data shall:
   1. Have each copy clearly marked to identify pertinent materials, products, models, finishes, etc.
   2. Show clearly standard options included.
   3. Show dimensions and clearances required.
   4. Show performance characteristics and capacities.

5. Show wiring diagrams and controls, and show necessary rough-in requirements for utility services and connections, where applicable.
6. Include manufacturer's installation instructions on 8.5-inch by 11-inch format.

C. Identify each item of product data by reference to sheet and detail numbers of Contract Drawings and/or specific reference to Articles or paragraphs of a Specification Section.

D. Where product data, as submitted, contains extraneous information, unmarked options, or is incomplete, it will be returned to Contractor without review.

2.08 SAMPLES

A. Contractor shall forward to Owner's Representative, at its own expense, samples designated for use on the Project. Include material, equipment, textures, colors, and fabrics in sizes and quantities as required by the Drawings and Specifications or as requested by Owner's Representative. Where there is an expected range of color or texture variations for the specified item, submit sufficient number of samples to illustrate range.

B. Submit and resubmit samples until accepted by Owner's Representative.

C. No review of a sample shall be taken in itself to change or modify the Contract requirement.

D. Finishes, materials, and workmanship in the completed Project shall match accepted samples.

E. Samples of value will be returned to Contractor, when requested in writing at time of submittal, for its use in the Project after review, analysis, comparison, or testing as may be required by Owner's Representative.

F. No samples shall be incorporated into the Work, unless otherwise specified or specific approval is given by Owner's Representative.

2.09 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria:
1. Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
2. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Owner's Representative.

B. Delegated-Design Services Certification:
1. In addition to shop drawings, product data, and other required submittals, submit paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
2. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

C. Delegated Design / Design-Build Engineering Design and Drawings: Furnish in a computer-aided design (CAD) program, AutoCAD, or accepted equal, unless otherwise directed. Drawings shall plot at a minimum 1/8" = 1'-0" scale.

2.10 COLORS

A. Unless the color and pattern are shown or specified, whenever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to Owner's Representative for review and selection.

B. Completely describe the relative costs and capabilities of each color and pattern, unless available colors and patterns have identical costs and wearing capabilities.

2.11 FIELD SAMPLES AND MOCKUPS

A. Comply with requirements specified in respective Specification Section.

2.12 REQUESTS FOR INFORMATION (RFI'S)

A. RFIs shall be submitted by the Contractor or by subcontractors to the Contractor who shall then assign the request an RFI number and forward the request on to the Owner's Representative. RFIs from contractors under separate contract with Owner, and performing work concurrently with work under this Contract, shall submit RFIs through the Contractor for coordination.

B. Subcontractors shall not submit RFIs directly to the Owner's Representative.

C. Each RFI shall be given a discrete, consecutive number such as "001," "002," "003," etc. Revisions or resubmittal of the same RFI shall maintain the original RFI number but be otherwise identified with a suffix such as "001A" for first revisions, "001B" for second revision, etc.

D. Contractor shall identify in the RFI the specific issue that the Contractor is requesting information on, where the issue is referred to in the Contract Documents, and what is the Contractor's proposed solution to the apparent conflict. RFIs not addressing these three issues will be rejected.

E. The Owner's Representative's response to RFIs will confirm a stated interpretation or otherwise interpret the design intent and may include furnishing an alternative conflict resolution.

F. The Owner's Representative will review and process RFIs in an average of 10 working days. It is acknowledged and understood that some RFIs will take longer to answer than others.

G. RFI Log: Contractor shall prepare and maintain a log of RFIs, and at any time requested by the Owner's Representative, the Contractor shall furnish copies of the log showing all outstanding RFIs.

PART 3 - EXECUTION

3.01 PROCEDURES FOR ACTION SUBMITTALS

A. General: Submit as specified in the General Conditions and Specification Sections.
   1. Submittals shall be made to Owner's Representative. Submittal of shop drawings via e-mail attachment will be generally accepted, though when requested by Owner's Representative**]**, Contractor shall provide full size and half size shop drawings.
   2. Subcontractors shall make submittals to Contractor.
   3. Submittals shall not be made directly to the Owner, unless specifically requested, or consultants of the Owner's Representative. Even if a submittal is reviewed and returned by a consultant of the Owner's Representative, such submittal shall be considered as not reviewed if not submitted through the Owner's Representative.

4. If more than one resubmittal of the same item or its component is required, the Contractor will be billed for additional review time and materials at current billing rates of the Owner's Representative.

B. Unless otherwise agreed or requested, Owner shall be provided with a copy of transmittals only.

C. Copies required in each Action Submittal shall be as follows unless otherwise mutually agreed or specified in a respective Specification Section:
   1. Shop Drawings and Product Data: Digital PDF (Portable Document Format) files via email, ftp site, or other secure file transfer protocol.
      a. Digital submittals shall be fully compatible with Adobe Acrobat Reader.
      b. All parties shall view and print with Adobe Acrobat (fully up-to-date) to ensure compatibility, unless agreed upon otherwise.
      c. Owner's Representative reserves the right to request hard copies of submittals as follows:
         1) Shop Drawings: Three sets of bond prints.
         2) Product Data: Three sets.
   2. Samples:
      a. Unless otherwise specified, submit samples in the quantity which is required to be returned, plus 2 which will be retained by the Owner's Representative.
      b. By prearrangement in specific cases, a single sample may be submitted for review and, when reviewed, be installed in the Work at a location agreed upon by the Owner's Representative.

D. Identification:
   1. Properly identify each submittal with name of Project, Contractor, subcontractor, and date.
   2. Accompany each submittal by an acceptable transmittal form referring to Project name and Specifications Section number, and paragraph number, when applicable, for identification of each item.
   3. Consecutively number shop drawings for each Section of work; retain numbering system throughout all revisions.
   4. Allow clear space on each drawing, product datum, and sample for stamp of Contractor and Owner's Representative. Where clear space is not available on samples, submit with tags or stickers attached.

E. Stamp each shop drawing, product datum, and sample to certify that it has been coordinated and checked for completeness and compliance with requirements of the Work, Project, and Contract Documents.

F. Review by Owner's Representative:
   1. General:
      a. Except for finish, color, and other aesthetic matters left to Owner's Representative's decision by Contract Documents, Owner's Representative's review of shop drawings, product data, and samples is only for Contractor's convenience in following work and does not relieve Contractor from responsibility for deviations from requirements of Contract Documents.
      b. Do not construe review by Owner's Representative as a complete check or relief from responsibility for errors or omissions of any sort in shop drawings or schedules or from necessity of furnishing work required by Contract Documents that may not have been shown on shop drawings.
      c. Review of a separate item by Owner's Representative does not indicate review of complete assembly in which it functions.
      d. Review comments of the Owner's Representative (or its consultants) will be shown when it is returned to the Contractor. The Contractor shall make and distribute such copies as are required for its purposes.
   2. Submittals not stamped by Contractor and submittals which, in opinion of the Owner's Representative, are incomplete, contain numerous errors, or have not been checked or have only been checked superficially will be returned to Contractor for resubmittal.
   3. Processing:

a. Owner's Representative will review shop drawings, product data, and samples in accordance with agreed upon "Submittal Schedule" and will return them to Contractor imprinted with stamp of the Owner's Representative.
b. Notations by Owner's Representative which increase Contract cost or time of completion shall be brought to attention of the Owner's Representative before proceeding with work. Failure to do so will result in the increased costs being borne by the Contractor.
c. Each submittal will be stamped indicating appropriate action required of the Contractor.
d. If for any reason the Contractor cannot comply with the notations, Contractor shall re-submit submittal. In the transmittal letter accompanying the re-submittal, clearly describe the reason(s) for not being able to comply with the notations.

G. Consultants' Review:
1. Submittals requiring review by Owner's Representative or its consultants shall be sent to the Owner's Representative. Owner's Representative will forward submittal to applicable consultant for their review.
2. Processing shall be in accordance with consultants stamp.
3. If action required by consultants stamp is not clear, Contractor shall immediately notify the Owner's Representative for a clarification.
4. If returned submittal also includes stamp by the Owner's Representative, processing shall be in accordance with the Owner's Representative's stamp.

H. Revisions:
1. Make revisions pertinent to by comments noted on the submittal.
2. If the Contractor considers any required revision to be a change, they shall so notify the Owner's Representative as provided for in the General Conditions.
3. Show each revision by number, date, and subject in a revision block on the submittal.
4. If for any reason Contractor cannot comply with the notations, Contractor shall resubmit submittal.

I. Revisions after Review: When a submittal has been reviewed by the Owner's Representative, resubmittal for substitution of materials or equipment will not be considered unless accompanied by an acceptable explanation as to why the substitution is necessary, or unless directed by the Owner.

3.02 PROCEDURES FOR INFORMATIONAL SUBMITTALS

A. General:
1. Prepare and submit "Informational Submittals" where required by the Specifications.
2. Number of Copies: Submit PDF as specified for Action Submittals two paper copies of each submittal, unless otherwise indicated. Owner's Representative will not return copies.
3. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
4. Test and Inspection Reports: Comply with requirements specified in Section 01 45 00 – Quality Control.

B. The following items shall be considered "Informational Submittals" whether or not identified as such in the respective Specification Sections.
1. Qualification Data.
2. Certificates for or from the following:
a. Installers.
b. Manufacturers.
c. Products and materials.
3. The following Reports:
a. Material and Product Test Reports.
b. ICC-ES Reports:
c. Preconstruction Test Reports.
d. Compatibility Test Reports.

e. Field Test Reports.
4. Maintenance Data.
5. Design Data.
6. Manufacturer's Instructions.
7. Manufacturer's Field Reports.
8. Insurance Certificates and Bond.
9. Construction photographs as specified .
10. Material Safety Data Sheets (MSDSs).

3.03 PROCEDURES FOR DEFERRED SUBMITTALS

A. Deferred Approval submittals shall first be submitted to the Owner's Representative. If the Owner's Representative reviews the submittal with corrections noted, those corrections must be addressed and the submittal returned to the Owner's Representative. Once the Owner's Representative has no comments on a submittal, it will be returned and shall be resubmitted with approval by all government agencies having jurisdiction."

B. The Contractor shall then submit to these agencies and make revisions required by these agencies until approval by all government agencies having jurisdiction is obtained. See Section 01 11 00 - Summary of Work for further requirements.

C. When approval has been obtained by all governing agencies having jurisdiction, the approved submittal shall be resubmitted to the Owner's Representative for final approval. It is the responsibility of the Contractor to verify acceptability of government agency required revisions with the Owner's Representative. If the resubmittal to the Owner's Representative includes revisions that had not been previously approved by the Owner's Representative in writing, the Owner's Representative has the right to reject these revisions. It is then the Contractor's responsibility to resubmit to government agencies having jurisdiction to obtain approval of the Owner's Representative's noted corrections.

3.04 PROCEDURES FOR CLOSEOUT AND MAINTENANCE MATERIAL SUBMITTALS

A. Number of Copies: Two, unless otherwise directed by Owner's Representative.

B. Comply with additional Closeout Procedures specified for the Project.

3.05 FINAL DISTRIBUTION AFTER REVIEW

A. In addition to copies of submittals required by Contractor, subcontractors, suppliers, and fabricators, Contractor shall make distribution to:
1. Contractor's jobsite file.
2. Project Record Documents file; see additional requirements specified in Section 01 78 39 - Project Record Documents.

END OF SECTION

# SECTION 01 41 00

# REGULATORY REQUIREMENTS

## 1.01 SUMMARY

A. Section Includes:
   1. The codes and regulations applicable to the Work.
   2. Code and regulatory abbreviations used in the Specifications.

B. Related Requirements:
   1. Section 01 42 00 - References, Abbreviations, and Definitions; requirements relating to industry standard references used in the Specification Sections.

## 1.02 APPLICABLE CODES AND REGULATIONS

A. Codes which apply to this Project include, but are not limited to, the following including additions, changes, and interpretations adopted by the enforcing agency in effect as of the date of these Contract Documents the Permit Application.
   1. City of Capitola:
      a. Municipal Codes established by the Building Inspection Commission (BIC) including the Building Code (CBC), Mechanical Code, Plumbing Code, and Electrical Code.
      b. Noise Ordinance.
      c. Construction debris and waste management regulations.
      d. Green Building Standards of CBC Chapter 13C.
   2. State of California Code of Regulations (CCR):
      a. Title 8, Industrial Relations.
      b. Title 19, Public Safety.
      c. Title 24, Building Standards Code.
         1) Part 2, California Building Code.
         2) Part 2.5, California Residential Building Code.
         3) Part 3, California Electric Code.
         4) Part 4, California Mechanical Code.
         5) Part 5, California Plumbing Code.
         6) Part 6, California Energy Code.
         7) Part 8, California Historic Building Code
         8) Part 9, California Fire Code.
   3. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."
      a. Control of Work: Conform to Section 5.
      b. Control of Materials: Conform to Section 6.
   4. The following additional Codes and Standards:
      a. California Occupational Safety and Health Act Standards (Cal-OSHA).
      b. Occupational Safety and Health Act (OSHA).
      c. Air Quality Standards of the Bay Area Air Quality Management District of the California Air Resources Board including emissions and dust during construction.
      d. Americans with Disabilities Act (ADA) Standards.
      e. Environmental Regulations including:
         1) 22 CCR, Section 66260 et seq.; California Hazardous Waste Management Regulations.
         2) 40 CFR, Part 260 et seq.; Hazardous Waste Management System.
         3) 42 USC, Section 6901 et seq.; Resource Conservation and Restoration Act (RCRA).
         4) National Pollutant Discharge Elimination System (NDPES).
      f. National Fire Protection Association (NFPA): Standards 13, 24, 72, and 80.
      g. National Electrical Code (NEC).

B. All work shall meet or exceed the requirements of the above codes.

C. References in the Specifications to "code" or to "building code," not otherwise identified, shall mean the foregoing specified codes, together with the additions, changes, amendments, and interpretations adopted by the enforcing agency and in effect on the date of these Contract Documents. Nothing on the Drawings or in the Specifications shall be interpreted as requiring or permitting work that is contrary to these rules, regulations, and codes.

D. Where other regulatory requirements are referenced in these Specifications, the affected work shall meet or exceed the applicable requirements of such references.

E. Regulatory requirements referred to shall have full force and effect as though printed in these Specifications.

F. Where the Drawings or Specifications call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by said laws, codes, rules, and regulations, the provisions of the Drawings and Specifications shall take precedence over said laws, codes, rules, and regulations.

1.03 OTHER APPLICABLE LAWS AND REGULATIONS

A. All applicable federal, state, and local laws, regulations of governing utility districts, regulations of the state fire marshal, federal, state and local environmental regulations, and the various other authorities having jurisdiction over the construction of the Project shall apply to the Contract throughout and they shall be deemed to be included in the Contract the same as though printed in these Specifications.

B. Discrepancies between these codes, rules, and regulations and the Contract Documents shall be brought to the attention of the Owner's Representative for resolution.

END OF SECTION

# SECTION 01 42 00

# REFERENCES, ABBREVIATIONS, AND DEFINITIONS

## 1.01 SUMMARY

A. Section Includes:
   1. Requirements for standard references used in the various Specification Sections.
   2. Standard reference abbreviations used in the Project Manual.
   3. Definitions of terms used in the Project Manual.

B. Related Requirements:
   1. Section 01 41 00 - Regulatory Requirements

## 1.02 STANDARD SPECIFICATIONS

A. The Contract Documents contain references to various standard specifications, codes, practices, and requirements for materials, work quality, installation, inspections, and tests published and issued by the organizations, societies, and associations. Such references are hereby made part of the Contract Documents to the extent required.

B. When standard specifications are included by abbreviation and number only, it is assumed that the Contractor is familiar with and has ready access to the specified standards.

C. When the effective date of a reference standard is not given, it shall be understood that the current edition or latest revision thereof and any amendments or supplements thereto in effect on the date of original issue of these Contract Documents, as indicated on the cover, shall govern the Work.

D. Reference standards are not furnished with the Contract Documents, because the Contractor, subcontractors, manufacturers, suppliers, and the trades involved are assumed to be familiar with their requirements.

E. Contractor shall obtain its own copies of required specified referenced publications.

F. The specification or standard referred to shall have full force and effect as though printed in these Specifications.

G. In addition to those standards specifically referenced in the Specifications, comply with the accepted industry standards and trade association recommendations for the respective portions of Work.

H. In the case of difference between referenced standards and the Contract Documents, the most stringent requirements prevail.

## 1.03 STANDARD SPECIFICATION ABBREVIATIONS

A. In addition to abbreviations indicated on the Drawings, references in the Project Manual to trade associations, technical societies, recognized authorities, and other institutions may include the following organizations, which are sometimes referred to by only the corresponding abbreviations. Not all abbreviations are listed, and not all listed abbreviations are used.

B. Abbreviations:

| | | |
|---|---|---|
| 1. | AA | Aluminum Association |
| 2. | AAADM | American Association of Automatic Door Manufacturers |
| 3. | AAMA | American Architectural Manufacturer's Association. |
| 4. | AASHTO | American Association of State Highway and Transportation Officials |

5. ACI American Concrete Institute
6. AEIC Association of Edison Illuminating Companies
7. AIA American Institute of Architects
8. AIEEE American Institute of Electrical and Electronic Engineers
9. AISC American Institute of Steel Construction, Inc.
10. AFI Air Filter Institute
11. AJCHN American Joint Committee on Horticultural Nomenclature
12. AMCA Air Moving and Conditioning Association
13. ANSI American National Standards Institute
14. APA APA - The Engineered Wood Association
15. ARI American Refrigeration Institute
16. ASHRAE American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.
17. ASLA American Society of Landscape Architects
18. ASME American Society of Mechanical Engineers
19. ASSE American Society of Sanitary Engineering
20. ASTM American Society for Testing and Materials
21. AWMAC Architectural Woodwork Manufacturers Association of Canada
22. AWPA American Wood Protection Association
23. AWI Architectural Woodwork Institute
24. AWS American Welding Society, Inc.
25. AWWA American Water Works Association
26. BHMA Builder's Hardware Manufacturers Association
27. CBC California Building Code
28. CRA California Redwood Association
29. CSI Construction Specifications Institute
30. CLFMI Chain Link Fence Manufacturers Institute
31. CRSI Concrete Reinforcing Steel Institute
32. CS Commercial Standard of National Bureau of Standards, U.S. Department of Commerce
33. DHI Door and Hardware Institute
34. FGMA Flat Glass Marketing Association
35. FM Factory Mutual
36. FS Federal Specification of General Services Administration
37. GA Gypsum Association
38. ICC-ES International Code Council Evaluation Service, Inc.
39. MIL Military Specification of U.S. Department of Defense
40. NAAMM National Association of Architectural Metal Manufacturers
41. NAAWS North American Architectural Woodwork Standards
42. NAFM National Association of Fan Manufacturers
43. NBS National Bureau of Standards
44. NEC National Electric Code
45. NEMA National Electrical Manufacturers' Association
46. NFC National Fire Code
47. NFPA National Fire Protection Association
48. NIST National Institute of Standards and Technology
49. NLMA National Lumber Manufacturers Association
50. NSF National Sanitation Foundations
51. PCI Precast Concrete Institute
52. PDI Plumbing and Drainage Institute
53. RIS Redwood Inspection Service [Grading Rules]
54. SDI Steel Deck Institute
55. SDI Steel Door Institute
56. SFPA Southern Forest Products Association
57. SMACNA Sheet Metal and Air Conditioning Contractors' National Association, Inc.
58. State of California:
    a. Caltrans Business and Transportation Agency, Department of Transportation

b. SFM Office of State Fire Marshal
c. DSA Division of State Architect.
59. SSPC SSPC: The Society for Protective Coatings
60. TCNA Tile Council of North America
61. UL Underwriters' Laboratories, Inc.
62. WCLIB West Coast Lumber Inspection Bureau
63. WDMA Window and Door Manufacturers Association
64. WI Woodwork Institute
65. WMMP Wood Moulding & Millwork Producers Association
66. WRCLA Western Red Cedar Lumber Association
67. WWPA Western Wood Products Association.

1.04 DEFINITIONS

A. Reference to Drawings: Where the words "shown", "indicated", "detailed", "noted", "scheduled". or words of similar import are used, it shall be understood that reference is made to the Drawings accompanying these Specifications, unless otherwise noted.

B. Addendum: The word "Addendum" shall mean written and/or graphic modifications to the Contract documents provided to holders of the Contract Documents prior to the opening of bids. Addenda shall be issued by the Owners Representative.

C. Alternates: The word "Alternates" shall be understood to mean alternate products, materials, equipment, systems, methods, units of work or elements of the construction, which may, at the Owners option and under the terms established by the Contract Documents, be added to, or deleted from the work.

D. Approvals: The words "approved", "approval", "acceptable", "acceptance", shall mean acceptance by the Owners Representative is required.

E. Contract Change Order: The words "Contract Change Order" shall mean a change order authorization to the Contractor, covering changes to the Contract found by the Owner Representative to be necessary for the proper completion or construction for the whole work required by the Contract, and establishing the basis of payment and/or time adjustments for the work affected by the changes, also sometimes referred to as a "Change Order."

F. Contract Documents: The words "Contract Documents" shall mean the documents contained within the General Conditions, Special Provisions of the Contract, the Drawings, the Specifications, Change Orders, and other modifications issued by the Owners Representative prior to and after execution of the Contract and identified as a Contract Document. [The words "Contract Documents" shall mean those documents as defined in the General Conditions.]

G. Directions: The words "directed," "designated," and "selected" shall mean the directions, designations, selection, of the Owners Representative, unless otherwise noted.

H. Drawings: The word "Drawings" shall mean the official Project bid or construction plans, plan details, profiles, typical cross sections, working drawings, shop drawings, supplemental drawings, and/or reproductions thereof, accepted or issued by the Owners Representative, which show the locations, character, dimensions, and details of work to be performed. All such documents are to be considered as a part of the Drawings.

I. Equals: The words "or equal," "equal to," "approved equal," "or approved equal," “accepted equal,” and "equivalent," shall mean "equal to or acceptable in the opinion of the Owners Representative," unless stated otherwise.

J. Language: Words and phrases requiring an action or performance, such as "perform," "provide," "install," "furnish," "connect," "test," "coordinate," and words and phrases of similar import, shall be understood to be preceded by the phrase "The Contractor shall" unless otherwise stated.

K. Modifications: The word "modifications" shall mean a written amendment to the Contract signed by both parties to the Construction Contract, a Change Order, a written interpretation issued by the Owners Representative or a written order for a minor change in the work issued by the Owners Representative.

L. Notice To Proceed: The words "Notice to Proceed" shall mean the written notice issued by the Owners Representative to the contractor fixing the date on which or within which dates the contractor shall start to perform the contractor's obligations under the Contract Documents.

M. Perform: The word "perform" shall mean that the contractor, at their expense, shall perform all operations including necessary labor, tools, and equipment and further including the furnishing and installation of materials that are indicated, specified, and required to complete such the conditions of the Contract and Contract Documents.

N. Project: The word "project" shall mean the total construction of the work performed under the Contract Documents.

O. Provide: The word "provide" shall mean that the Contractor, at its expense, shall furnish and install the work, complete in place and ready for use, including furnishing of necessary labor, materials, tools, equipment and transportation.

P. Required: The word "required" shall mean "as required to properly complete the work and as required and acceptable to the Owner's Representative" unless otherwise noted.

Q. Shop Drawings: The words "shop drawings" shall mean drawings, diagrams, schedules, and other data specifically prepared for the work by the contractor or their sub-contractor, manufacturer, supplier, or distributor to illustrate some portion of the work.

R. Site: The words "Site" or "Sites" shall be understood to mean the property or properties described within the Contract Documents and indicated on the Drawings where the work shall commence.

S. Substantial Completion: The words "substantial completion" shall mean the time and date when the work, or designated portion thereof, is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the work, or designated portion thereof, for the use for which it was intended, as evidenced by the Owner's Certificate of Substantial Completion. The Certificate of Substantial Completion shall set forth the date on which Substantial Completion is deemed by the Owners Representative in its sole discretion to have occurred. This shall occur only when the site improvements are 100 percent complete and shall exclude correction of final punch list items(s) and the execution of the Landscape Maintenance Period. The issuance of a Certificate of Substantial Completion shall signify the date on which the accounting of Contract "Working Days" or "Calendar Days" is terminated insofar as they may relate to Liquidated Damages.

T. Work: The word "work" whether capitalized or in lower case, shall be understood to mean labor, materials, or both, and the entire construction encompassed by the Contract Documents.

END OF SECTION

# SECTION 01 45 00

# QUALITY CONTROL

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Testing and inspection requirements.
   2. Testing Agency qualifications.
   3. Manufacturer's field services.

B. Related Requirements:
   1. Inspections and Testing Required by Laws, Ordinances, Rules, Regulations, Orders, or Approvals of Public Authorities: Conditions of the Contract.
   2. Additional requirements for inspections and testing are included in the General Conditions.

### 1.02 TESTING LABORATORY SERVICES

A. General:
   1. Requirements for testing are included in governing codes and described in various Sections of the Specifications.
   2. The Owner will employ and pay for the services of an Independent Testing Agency to perform testing and inspection requirements required by code and other tests and inspections when specified to be performed and paid for by the Owner. Employment by the Owner of the Testing Agency shall in no way relieve Contractor's obligations to perform the Work of the Contract.
   3. Tests required by the Specifications and not specified or required by Code to be performed and paid for by the Owner shall be performed by a testing laboratory employed and paid for by the Contractor and meeting the qualification requirements specified in this Section.
   4. Where no testing requirements are described, but the Owner decides that testing is required, the Owner may require such testing be performed under current pertinent standards for testing. Payment for such testing will be by the Owner.
   5. Inspections, tests, and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with the Contract Documents.

B. Qualification of Testing Agency:
   1. Meet "Recommended Requirements for Independent Laboratory Qualification," published by American Council of Independent Laboratories.
   2. Meet basic requirements of ASTM E329, "Use in the Evaluation of Testing and Inspection Agencies as Used in Construction."
   3. Authorized to operate in the State of California.

C. Limitations of Authority of Testing Agency: Testing Agencies are not authorized to:
   1. Release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Approve or accept any portion of the Work.
   3. Perform any duties of the Contractor.

D. Testing Agency Duties:
   1. Cooperate, together with Contractor, in notifications, information, scheduling, storage, and access as necessary to meet requirements for service without causing delays on Project.
   2. Perform specified inspections, sampling, and testing of materials and methods of construction.
   3. Comply with specified standards.
   4. Ascertain compliance of materials with requirements of Contract Documents.

5. Notify Owner's Representative and Contractor when test or inspection reveals undesirable conditions, nonconformance, or failure to meet requirements.
6. Promptly submit written report of each test and inspection, with copies to Owner's Representative, Contractor, and governing agencies as required.
    a. Include all samples taken and tests made, regardless of results.
    b. Include reports to show specified requirements, and state whether or not test results comply with requirements.
7. Perform additional tests as required by the Owner's Representative.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. It is the Contractor's responsibility to coordinate the services of all testing and inspection required by the separate Specification Sections whether or not to be performed by the Owner's or Contractor's Testing Agency.

B. Contractor shall furnish promptly, without additional charge, all reasonable facilities; labor and materials necessary for safe, thorough, and convenient inspection; and tests that may be required by the Contract Documents.

C. Prepare and submit to Owner's Representative a schedule of tests required of the Testing Agencies at least 15 working days in advance of first test. In addition, Contractor shall give minimum 48 hours' notice to the Testing Agency prior to required tests and inspections.

D. Furnish, prepare, and deliver test samples and specimens as required by the Testing Agency except where such preparation and handling are to be performed by Testing Agency. Contractor shall be solely responsible for delays due to such samples' not being submitted and resubmitted, if necessary, in the time required for tests or inspections before material is incorporated into the Work.

E. Cooperate with Testing Agency personnel in providing access to materials being tested or inspected.

F. Make necessary repairs to in-place work caused by removal of required test samples.

G. Materials furnished and installed on the Project shall be equal to approved test samples in every respect.

H. Samples which are of value after testing will remain the property of the Contractor, but no such samples shall be incorporated in the Work without written approval of the Owner's Representative.

I. Costs associated with testing, inspections, and observations due to the following shall be the responsibility of the Contractor:
1. Re-testing due to failure of initial samples.
2. Unacceptable changes in sources, lots, or suppliers of materials after original testing established compliance.
3. Changes in methods or materials of construction by contractor that require testing, inspection, or other related services in excess of those required by original design.
4. Failure to properly notify the Owner's Representative at critical stages of construction.
5. Requesting testing, inspection, and/or observation of work not ready.

1.04 QUALITY ASSURANCE

A. Materials furnished and work performed under the Contract shall be subject to review by the Owner's Representative. The Contractor shall be held strictly to the requirements of the Contract Documents regarding quality of materials, workmanship, and diligent execution of the Contract. Review by the Owner's Representative may include mill, plant, shop, or field review as deemed necessary.

B. Work performed in the absence of any prescribed inspection or observation may be subject to removal and replacement. In such a case, the entire cost of removal and replacement shall be borne by the Contractor, regardless of whether the work removed is found to be defective or not.

1.05 CONFLICTING REQUIREMENTS

A. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Owner's Representative for a decision before proceeding.

B. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Owner's Representative for a decision before proceeding.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXAMINATION OF CONDITIONS

A. Prior to installing any portion of the work, the Contractor shall examine the site and verify that site conditions are acceptable to begin work of each section.

B. Verify that work specified elsewhere has been completed to an appropriate stage to begin work of each section.

C. Materials or products requiring installation under the supervision or inspection of a specific materials manufacturer or manufacturer's representative shall be examined and/or tested, and accepted in writing, by such representative(s) prior to installation of work.

D. Notify the Owner's Representative immediately in writing of any irregularities or unacceptable conditions and re-direct work to avoid delay.

E. Start of work by Contractor shall indicate Contractor's acceptance of site conditions.

3.02 TOLERANCES

A. Tolerances not specifically identified shall meet the written standards and/or recognized commercial tolerances established for the specific materials or product. Refer to Section 01 42 00 - References.

3.03 REQUIRED TESTS AND INSPECTIONS

A. "Special Inspections" as required by the CBC.

B. Additional Tests and Inspections: See the various technical Sections of the Specifications.

3.04 FAILURE TO PASS TESTS

A. Failure of any material or article to pass specified tests will be sufficient cause for refusal to consider any further samples of the same brand or make of that material or article.

B. Where an individual material is to be part of an assembly with other materials for incorporation in the Work, failure of the material to pass specified tests or to conform to indicated standards will be sufficient cause for its rejection and removal and replacement, regardless of whether tests or inspections have been made or not in an assembled or in an unassembled condition.

C. When tests indicate non-compliance, the Contractor shall pay all direct and indirect costs of subsequent re-testing until compliance is established.

3.05 MANUFACTURER'S FIELD SERVICES

A. When specified in respective Specification Sections, Contractor shall require supplier or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, testing, adjusting and balancing of equipment as applicable, and to make appropriate recommendations. Contractor is responsible for proper notification of manufacturer's representative before installation of applicable work and for obtaining necessary inspection certificate stating that installation was observed and approved.

B. Product Performance Verification: The supplier of products specified based on performance criteria shall, at the request of the Agency, inspect the installed product and certify conformance of the product to specified criteria under the installed conditions.

C. Manufacturer's representative shall submit written report to the Owner's Representative listing observations and recommendations.

END OF SECTION

# SECTION 01 50 00

# TEMPORARY FACILITIES AND CONTROLS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Temporary facilities and controls needed for the Work during construction including, but not necessarily limited to:
   1. Temporary utilities.
   2. Sanitary facilities.
   3. Enclosures such as coverings, barricades, and fences.
   4. Site security.

B. Related Requirements:
   1. Equipment normally furnished by individual trades in execution of their portions of the Work shall comply with requirements of pertinent safety regulations.
   2. Permanent installation and hookup of utility lines are included under other Sections.

### 1.02 SELECTED REFERENCE AND REGULATORY REQUIREMENTS

A. National Fire Protection Association (NFPA):
   1. 10 - Portable Fire Extinguishers.
   2. 241 - Safeguarding Building Construction and Demolition Operations.

B. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 GENERAL

A. Furnish, install, and pay for meters, equipment, wiring, and piping necessary to provide such utilities.

B. Additional requirements for construction facilities and temporary controls are included in the General Conditions.

C. Provide written notification to the Owner to request use of new building equipment for temporary facilities. New building equipment shall not be used for temporary facilities without prior written approval from Owner.

### 1.04 REQUIREMENTS FOR REGULATORY AGENCIES

A. Comply with applicable standards referenced in Section 01 42 00 - References, Abbreviations, and Definitions.

B. All facilities shall be provided and maintained by the contractor in accordance with Cal-OSHA and applicable laws and ordinances.

C. Contractor shall:
   1. Take suitable steps to ensure that public utilities encountered in connection with the Work will not be damaged.
   2. Send notices, make necessary arrangements, and provide services required for the care of gas mains, water pipes, sewer pipes, conduits, cables, and other equipment or property.

3. Arrange with utility companies for fees required to move or remove their meters, poles, cables, guy wires, or equipment in or set under the property which will interfere with the construction work or which will not be required in the new construction.

## PART 2 - TEMPORARY FACILITIES AND CONTROLS

### 2.01 MATERIALS

A. General: Materials may be new or used but shall be adequate in capacity for the required usage, shall not create unsafe conditions, and shall not violate requirements of applicable codes and standards.

B. Tools, extension cords, and electrical equipment shall conform to Underwriters' Laboratory standards and OSHA requirements and shall be in proper working order to preclude hazard to occupants and premises.

### 2.02 UTILITY SERVICES

A. Power and Lighting: Furnish, install, and maintain temporary wiring, poles, meter board, service entrance switch, lamps, and equipment as necessary to provide temporary lighting and power for the construction site.
   1. Pay all costs for temporary electrical systems required for construction.
   2. Source of power shall be at location on site acceptable to the Owner's representative. Required temporary transmission lines shall be arranged by contractor in conjunction with the appropriate utility company.

B. Water:
   1. Install temporary piping and valves downstream from permanent (new) meter locations as acceptable to the Owner's representative. No temporary water services shall be installed prior to meter installation without prior Owner review and acceptance.
   2. Temporary water facilities shall be installed with an acceptable reduced pressure backflow prevention unit furnished and installed by the contractor.
   3. Locate temporary sources of water route, and construct pipelines so that they do not create a hazard or interfere with public access, traffic, or construction operations.
   4. Design and construct such pipelines.

C. Utility Costs for Contractors: Distribution of temporary utility services to sub-contractors shall be Contractor's responsibility and cost.

### 2.03 TEMPORARY TELEPHONE AND INTERNET SERVICE

A. Contractor shall arrange, provide, and pay for the following temporary service at the site.
   1. A cell phone line and phone for the Contractor's Superintendent.
   2. Internet access for laptop or another acceptable internet access device.

### 2.04 TEMPORARY SANITARY FACILITIES

A. Provide, pay for, install, and maintain, for duration of the Work, necessary enclosed toilet and sanitary facilities for construction personnel.
   1. Sanitary facilities shall be provided, maintained with supplies as required for the number of construction personnel in compliance to local regulations.
   2. Locate such facilities a reasonable distance from all working areas.

B. New or existing restroom facilities, if available, shall not be used by construction personnel except with written permission from the Owner.

2.05 FIRST AID

A. Provide and maintain first aid supplies as required Cal-OSHA and applicable local ordinances.

B. Make arrangements with local emergency center and nearest hospital to receive personnel requiring medical attention, including emergencies. Information for emergency center shall be conspicuously displayed at the construction office when an office is required on the Project.

2.06 STORAGE ENCLOSURES

A. Provide sheds and enclosures necessary for storing applicable materials and equipment.

B. Enclosures shall be conveniently located, substantially and neatly constructed, and weather tight.

C. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.

D. For exterior storage of fabricated products, place on sloped supports, above ground.

E. Provide off-site storage and protection when site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of product.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent contamination by foreign matter.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

J. Hazardous or Flammable Materials:
   1. Use and store hazardous or flammable chemicals, liquids, or gases brought into the Project site in approved containers, conforming to local, state, and national fire codes.
   2. Use hazardous materials in a manner that will prevent their accidental release into other areas.
   3. Do not discard hazardous materials into the jobsite waste-disposal facilities.
   4. Remove empty containers from the premises immediately and disposed of in a legal manner.

2.07 STAGING AND HOISTS

A. Furnish and maintain hoists, staging, rigging, and runways required in the execution of the Work.

B. Erect, equip, and maintain temporary work in accordance with the statutes, laws, ordinances, rules, or regulations of the state or other authorities and state-approved insurance companies having jurisdiction.

2.08 SAFETY AND PROTECTION

A. General:
   1. Follow construction procedures necessary to provide a safe working condition through all phases of the Project. Procedures shall conform to the Safety Orders, Division of Industrial Safety, Title 8, California Code of Regulations.
   2. Conform to applicable requirements of the State Occupational Safety and Health Administration.

3. The Owner, Owner's Representative, and field inspectors are not hired to review or approve safety procedures followed by the Contractor.

B. Contractor is solely responsible for outlining safety procedures to be followed by its workers, subcontractors, and related trades working on its Project. Provide for safety of the public both day and night where they are exposed to construction operations.

C. Contractor shall also take whatever care is necessary to avoid damage to existing facilities or utilities to remain, whether on the Project or adjacent to it, and shall be liable for any damage thereto or interruption of service as a result of its operations.

D. Provide fences, barricades, railings, warning lights, lights and other protection required by law, Contract Documents, and common sense to ensure public safety.

E. Give adequate warning to the public at all times whenever a dangerous condition exists as the result of construction work. Furnish Owner's Representative with name, address, pager number and local telephone number of the superintendent responsible and at least one other person for the maintenance of barriers, signs, lights, and other accident prevention devices for evenings and weekends.

F. Protection of Work and Facilities:
1. Protect adjacent property, roads, streets, curbs, planting areas, erosion control materials and other improvements during construction operations. All damaged materials shall be replaced and/or repaired at the expense of the contractor and to the satisfaction of the Owner's Representative.
2. Protect installed work and provide special protection where applicable.
3. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
4. New turf areas shall be fenced off during turf establishment and specified Landscape Maintenance Period subject to the discretion of the Owner's Representative.
5. Contractor shall install temporary construction fencing per contract documents and place signage on the fence stating, "Construction Area – Keep Out" and "No Trespassing". Signs shall be located along fence every 75 feet.

G. Vehicular Safety: Motorized and/or self-propelled construction equipment shall be equipped with a hub-cap type reverse signal alarm.

2.09 WATER CONTROL

A. Furnish and maintain pumps or other devices that may be required by Contractor's work under this Contract.

B. The Work shall be kept free of standing water during construction.

2.10 MAINTENANCE OF TRAFFIC, ACCESS, AND PARKING

A. Throughout progress of work, do not interfere with use of or access to adjacent buildings or property.

B. Construct, designate and maintain specific vehicular access as required for the orderly progress of the work.
1. Engineer construction access roads and parking areas as necessary to provide suitable support during all weather conditions for anticipated loads, including municipal fire apparatus.
2. Provide adequate surface drainage without interrupting natural flow of existing drainage.

C. Parking:

1. Provide temporary on-site parking to accommodate construction personnel and Owner's Representative to the greatest extent possible. Coordinate location with the Owner's Construction Coordinator.
2. Contractor shall make arrangements for offsite parking, if required, with adjacent public parking facilities to accommodate vehicles of construction personnel. Cost of parking is the responsibility of the Contactor and/or its subcontractor.

D. Restore temporary vehicular access and parking areas to original or specified conditions prior to Project Final Acceptance.

E. Move and relocate traffic signs and signals, controls, power and light poles, and similar utility and public service items obstructed by Project barricades and operations.

F. Maintain accessibility from street at all times to fire hydrants within construction area.

G. Construction traffic shall be routed, whenever possible, to avoid noise impacts on the surrounding neighborhood.

H. Construction period for trucks hauling fill and piling materials shall be restricted to nonpeak hours to minimize impact to rush hour traffic and to avoid noise impacts on the surrounding existing residential areas.

I. Vehicles (wheels in particular) shall be cleaned before leaving site so as to minimize impact on City streets.

J. Clean and sweep all streets muddied or littered from construction activity to the satisfaction of the City.

2.11 HAUL ROUTES

A. Comply with any and all local governing ordinances and guidelines.

2.12 FIRE PROTECTION

A. Take precautions to prevent and eliminate fire hazards. The Contractor shall be responsible for providing, maintaining, and enforcing any necessary or required fire prevention safeguards until project final acceptance.

B. Provide fire extinguishers on the premises during the course of construction of the type and sizes recommended by the NFPA 10 and NFPA 241 to control fires resulting from the particular work being performed. Instruct employees in their use. Place extinguishers in the immediate vicinity of the work being performed, ready for use.

C. Fire Inspection: The Contractor's Superintendent shall inspect the entire project as necessary to make certain the required precautions are being maintained.

D. Combustible and/or flammable Building Materials: Only an appropriate working supply of flammable fuel or building materials shall be located inside storage facilities.

E. During the use of hazardous equipment, such as acetylene torches, welding equipment, bitumen kettles, and similar devices, no work shall start or equipment used unless fire extinguishers of specified type and capacity are placed in the working area and available for use by workmen using such hazardous equipment. Extinguishers shall meet standards established by Underwriter's Laboratory and shall be inspected at regular intervals and recharged by the contractor, as necessary.

F. Combustible and/or flammable Waste Materials. Oil-soaked rags, papers, and other highly combustible materials must be stored in closed metal containers with tightly-hinged lids at all times, and shall be removed from the site at the close of each day's work and more often when necessary.

2.13 TOOL AND ELECTRICAL EQUIPMENT

A. Tools, extension cords, and electrical equipment shall conform to Underwriters' Laboratory standards and OSHA requirements and shall be in proper working order.

2.14 TEMPORARY SIGNS AND NOTICES

A. Contractor shall post and maintain all signs and notices required by law or ordinance. No advertisements will be permitted on the premises without approval of the Owner.

2.15 TRASH REMOVAL

A. Store trash or rubbish resulting from construction within the Contract work area.

B. Provide the necessary on-site containers for the collection of recycling materials, waste materials, and debris.

C. Remove waste materials and debris from the site periodically and dispose of at recycling centers or legal disposal sites in accordance with governing construction and demolition debris regulations.

D. Keep the work area clean at all times. Increase frequency of trash removal, when requested by the Owner, to conform to this requirement.

E. Waste material and debris shall not be buried at the site.

F. Burning of trash and debris on the site will not be permitted.

2.16 SECURITY

A. All site security shall be the responsibility of the Contractor at its expense and no additional cost to Owner.

B. Employment of security personnel for non-construction hours shall be left to the discretion of the Contractor, who shall be fully responsible for any theft or damage to any material, equipment or to portion of the work until Project Final Acceptance.

C. Security provisions shall be provided 24 hours a day, 7 days a week, including holidays, until acceptance of the Project by Owner.

D. If security personnel are used, provide Owner's Representative with the name and pager number or 24-hour telephone number of a contact person who shall have primary responsibility for security.

E. Contractor is strongly encouraged to provide site security during installation and curing of the track surfacing in order to prevent damage to surfacing.

2.17 DUST CONTROL

A. Blowing dust shall be reduced by timing construction activities so that paving begins as soon as possible after completion of grading and by landscaping disturbed soils as soon as possible.

B. All portions of the site shall be watered as many times a day as required to ensure proper dust control seven (7) days a week for the duration of the Project.
   1. Sprinkle unpaved construction areas with water at least twice per day or as necessary to eliminate dust.
   2. Cover stockpiles of soil, sand, and other similar materials.
   3. Cover trucks hauling debris, soil, sand, and other similar materials.

C. The Contractor shall obtain reclaimed water from the City, if available, for compliance with the above requirements.

D. The Contractor shall maintain and operate construction equipment so as to minimize exhaust emissions of PM10 and other pollutants by means of the following:
   1. Prohibition on idling of motors of equipment that is not in use and by waiting trucks.
   2. Implementation of specific maintenance programs to reduce emissions for equipment in frequent use during construction.

PART 3 - EXECUTION

3.01 SYSTEMS

A. Maintain and operate systems to assure continuous service.

B. Modify and extend systems as work progress requires.

3.02 STORM WATER POLLUTION PREVENTION

A. Contractor shall be required to adhere to the project's Storm Water Pollution Prevention Plan (SWPPP) prepared and approved for this Project.

3.03 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the work.

B. Completely remove temporary materials and equipment when their use is no longer required.

C. Clean and repair damage caused by temporary installations or use of temporary facilities.

D. After removal of temporary facilities, restore existing facilities used for temporary services back to an "as was" or better condition subject to the discretion of the Owner's Representative.

E. Full compensation for cleanup shall be included in other items of work. No separate compensation will be allowed for work pertaining to cleanup or disposal of material.

END OF SECTION

# SECTION 01 71 23

# FIELD ENGINEERING

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Field engineering services for proper completion of the Work including, but not necessarily limited to:
   1. Establishing and maintaining lines and levels.
   2. Structural design of shoring, forms, and similar items provided by the Contractor as part of its means and methods of construction.
   3. Excavations and elevations, footings and piers required for installation of work items.
   4. Establishing horizontal and vertical control for site construction items.

B. Related Requirements:
   1. Section 01 78 29 - Conformance Survey

### 1.02 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Informational submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

### 1.03 INFORMATIONAL SUBMITTALS

A. Name and address of surveyor or professional engineer to the Owner's Representative.

B. Upon request of the Owner's Representative, 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.

### 1.04 QUALITY ASSURANCE

A. Contractor shall employ a California Registered Civil Engineer or Licensed Land Surveyor, hereafter referred to as Surveyor, to lay out the entire work and set grades, lines, levels, and positions throughout the site.

### 1.05 SURVEY REFERENCE POINTS

A. Existing horizontal and vertical control points for the Project are those designated on the Drawings Owner's original survey. Locate and protect these control points prior to starting site work and preserve permanent reference points during construction.

B. Do not change or relocate reference points or items of the work without specific review and acceptance by the Owner's Representative.

C. Promptly advise the Owner's Representative when a reference point is lost, destroyed, or requires relocation because of other changes in the work. Upon direction of the Owner's Representative, replace reference stakes or markers according to the original or appropriate survey control.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 LAYING OUT THE WORK

A. Prior to beginning work, locate or set all general reference points, benchmarks, establish monuments and take action as necessary to prevent their destruction, then layout all lines, elevations, and measurements for entire work.

B. Verify figures and dimensions shown on the Drawings and son surveys furnished by the Owner before starting work. Notify the Owner's Representative immediately of any discrepancies and re-direct work to avoid delay.
   1. Contractor shall accept responsibility for errors resulting from failure to notify Owner's Representative of known discrepancies.
   2. Offsets will be as agreed upon, in writing, by the Contractor and the Owner's Representative.

C. Establish monuments on curbs, manholes or pavements with concrete embedded steel pipe with lead plug and/or brass nail with washer, as acceptable to the Owner's Representative.

D. Verify layout from time to time as work progresses.

3.02 RECORDS

A. Maintain a complete and accurate log of all control and survey Work as it progresses in accordance with the requirements of Section 01 78 39 - Project Record Documents. Show exact locations of the monuments if any are disrupted or destroyed.

END OF SECTION

# SECTION 01 78 29

# CONFORMANCE SURVEY

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Conformance surveying required for proper completion of the work including, but not necessarily limited to, the following:
   1. Synthetic turf construction, including subgrade and base preparation.
   2. Playground resilient surfacing including subgrade and base preparation, resilient surface paving, and adjacent finish surface/edges/curbing.
   3. Other applicable Project components.

B. Related Requirements:
   1. Section 01 33 00 – Submittal Procedures
   2. Section 01 71 23 – Field Engineering
   3. Section 01 78 39 – Project Record Drawings
   4. Section 31 20 00 – Earth Moving
   5. Section 32 11 00 – Base Courses
   6. Section 32 12 16 – Asphalt Paving
   7. Section 32 18 00 – Miscellaneous Paving and Surfacing
   8. Section 32 90 00 – Planting

### 1.02 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

### 1.03 ACTION SUBMITTALS

A. Conformance Survey: In addition to required prints, submit 1 electronic copy in AutoCAD or scaled PDF image of all conformance surveys for the Project. Review response by the Owner Representative shall identify any areas out of tolerance.

### 1.04 INFORMATIONAL SUBMITTALS

A. Name and address of Contractor's licensed surveyor to the Owner's Representative.

### 1.05 QUALITY CONTROL AND REWORK

A. Contractor shall retain a California Licensed Land Surveyor to obtain survey data and supervise preparation of the Conformance Surveys as specified.

B. Portions of a survey that does not conform to the grading tolerance requirements identified in this Section will be corrected by the Contractor at its expense. Areas out of conformance shall be resurveyed at the Contractor's expense by its Surveyor. Revised points shall be added to the original digital file for resubmittal, review, and acceptance by the Owner Representative.

C. Delays and costs incurred due to grades out of conformance are the sole responsibility of the Contractor. At any time during construction and following acceptance of a portion of the survey by the Owner, the Owner reserves the right to recheck the surface grades at its expense to verify it is still in conformance.

D. It is the Contractor's responsibility to protect the grading and compaction tolerances of surveyed surfaces after Conformance Surveying operations are complete and accepted, and prior to installation of subsequent materials.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 LAYING OUT THE WORK

A. Prior to beginning work, Contractor shall secure the electronic grading plan from the Owner for use by the Surveyor.

B. The Contractor's Surveyor shall provide all conformance survey drawings. The drawings shall provide both the design elevations and the as-constructed spot elevations. These elevations shall be for comparison to those on the Contract Documents for the same location. Contractor shall also show the difference in these two numbers. Unique reference numbers shall be assigned to each point for reference purposes. For spacing requirements, refer to specific type of improvement identified in this Section.

C. Accuracy of the Contractor's surveys provided under this Section shall be to 0.01 feet.

D. The Contractor's Licensed Surveyor shall provide all conformance survey drawings and all 25-foot grid or other grid conformance grades based on the designed grades shown on the Drawings.

3.02 RESILIENT SURFACING & SYNTHETIC TURF SUBGRADE AND BASE CONFORMANCE SURVEYING

A. General: The stone grades shall not vary from the specified grades more than 1/4-inch (0.02) feet at any location when measured in any direction. In addition, no two adjacent points within the grid shall cumulatively deviate more than 1/2-inch (0.04 feet) from point to point of the design grades.

B. Subgrade:
   1. Contractor shall verify that subgrade has been prepared according to the Specifications with regard to compaction and grade tolerances and is free of debris, non-compactable material, topsoil, or organics prior to beginning work.
   2. Prior to acceptance of the subgrade, a Conformance Survey shall be prepared by the Contractor and a digital file submitted to the Owner Representative as specified. The survey shall be based on a 20-foot grid showing the field crown, the center of the subgrade elevation of the subdrain trench edges, perimeter of the field at edge finish grade and curb finish surface. The plan shall show the comparison of the design grades versus the as-constructed grades.
   3. Top of subgrade elevations shall be verified using laser-operation survey instruments. Grades at each point shall be within plus or minus 1/2-inch (0.04 feet) from the elevations shown on the Drawings. In addition, no two adjacent points within the grid shall cumulatively deviate more than 3/4-inch (0.06 feet) from the respective points' design grades.

C. Completed Stone Base:
   1. Prior to acceptance of the stone base, a Conformance Survey will be prepared by the Contractor's Surveyor and submitted by the Contractor to the Owner's Representative as specified.
   2. The survey shall be based on a 25-foot grid showing the field crown, perimeter of the field and adjacent curb edge.
   3. The survey plan shall show the comparison of the design grades versus the as-constructed grades.
   4. A portion of the survey that does not conform to the requirements identified above shall be corrected by the Contractor.

a. Areas out of conformance shall be resurveyed following the identical procedure stated above by the Surveyor, and these revised points shall be added to the original digital file for review and acceptance by the Owner's Representative.
b. Delays and costs incurred due to grades out of conformance are the sole responsibility of the Contractor.

5. It is the Contractor's responsibility to protect the grading and compaction tolerances of the base after conformance survey is complete and prior to installation of the synthetic turf.

D. Finish surface planarity shall be verified, and if necessary adjusted, by the Contractor using the string line method.
1. A mason's line held taught between two workers separated by a distance of approximately 40 feet shall be placed directly on the finished surface parallel to the direction of greatest slope.
2. A third worker shall check for separations between the mason's line and the finished surface that are equal to or greater than the specified tolerances.
3. Entire finished surface shall be "walked" with mason's line in increments of approximately 3 feet.
4. Areas of separation shall be outlined with marking paint and the depth of separation indicated.

END OF SECTION

# SECTION 02 41 13

# SITE CLEARING AND DEMOLITION

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Site clearing and demolition work and related activities as shown on the Drawings and specified herein. The general extent of the site clearing and demolition work includes, but is not necessarily limited to, the following:
   1. Demolition, removal and disposal of designated items.
   2. Careful removal, protection and re-installation of designated items.
   3. Careful removal and salvage of designated items.
   4. Disconnection and capping of existing utility and irrigation lines.
   5. Incidental demolition of abandoned utility and irrigation lines.
   6. Spraying until dead, clearing, grubbing vegetated areas and rototilling in existing turf areas.
   7. Protection of existing plant material.
   8. Removal of designated trees and planting areas.

B. Related Requirements:
   1. Section 31 20 00 - Earth Moving
   2. Section 32 01 90 - Existing Tree Protection and Maintenance

### 1.02 REFERENCES AND REGULATORY REQUIREMENTS

A. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

### 1.04 ACTION SUBMITTALS

A. Product Data: Manufacturer's product information on herbicides to be used for approval prior to use.

### 1.05 INFORMATIONAL SUBMITTALS

A. Schedule: Indicate the proposed timeline for site clearing and demolition work including shut off times and capping of utility services on the project schedule.

### 1.06 QUALITY ASSURANCE

A. The Owner will obtain and pay for all permits required in connection with this work. Fees for the dumping of debris shall be paid for by the Contractor.

### 1.07 FIELD CONDITIONS

A. Dust Control:
   1. The Contractor shall prevent the formation of airborne dust on and around the project site with the use of sprinkled water or other means acceptable to the Owner's Representative. Non-compliance

with proper dust control measures may be grounds for issuance of a "stop work" order by the Owner until satisfactory measures are implemented.

B. Utility Services:
   1. Issue written notices of planned demolition operations to utility companies and coordinate site clearing and demolition improvements as requested by the utility companies.
   2. Existing power poles and lines serving existing occupied buildings shall remain. Arrange work in order to maintain utilities not designated for removal.
   3. Coordinate work in order to maintain utilities to temporary on-site facilities.

PART 2 - PRODUCTS

2.01 HERBICIDES

A. Herbicides shall conform to Owner's approved chemicals list.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Conform to applicable requirements of Section 01 45 00 - Quality Control.

B. Carefully identify limits of demolition and site clearing.

C. Mark project areas in coordination with the Owner's Representative and as necessary to clearly identify the interface of items to be removed and items remain.

3.02 PREPARATION

A. Protection:
   1. Make provisions and take necessary precautions to protect all existing items not designated for removal. An existing item or area damaged during construction operations shall be replaced or repaired to an "as-was" or better condition at no additional cost to the Owner and subject to the acceptance of the Owner's Representative.
   2. Erect barriers, fences, guard rails, enclosures, chutes, and shoring as necessary to protect personnel, structures, and utilities to remain.
   3. Provide warning signs and lighting as necessary for vehicular and personnel protection. Maintain warning signs during construction as required by applicable safety ordinances and as reasonably prudent.
   4. Coordinate arrangements for items to be salvaged and turned over to the Owner.
   5. Notify Underground Service Alert (USA), (800) 640-5137, and local utility companies to verify locations of existing utilities a minimum of 48 hours prior to beginning work.
   6. Provide tree protection fencing prior to commencing demolition and site clearing work.

B. Traffic Access:
   1. Ensure minimum interference with roads, streets, driveways, sidewalk and adjacent facilities.
   2. Do not close or obstruct streets, sidewalk, alleys or passageways without acceptance from the Owner's Representative or governing authorities as applicable.
   3. Provide approved alternate routes around closed or obstructed traffic ways as required by the Owner's Representative.
   4. Maintain access to adjacent existing buildings to ensure uninterrupted operations during demolition work.

3.03 DEMOLITION

A. General: Refer to the Drawings for extent of demolition and site clearing work.

B. Paving: Demolish paving in accordance with local noise ordinance regulations and as acceptable to the Owner's Representative.

C. Filling:
1. Completely fill below-grade areas and voids resulting from demolition work.
2. Install appropriate, acceptable fill material consisting of soil, gravel, or sand, free of trash and debris, stones over 6-inch diameter, roots, or other organic matter. Meet fill and compaction requirements specified and recommended by the Owner's Geotechnical Engineer.

D. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both the nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of response from Owner's Representative, rearrange selective demolition and site clearing schedule as necessary to continue overall job progress without delay.

3.04 CLEARING AND GRUBBING

A. Remove trees as shown on Drawings. Removal shall include trunks and roots over 1 inch in diameter to a depth of 18 inches below subgrade elevations.

B. Mow all existing turf areas to a height of 1 inch and remove cuttings.

C. Prior to site clearing, existing vegetation below 12 inches in height and turf areas to be removed shall be sprayed with a non-selective broad spectrum systemic herbicide for perennial vegetation and straight contact herbicide for annual vegetation in accordance with a licensed pest control advisor or herbicide manufacturers. recommendations.

D. Allow a sufficient period of time to ensure that all sprayed vegetation is dead. Refer to manufacturer's recommendations.

E. Irrigation heads, valves, and controllers shall be salvaged and provided to Owner.

F. Clear and strip vegetative material from soil surface and remove unless noted otherwise. Existing turf areas to be removed need not be stripped, but may be cross-ripped in two opposite directions and roto-tilled into the ground to a minimum 6-inch depth. Remaining clods of turf shall be no larger than 2 inches in diameter.

G. Clear and strip vegetative material from soil surface and remove unless noted otherwise. Existing turf areas to be removed need not be stripped, but may be pulverized into the underlying soils a minimum of 18" during the chemical treatment process.

H. Existing turf areas to be removed shall be pulverized to a minimum 6-inch depth.

I. Clear/strip vegetative material from soil surface and remove unless noted otherwise. Existing turf areas to be removed need to be stripped to remove organic soil.

J. Contractor is responsible for stockpiling and protecting all topsoil needed for landscaping improvements. Refer to respective earthwork and landscape Specifications.

K. Utilities and Related Equipment:

1. The locations of existing utilities, as may be shown on the Drawings, are approximate. Should existing utilities not shown on the Drawings be encountered during construction operations, notify the Owner's Representative immediately, and re-direct work to avoid delay. The Owner's Representative will then determine what action, if any, is required.
2. Remove abandoned utilities as indicated and as uncovered by the work and terminate in a manner conforming to code.
3. Remove and salvage designated items and related equipment and deliver to a location acceptable to the Owner's Representative.

L. Underground Piping:
1. Existing storm drain and irrigation systems, as may be shown on the Drawings, shall be modified to allow for construction of new items and systems as a part of this project. Caution shall be exercised so as not to damage underground piping not scheduled for removal.
2. Remove underground piping as indicated or necessary and backfill to specified compaction density.
3. Existing piping abandoned but not removed shall be backfilled with slurry fill (grout), and ends shall be capped with concrete.
4. Manholes and lines scheduled for removal which connect to active systems shall have their active remaining portions capped, plugged, or blind-flanged as appropriate.
5. Materials used for pipe terminations and temporary connections shall be the same as the existing lines. Fittings and flanges shall be of weight and class suitable for the service in which used.

## 3.05 SALVAGE

A. Demolition:
1. Materials or equipment to be demolished shall become the property of the Contractor except for items specified or noted on the Drawings to be salvaged for the Owner.
2. Carefully remove items to be salvaged to avoid damage.
3. Irrigation heads, valves and existing controller shall be salvaged and provided to Owner. Contractor shall clean and box items. Items shall be returned to Owner in accordance with instructions provided by the Owner.

B. Replacement: In the event items not scheduled to be demolished are damaged, promptly replace or repair such items to an as-was or better condition per the discretion of the Owner's Representative at no additional cost to Owner.

C. Materials scheduled for removal shall not be placed on view to prospective purchasers or sold on site.

## 3.06 CLEANING

A. Debris and Rubbish:
1. Remove and transport debris and rubbish as it accumulates and dispose in a legal manner via recognized haul routes in accordance with Section 01 50 00 - Temporary Facilities and Controls in a manner that will prevent spillage on streets or adjacent areas.
2. Remove tools, equipment and appliances used for demolition from the site upon completion of the work.
3. Clean entire project area, adjacent streets, and pavements to a broom-clean, "stain-free" condition per the discretion of the Owner's Representative.

END OF SECTION

# SECTION 09 91 15

# EXTERIOR SITE PAINTING

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Painting and painter's finish on site and landscape improvements, except prefinished items and unless otherwise noted, as required to complete finishing of the Work. The Work includes the following specific items:
      a. Field painting of exposed bare and shop-primed mechanical items.

B. Items Not Included in This Section:
   1. Factory-prefinished items as specified in various Sections.
   2. Painting specified elsewhere and included in respective Sections, including but not necessarily limited to shop priming.

C. Related Requirements:
   1. Section 09 96 23 - Graffiti-Resistant Coatings
   2. Section 32 36 00 - Landscape Decorative Metal; site finishing of landscape metal fabrications.

### 1.02 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Coordination: Perform painting work in proper sequence with work of other trades so as to avoid damage to finished work.

### 1.03 ACTION SUBMITTALS

A. Product Data: A complete list of materials proposed for use, together with manufacturer's technical information, including paint label analysis and application instructions.

B. Color Samples:
   1. Appropriately label and identify each sample, including location and application. Include manufacturer's name, color number, and gloss units.
   2. Wood: Prepare on type and quality of wood specified, 12 inches square or long, as applicable.
   3. Other Surfaces: Prepare on hardboard, 8 inches square.
   4. Each sample shall have stepped finish, clearly showing each coat and build-up of specified finish. Submit separate samples for each required gloss level.
   5. Resubmit samples as requested until required sheen, color, and texture are achieved.
   6. See also requirements for field samples below.

### 1.04 INFORMATIONAL SUBMITTALS

A. Statement of applicator qualifications.

### 1.05 CLOSEOUT SUBMITTALS

A. Extra stock as specified.

B. Specified warranty.

1.06 QUALITY ASSURANCE

A. Coatings used on interior shall meet LEED program requirements and shall be Green Seal Standard GS-11 compliant.

B. Unsuitability of Specified Products: Claims concerning unsuitability of any material specified (or inability satisfactorily to produce the Work) will not be entertained, unless such claim is made, in writing, to Owner's Representative before beginning of application.

C. Single-Source Responsibility:
1. To the maximum extent practicable, select a single manufacturer to provide all materials required by this Section, using additional manufacturers to provide systems not offered by the selected principal manufacturer.
2. For each individual system:
   a. Provide primer and other undercoat paint produced by same manufacturer as finish coat.
   b. Use thinner within manufacturer's recommended limits.

D. Applicator Qualifications:
1. Not less than 5 years of documented experience in painting work similar in scope to work of this Project.
2. Maintain a crew of painters who are fully qualified to satisfy requirements of this Section.

E. Field Samples:
1. Request review, by the Owner's Representative, of first finished item of each finish type or color scheme required for color, texture, and workmanship.
2. For walls, finish a panel 8 feet square.
3. Modify selected colors, if requested by Owner's Representative, to achieve desired effect.
4. Use first acceptable surface or item as the Project standard for each color scheme.

F. Primers:
1. Provide finish coats that are compatible with prime paints used.
2. Review other Sections of these Specifications in which prime paints are to be provided in order to ensure compatibility of total coatings system for various substrates.
3. Upon request, furnish information to other Sections regarding characteristics of finish materials proposed for use.
4. Provide barrier coats over incompatible primers, or remove and re-prime as required.
5. Notify Owner's Representative, in writing, of any anticipated problems arising from using specified coating systems with substrates primed by other Sections.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original, new, unopened packages and containers bearing the manufacturer's name and label describing contents including the following information:
1. Name or title of material.
2. Manufacturer's stock number and date of manufacture.
3. Contents by volume for major pigment and vehicle constituents.
4. Thinning instructions.
5. Application instructions.
6. Color name and number.

B. Store materials in tightly covered containers. Maintain containers in a clean condition, free of foreign materials and residue.

C. Store materials at ambient temperature of between 45 degrees F minimum and 90 degrees F maximum, in a well-ventilated area.

D. Ensure that storage area is neat and orderly.

E. Take precautionary measures to prevent fire and health hazards.

1.08 FIELD CONDITIONS

A. Ambient Conditions:
   1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be stored and applied.
   2. Do not apply finish in areas where dust is being generated.

B. Cover or otherwise protect in progress and finished work of other trades, and surfaces not being painted concurrently or not to be painted.

1.09 WARRANTY

A. Color and Life of Film:
   1. At the end of 1 year, colors of surfaces shall have remained free from serious fading. Variations (if any) shall be uniform.
   2. Materials shall have their original adherence at end of 1 year. There shall be no evidence of blisters, running, peeling, scaling, chalking, streaks, or stains at end of this period.

1.10 EXTRA MATERIALS

A. At completion of the Work, deliver to Owner extra stock of paint of each color used in each coating material used.

B. Containers shall be full, tightly sealed, and clearly marked.

C. Provide the following quantities:
   1. Field Colors: One 5-gallon container.
   2. Accent Colors: One 1-gallon container.

PART 2 - PRODUCTS

2.01 MANUFACTURERS AND PRODUCTS

A. Products are specified under "Paint Systems" in Part 3 below and are manufactured by Kelly-Moore Paints, unless otherwise indicated. Equivalent products manufactured by PPG, Benjamin Moore, Sherwin-Williams, or Dunn-Edwards are acceptable.

B. Materials selected for coating systems for each type surface shall be the product of a single manufacturer or shall be acceptable to manufacturer of finish coating for system.

C. If more than one quality level of product type is marketed, use material of highest quality.

2.02 COLORS

A. Colors shall be as scheduled on the Drawings. Scheduled colors may have manufacturer identifications other than the acceptable manufacturers listed above. The Drawing listing is solely for the purpose of

conveying color information and does not imply manufacturer's approval or waiver of the requirement that all coatings be from the same manufacturer, unless a specific system is not available from the primary manufacturer.

B. Submit samples of selected colors as specified in Part 1 above.

C. Colors of paints, including shades of stain, shall match color chips on schedule.

2.03 MIXING AND TINTING

A. Deliver paints and stains ready mixed to jobsite.

B. Accomplish job mixing and job tinting only if required for adjustment to finish applied to field test areas to achieve color acceptable to Owner's Representative.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence, or quality of work and that cannot be put into acceptable condition through preparatory work as included in Article 3.2, "Preparation."

B. Do not proceed with surface preparation or coating application until conditions are suitable.

3.02 PREPARATION

A. General:
   1. Verify that surfaces to be painted are dry, clean, smooth, and free from deleterious materials.
   2. Protect hardware, exposed metals, and other surfaces that are not to be painted by masking, removal, or other means to ensure a neat job.

B. Wood - General:
   1. Cleaning and Sanding:
      a. Remove handling marks and effects of exposure to moisture with a thorough, final sanding over all exposed surfaces, using 150-grit or finer sandpaper.
      b. Clean and vacuum before applying sealer or finish.
   2. Wood to Receive Opaque Finish: Fill nail holes, cracks, open joints, and other defects with filler after priming coat has dried. Color shall match finish color.
   3. Wood to Receive Transparent Finish:
      a. Remove any material that would adversely affect penetration or appearance of finish.
      b. Do not seal wood surfaces to receive transparent finish.

C. Wood – New Exterior, Opaque Finish:
   1. Surfaces shall be dry and free of grease and splatters.
   2. Rough surfaces shall be sanded smooth.
   3. Fill nail holes, cracks, open joints, and other defects with filler after priming coat has dried. Exposed nail heads shall be spot primed.
   4. Avoid painting surfaces while exposed directly to hot sun.
   5. Smooth surfaces shall be sanded thoroughly to allow proper penetration and adhesion. Areas exhibiting tannic acid staining shall receive two coats of primer waiting 24 hours between coats. Sand and prime as soon as possible after installation to avoid UV degradation of unpainted wood surface.

6. Mildew, if present, shall be removed by scrubbing with a commercial mildew wash in accordance with manufacturer's directions.

D. Wood - Existing Exterior, Opaque Finish:
1. Remove all blistered, peeling and scaling paint to a sound substrate by scraping, sanding, and wire brushing. Spot prime bare wood and exposed nail heads before applying overall coat of primer.
2. Surfaces that exhibit moderate to heavy chalk deposits shall be thoroughly cleaned to sound substrate by wire brushing, sanding, or power washing.
3. Loose and split sealants shall be removed and replaced; see Section 07 92 00 - Joint Sealants.
4. Glossy surfaces shall be dulled by sanding. Crystalline deposits shall be removed by flushing with water from a hose.
5. Mildew, if present, shall be removed by scrubbing with a commercial mildew wash in accordance with manufacturer's directions.

E. Wood – New and Existing Exterior, Transparent Finish:
1. Surfaces shall be dry and free of grease and splatters.
2. Avoid coating surfaces while exposed directly to hot sun.
3. Mildew, if present, shall be removed by scrubbing with a commercial mildew wash in accordance with manufacturer's directions.
4. Comply with additional requirements of the coating manufacturer.

F. Metals:
1. Remove mill scale, rust, and corrosion.
2. Clean oils, grease, and dust from surfaces.
3. Touch up chipped or abraded areas in shop coatings, using appropriate primer.
4. Soluble Salts: Removal of soluble salts from bare metal and galvanized metal surfaces, both interior and exterior, is required prior to application of primer coats to preclude pre-mature coating failure and accelerated corrosion.
    a. Removal shall be in accordance with SSPC-Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates."
    b. Abrasive blasting, where specified as a required surface preparation procedure, shall be performed after removal of soluble salts. Abrasive blasting is not an acceptable procedure for removal of soluble salts.
5. Previously Painted Metal: Prepare in accordance with recommendations of coating manufacturer based on condition of surfaces and the following:
    a. Remove loose paint, dirt, and chalk with scraper and strong detergent solution.
    b. Abrade shiny surfaces, such as baked enamel.
    c. Clean surfaces of dust from sanding and other foreign matter that could adversely affect adhesion or performance of coating system. Remove sanding dust with a clean, wet rag.
    d. Surfaces shall be clean, dry, smooth, and even.

G. Concrete:
1. Fill cracks and irregularities with Portland cement grout or patching mortar in order to provide uniform surface texture.
2. Surfaces shall not be painted until they have completely cured and have a stabilized moisture content but in no case less than 60 days from completion of surface.

H. Cement Plaster:
1. Fill cracks and irregularities with Portland cement grout or patching mortar in order to provide uniform surface texture.
2. Surfaces shall not be painted until they have completely cured and have a stabilized moisture content but in no case less than 60 days from completion of surface.

I. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions

J. Surfaces that cannot be prepared or painted as specified shall be immediately brought to the attention of the Owner's Representative, in writing.
   1. Starting of work without such notification will be considered acceptance by the Contractor of surfaces involved.
   2. Replace unsatisfactory work caused by improper or defective surfaces, as directed by Owner's Representative.

3.03 FACTORY FINISHING AND PRIMING

A. Pertinent Work and Requirements Specified Elsewhere: Review all Sections for products that are to be factory finished or factory (shop) primed.

B. Touch-up: Touch up abrasions in prime coat immediately after products arrive on jobsite and as required prior to application of finish coats.

3.04 APPLICATION

A. Do not apply initial coating until moisture content of surface is within limitations recommended by paint manufacturer.

B. Application:
   1. Apply paint with suitable brushes, rollers, or spraying equipment.
   2. Guardrails and other exposed metal requiring field finish painting shall be sprayed to the fullest extent conditions will permit. If brush or roller application is used, surface finish shall be subject to review by the Owner's Representative for complying with the appearance requirements specified herein.
   3. Apply coatings in accordance with manufacturer's recommendations.
   4. Rate of application shall be within limits recommended by paint manufacturer for surface involved.

C. Spray-Gun Application - Standard Coatings:
   1. Spray-apply standard paints only with airless sprayer.
   2. Apply in fine, even spray, without addition of thinner, using nozzle pattern suitable to surface being painted.
   3. When necessary, follow by brushing to ensure uniform coverage and to eliminate wrinkling, blistering, and air holes.
   4. If spraying becomes detrimental to equipment or objectionable to personnel, brush painting will be required.

D. Comply with recommendation of product manufacturer for drying time between succeeding coats.

E. Finish coats shall be smooth and free from brush marks, streaks, laps or pileup of paints, and skipped or missed areas.

F. Leave all parts of moldings and trim clean and true to details with no undue amount of paint in corners and depressions.

G. Make edges of paint adjoining other materials or colors clean and sharp, with no overlapping.

H. Refinish whole area where portion of finish is not acceptable.

3.05 CLEANING

A. Touch up and restore finish where damaged.

B. Remove spilled, splashed, or spattered paint from all surfaces. Do not mar surface finish of item being cleaned.

C. Leave storage space clean and in condition required for equivalent spaces in Project.

3.06 PAINT SYSTEMS

A. General:
1. This Specification shall serve as guide and is meant to establish procedure and quality. Confer with the Owner's Representative to determine exact finish desired.
2. Number of coats scheduled is minimum. Additional coats shall be applied at no additional cost as required to hide base material completely, produce uniform color, and provide required and satisfactory finish.

B. Acceptance of Final Colors: Final coat of paint shall not be applied until colors have been accepted by the Owner's Representative.

C. Gloss and Sheen Ratings: It is recognized that manufacturer's use various identifiers for the sheen of their paints. The sheen rating of applied paint, therefore, shall be identified as a Gloss Level and generally fall within the following limits established by the Master Painters Institute, Inc. (MPI) Standards and ASTM D523. Not all of the Gloss Levels are necessarily scheduled or used on this Project.
1. Gloss Level 1: Matte or Flat; not more than 5 units at 60 degrees and 10 units at 85 degrees.
2. Gloss Level 2: Velvet or Low Sheen; not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
3. Gloss Level 3: Eggshell; 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
4. Gloss Level 4: Satin; 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
5. Gloss Level 5: Semi-gloss; 35 to 70 units at 60 degrees.
6. Gloss Level 6: Gloss; 70 to 85 units at 60 degrees.

D. Clarification of System Terminology:
1. Exterior paint Systems are specified and identified herein by initial letters "EXT."
2. Initial numbers for each System identify the substrate to be coated.
3. Letter following substrate numbers identify the general finish coat chemistry summarized as follows:

| CODE | DESCRIPTION |
|---|---|
| A | Standard acrylic |
| B | Standard alkyd |
| C | Semi-transparent stain |
| D | Semi-solid stain |
| H | High performance polyurethane |
| M | Premium performance acrylic polymer |
| T | Fluoropolymer |

4. Hyphenated suffix identifies the topcoat gloss levels.

E. Exterior Painting Systems:

EXT 3.1A-1
Acrylic on Concrete and Cement Plaster - Gloss Level 1

| | | |
|---|---|---|
| 1 coat | 6001-XXXX | Acrylic Bonding Primer |
| 2 coats | 2200-XXXXV | 100% Acrylic Flat |

EXT 4.2A-1
Latex on Concrete Unit Masonry - Gloss Level 1

| | | |
|---|---|---|
| 1 coat | "Bloxfil" 4000 | Heavy-duty Block Filler |
| 2 coats | 2200-XXXX | 100% Acrylic Flat |

EXT 5.1A-5
Acrylic over Waterborne Primer on Ferrous Metal - Gloss Level 5

| | | | |
|---|---|---|---|
| 1 | coat | 4020-1000 | Metal Primer (If Not Shop Primed) |
| 2 | coats | 4206-XXXX | Acrylic Semi-gloss |

EXT 5.1M-6
Acrylic over Waterborne Primer on Ferrous Metal - Gloss Level 6

| | | | |
|---|---|---|---|
| 1 | coat | 4020-1000 | Metal Primer (If Not Shop Primed) |
| 2 | coats | 4208-XXXX | Acrylic Gloss |

EXT 5.3-5
Acrylic over Waterborne Primer on Galvanized Metal – Gloss Level 5

| | | | |
|---|---|---|---|
| Pretreatment (SSPC SP-1) | | Devprep 88 | Heavy-duty cleaner |
| 1 | coat | 4020-1000 | Primer |
| 2 | coats | 2406-XXXX | 100% Acrylic Semi-gloss |

EXT 5.4G-5
Acrylic on Factory-Primed Aluminum - Gloss Level 5

| | | | |
|---|---|---|---|
| 2 | coats | 2406-XXXX | 100% Acrylic Semi-gloss |

EXT 5.1M-5
Premium-Performance Acrylic Polymer over Epoxy on Shop Primed Decorative Metal- Gloss Level 5

| | | | |
|---|---|---|---|
| Pretreatment | | | As specified in Section 05 7000, "Decorative Metal" |
| 1 | coat | Tnemec 27WP | Two-component, water-based epoxy tinted to match color of topcoat (if primer not shop applied) |
| 1 | coat | Tnemec Series 1029 | High dispersion acrylic polymer |

Note: Provide additional topcoat if required to achieve manufacturer's recommended total DFT (primer plus finish coats), or to achieve complete hiding for selected color.

EXT 5.1H-5
High Performance Polyurethane over Galvanized Metal, Gloss Level 5

| | | | |
|---|---|---|---|
| Pretreatment | | | As specified in Section 32 3600 – Landscape Decorative Metal |
| 1 | coat | Tnemec 27WB | Two-component, water-based epoxy tinted to match color of topcoat (if primer not shop applied) |
| 1 | coat | Tnemec UVX Series 750 | Polyurethane |

Note: Provide additional topcoat if required to achieve manufacturer's recommended total DFT (primer plus finish coats), or to achieve complete hiding for selected color. Comply with manufacturer's maximum recoat time.

EXT 5.3T-5
High Performance Fluoropolymer Finish on Galvanized Steel - Gloss Level 5: Tnemec coatings as specified, or equal.

| | | | |
|---|---|---|---|
| Pretreatments | | | |
| | Cleaner | SSPC SP-1 | Heavy-duty cleaner |
| | Additional Surface Preparation | ASTM D6386 | Brush Blast |
| 1 | coat | Tnemec "Chembuild" Series 135" | Modified polyamidoamine epoxy applied at 102 microns to 127 microns (4.0 to 5.0 mils) in one or more coats |
| 1 | coat | Tnemec "Endura Shield" Series 740 | Low VOC hybrid aliphatic polyurethane applied at102 microns to 127 microns (4.0 to 5.0 mils) in one or more coats |
| 1 | coat | Tnemec "Fluoronar" Series 1071 | High-solids thermoset fluoropolymer applied at 51 microns to 76 microns (2.0 to 3.0 mils) in one or more coats |

Note: Provide additional topcoat if required to achieve manufacturer's recommended total DFT (primer plus finish coats), or to achieve complete hiding for selected color.

EXT 6.3A-4
Acrylic on Dressed Lumber - Gloss Level 3

| | | | |
|---|---|---|---|
| 1 | coat | 2000-1000 | 100% Acrylic Primer |
| 2 | coats | 2402 XXXXV | 100% Acrylic Satin Enamel |

EXT 6.3A-5
Acrylic on Dressed Lumber - Gloss Level 5

| | | | |
|---|---|---|---|
| 1 | coat | 2000-1000 | 100% Acrylic Primer |
| 2 | coats | 2406-XXXXV | 100% Acrylic Semi-gloss Enamel |

EXT 6.3D
Semi-Transparent Stain on Dressed Lumber

| | | | |
|---|---|---|---|
| 1 | coat | 2610-XXXX | "Woodpride" Waterborne |

EXT 6.3V-5
Clear Alkyd Varnish on Dressed Lumber - Gloss Level 6

| | | | |
|---|---|---|---|
| 3 | coats | Cabot 18040 | Spar Varnish |

EXT 6.3V-3
Cleary Alkyd Finish over Clear Base Coat on Dressed Lumber – Gloss Level 3

| | | | |
|---|---|---|---|
| Surface Preparation | | Gemini "Wood Prep" | Mill glaze remover |
| 1 | coat | Sikkens "Cetol 1" | Translucent Alkyd Primer |
| 2 | coats | Sikkens "Cetail 23 Plus" | Translucent Alkyd Topcoat |

END OF SECTION

# SECTION 09 96 23

# GRAFFITI-RESISTANT COATINGS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Liquid-applied sacrificial surface sealer for all exterior masonry and concrete wall surfaces that will prevent penetration of staining mediums and allow easy removal and reapplication.
   2. Items included in the scope include, but are not limited to, the following:
      a. Guardrails and Handrails

### 1.02 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

### 1.03 ACTION SUBMITTALS

A. Product Data: Manufacturer's specifications, installation instructions, and general recommendations for specified coating materials. Include instructions and recommendations for cleaning and preparation of concrete surfaces, coating and recoating application techniques, equipment to be used, coverage rates, accessory materials, and special removal procedures.

B. Samples: 12-inch-square of each substrate to receive graffiti-resistant coating, with coating applied to half of each sample.

### 1.04 INFORMATIONAL SUBMITTALS

A. Statement of applicator qualifications.

B. Letter documenting work has been applied in compliance with specifications and manufacturer's written instructions and that specified field testing has been satisfactory.

### 1.05 CLOSEOUT SUBMITTALS

A. Extended warranty.

B. Maintenance materials.

### 1.06 QUALITY ASSURANCE

A. Applicator Qualifications: Approved in writing by the manufacturer with documented experience in application of similar graffiti-resistant coatings.

B. Mockup:
   1. Treat and evaluate a minimum eight square foot area of completed wall at the Project site for product adhesion, compatibility and appearance.
   2. Apply and remove graffiti to a portion of the mock-up to the satisfaction of the Owner's Representative.

3. Application shall not continue unless mockup is acceptable to Owner's Representative.

C. Do not apply specified coatings when surfaces or ambient air temperature is below 45 degree F or over 90 degrees F, or expected to drop below freezing during the 24-hour period following application.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store materials at site in protected location, and away from flame, excessive heat, at temperatures above 40 degrees F.

1.08 MAINTENANCE

A. At completion of the Work, deliver to Owner specified cleaning and application solution sufficient to clean and recoat a minimum of 500 square feet of coated wall surface.

B. Stock shall be in factory sealed and clearly labeled containers.

C. Stock shall be delivered and stored as directed by the Owner.

1.09 WARRANTY

A. Manufacturer: Provide Owner with a written 10-year warranty, signed by the manufacturer, agreeing to repair or replace work that exhibits defects in materials or workmanship. Defects are defined to include failure to withstand complete graffiti removal, ghosting, shadowing, chemical stain, yellowing, and normal environmental effects.

PART 2 - PRODUCTS

2.01 PERFORMANCE CRITERIA

A. The coating shall not darken, stain, or discolor substrate surfaces.

B. The coating shall be non-yellowing.

2.02 MATERIALS

A. Graffiti-Resistant Coating System: "Defacer Eraser" SC-1 by Prosoco, or equal meeting governing VOC requirements.

B. Application Equipment: Medium-to-large-capacity airless sprayer and hoses or other equipment as recommended by the coating manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are dry, clean, and free of dust, dirt, grime, oils, alkali or acid residues, and other contaminants or compounds unacceptable to the graffiti-resistant coating manufacturer.

3.02 PREPARATION

A. Clean and prepare substrates in accordance with graffiti-resistant coating manufacturer's instructions.

B. Test for moisture content in accordance with manufacturer's instructions to ensure that surface is sufficiently dry.

C. Protect adjacent surfaces not to receive coating from spillage or blow-over.

D. Cover adjoining and nearby surfaces of metal and glass as required.

3.03 APPLICATION

A. Apply graffiti-resistant coating following manufacturer's recommendations for number of coats and their application.

B. Avoid runs or applying coating to heavily as this will impair transparency of cured material. Excessive coating will turn milky when it gets wet after curing.

C. Runs or sags on masonry surface shall be immediately brushed out using a clean soft brush.

D. Clean spillage from horizontal surfaces immediately after spillage.

END OF SECTION

# SECTION 31 01 90

# LANDSCAPE AND SITE MAINTENANCE

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Landscape maintenance and related work as shown on the Drawings and specified herein including, but not necessarily limited to, the following:
   1. Tree, shrub, ground cover and turf areas.
   2. Irrigation systems.
   3. General site clean-up.

B. Related Requirements:
   1. Section 32 80 00 - Irrigation
   2. Section 32 90 00 - Planting

### 1.02 REFERENCES AND REGULATORY REQUIREMENTS

A. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

### 1.04 ACTION SUBMITTALS

A. Product Data: Manufacturer's product information on pesticides and herbicides to be used for approval prior to use.

### 1.05 QUALITY ASSURANCE

A. Control of Work: Comply with Section 5 of the Standard Specifications.

B. Control of Materials: Comply with Section 6 of the Standard Specifications.

C. The Maintenance Contractor shall be experienced in horticulture and landscape maintenance, practices, and techniques, and shall provide sufficient number of workers with adequate equipment to perform the work during the Landscape Maintenance Period.

### 1.06 LANDSCAPE MAINTENANCE PERIOD

A. Landscape Maintenance Period shall be 90 calendar days.

B. Continuously maintain the entire project area during the progress of the work, during the specified Landscape Maintenance Period or until Final Acceptance of the project by the Owner's Representative.

C. Landscape Maintenance Period shall not start until all elements of construction, planting and irrigation for the entire project are completed in accordance with Contract Documents. A prime requirement is that turf and landscape areas shall be planted and that turf areas shall show an even, healthy stand of "sod-

like" turf which shall have been mown twice. If such criteria are met to the satisfaction of the Owner's Representative, a written notification shall be issued to establish the effective beginning date of Landscape Maintenance Period. Additionally, elements included in the Pre-maintenance Punch-list shall have been completed to the satisfaction of the Owner's Representative. The Landscape Maintenance period shall, at the discretion of the Owner's Representative, be allowed to start and finish at different times in different areas as applicable.

D. A day of improper maintenance, as determined by the Owner's Representative, shall not be credited as an acceptable Landscape Maintenance Period day. The Landscape Maintenance Period shall be extended on a day-for-day basis should this occur until proper maintenance, as determined by the Owner's Representative, is being performed.

E. Contractor shall secure the project site against trespass, vandalism, and theft during the Landscape Maintenance Period. Security procedures shall be coordinated with the Owner's Representative.

F. Access to fields by Owner in each project area may be required prior final acceptance of turf. Softball and baseball fields are anticipated to be used by Owner for games or practice. Multi-purpose fields may also be utilized for games and practice. Contractor shall coordinate its mowing schedule and other maintenance schedules with Owner. School use will have priority over maintenance.

1.07 GUARANTEE

A. All work executed under this section shall be guaranteed against any and all poor, inadequate or inferior materials and/or workmanship, as determined by the Owner's Representative, for the entire Landscape Maintenance Period and for a period of one year after Final Acceptance of project.

B. The Contractor shall install all replacement material in conformance with the Contract Documents.

1.08 FINAL ACCEPTANCE

A. Upon completion of all project work, including Landscape Maintenance Period, the Owner's Representative will, upon written request from the Contractor (2 working day minimum notice), make an observation to determine conformance with the Contract Documents.

B. If, at the final project observation, work is found at variance with the Contract Documents, or is otherwise unacceptable, the Owner's Representative shall issue a punch-list of items requiring attention to the Contractor. The Contractor shall repair, replace, or otherwise correct all non-compliant work, continue Landscape Maintenance Period, and make another written request to the Owner's Representative to verify punch-list completion. If punch-list is found to be incomplete, or if site is still found to be unacceptable, the Contractor shall be back-charged as necessary for this and all additional observations required to issue Final Acceptance. All replacement materials and installations shall be in accordance with the Contract Documents. Remove rejected work and materials immediately from project. Prior to Final Acceptance, Contractor shall provide the Owner's Representative with all Record Drawings and written Guaranty Statements in accordance with the Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials used shall either conform to Specifications in other Sections or shall otherwise be acceptable to the Owner's Representative. The Owner's Representative shall be given a monthly record of all herbicides, insecticides and disease control chemicals used.

B. Maintenance Fertilizer: "Gro-Power High Nitrogen" as available through Gro-Power, Inc., 800-473-1307, or accepted equal, and shall contain the following chemical analysis:

| Percent | Chemical |
|---|---|
| 14% | nitrogen |
| 4% | phosphoric acid |
| 9% | potash |

C. Humus: Inactive, decomposed organic material approved by Owner's Representative.

PART 3 - EXECUTION

3.01 MAINTENANCE

A. General: Proper maintenance, including watering, weeding, mowing, edging, fertilization, repairing, and protection is required until Final Acceptance of the entire project but not less than the specified Landscape Maintenance Period.

B. Watering: Water appropriately for each plant type to insure vigorous and healthy growth until work is accepted. Water or irrigate in a manner to prevent runoff or erosion. When hand watering, use a "water wand" to break the water force.

C. Weeding: Entire project site shall be kept free of weeds at all times. Control new weed growth with pre-emergent herbicides. If weeds develop, use legally approved herbicides.
   1. No herbicide shall be used without the Owner's Representative prior consent. Use herbicides in accordance with manufacturer's recommendations. If selective herbicides are used, extreme caution shall be observed so as not to damage other plants. Spraying shall only be done under windless conditions.
   2. Disease and Pest Control: Disease and insect damage shall be controlled by the use of fungicides and insecticides, subject to the prior consent of the Owner's Representative. Mole and gopher mitigation shall be accomplished using legal means other than poison baits.

D. Tree "rings" in Turf Areas: Remove turf from around each tree to create a 4-foot diameter turf free area.

E. Pruning:
   1. Trees: Prune trees to select and develop permanent scaffold branches; to eliminate narrow V-shaped branch forks that lack strength; to reduce potential toppling and wind damage by thinning out crowns; to maintain a natural appearance; and to balance crown with roots. Prune only as directed by the Owner's Representative.
   2. Shrubs: The objectives of shrub pruning are the same as for trees. Shrubs shall not be clipped into balled or boxed forms unless such is required by the design.
   3. All pruning cuts shall be made to lateral branches, buds or near flush with the trunk. "Stubbing" or heading cuts is not permitted.
   4. Remove from the project all pruned branches and material. Remove and replace plant material excessively pruned or malformed resulting from improper pruning practices at no additional cost to the Owner
   5. All trees to be pruned shall be marked for review and approval prior to proceeding with the work. Pruning work shall be performed under the supervision of a certified arborist.
   6. Work shall comply with the tree pruning guidelines provided by the International Society of Arboriculture, any applicable city standards, and in accordance with standard horticultural pruning practices.

F. Staking: Stakes shall remain in place through the maintenance and guaranty periods and shall be periodically inspected and adjusted by the Contractor to prevent rubbing that causes bark wounds, loosen for proper growth or other appropriate reasons.

G. Protection: The Contractor shall maintain protection of planting areas until Final Acceptance. Damaged areas shall be repaired or replaced at the Contractor's expense. Install a temporary maintenance fence using 4-foot blaze orange with steel driven stakes, or acceptable equal, around all turf areas for the entire length of Landscape Maintenance Period.

H. Trash: Remove trash in all project areas plus adjacent pedestrian walkways and parking areas for the entire length of Landscape Maintenance Period.

I. Replacement: Refer to the Article "Guarantee" in Part 1.

J. Fertilizing: Turf shall be fertilized on day 45 and 85 after initial seeding or installation with 20 pounds of fertilizer per 1,000 square feet.

3.02 TURF MAINTENANCE

A. Mowing and Edging
1. Turf shall not be allowed to exceed 3 inches in height and shall not be mown shorter than 1-1/2 inches in height. Turf shall be well established, free of bare spots and weeds, and of a "sod-like" quality to the satisfaction of the Owner's Representative prior to Final Acceptance.
2. All grass clippings shall be picked up and removed from the site and premises.
3. Let turf areas dry out enough so that mower wheels do not skid, tear, or mark the surface.
4. Edges shall be trimmed at least twice monthly or as needed for neat appearance. Clippings shall be completely removed and disposed of off-site.

B. Watering: Turf shall be watered at such frequency as weather conditions require to replenish soil moisture below root zone and to establish healthy turf areas.

C. Disease Control: Control all turf diseases throughout the Landscape Maintenance Period with legally approved fungicides and herbicides.

D. Weed Control: Control broad leaf weeds with selective, legally approved herbicides. No herbicide shall be used without the prior consent of the Owner's Representative.

E. Replacement: At or near the end of specified Landscape Maintenance Period, a final observation of turf areas will be made jointly by the Owner's Representative and Contractor. Remove deceased areas and unhealthy stands of turf from the site; do not bury into the soil. Replant all applicable areas with materials and in a manner acceptable to the Owner's Representative.

3.03 IRRIGATION SYSTEM

A. System Observation: The Contractor shall visually check all systems for proper operation on a weekly basis and make necessary repairs. Equipment shall be adjusted as necessary for proper coverage and function.

B. Controllers: Program automatic controllers for appropriate seasonal water requirements. Perform a full instruction session in the presence of the Owner's designated maintenance personnel demonstrating programming, system testing, and trouble shooting. Include instructions on how to turn off system in case of emergency.

C. Repairs: Repairs made to the irrigation system shall be at the Contractor's expense. Repairs, when required, shall be made within 24 hours of discovery by either Owner or Contractor.

## 3.04 FIELD QUALITY CONTROL

A. Final Review:
   1. At, or near the end of specified Landscape Maintenance Period, the Contractor shall make a written request for a final review and the work shall be reviewed for conformance with the Construction Documents.
   2. If the work is not accepted at time of review, a punch-list of items requiring attention will be prepared by the Owner's Representative and issued to the Contractor for correction.
   3. The Landscape Maintenance Period shall be extended at Contractors sole cost, as necessary.
   4. Upon completion of the punch-list, the Contractor shall again make written request for review. If, upon re-visiting the site, it is found that the punch-list has not been completed, the review shall end and a subsequent visit shall not be scheduled until the Contractor can assure the Owner the work is complete. The incomplete punch-list review meeting and any further visits and reviews, and re-inspections required due to Contractor not being prepared, or non-conformance with the Construction Documents, shall be back charged to the Contractor.

B. Final Acceptance: When work is found to be in conformance with the Contract Documents, subject to the discretion of the Owner's Representative, a statement of Final Acceptance shall be issued to the Contractor.

END OF SECTION

# SECTION 31 20 00

# EARTH MOVING

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Site excavation and backfilling as shown on the Drawings including, but is not necessarily limited to, the following:
   1. Topsoil stripping, stockpiling, and replacement into planting areas.
   2. Rough grading.
   3. Filling and backfilling to attain required grades.
   4. Excavating for paving, footings, and foundations.

B. Related Requirements:
   1. Section 01 33 00 - Submittal Procedures
   2. Section 01 71 23 - Field Engineering
   3. Section 01 78 39 - Project Record Drawings
   4. Section 02 41 13 - Site Clearing and Demolition
   5. Section 31 23 00 - Excavation and Fill
   6. Section 32 01 90 - Existing Tree Protection and Maintenance
   7. Section 32 11 00 - Base Courses
   8. Section 32 90 00 - Planting

### 1.02 REFERENCES

A. California Building Code (CBC).

B. American Society for Testing and Materials (ASTM):
   1. D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.

C. California Occupational Safety and Health Standards (OSHA):
   1. Article 6 - Excavations and Shoring.

D. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

### 1.04 CLOSEOUT SUBMITTALS

A. Project Record Drawings:
   1. Conform to requirements specified in Section 01 78 39 - Project Record Documents.
   2. Accurately record locations of utilities remaining, re-routed utilities, new utilities, and newly discovered utilities by horizontal dimensions, elevations, inverts, and slope gradients.

1.05 ACTION SUBMITTALS

A. Import Topsoil:
   1. It is the Contractor's responsibility to determine if import topsoil is required on the Project.
   2. If required, Contractor shall submit four 1/2-pound samples in nominal 1 quart-sized "zip-lock" plastic bags for each proposed import topsoil. Each sample shall include current accompanying fertility and structure analyses prepared by a recognized soil and plant laboratory.

1.06 QUALITY ASSURANCE

A. Adhere to requirements, recommendations, and Best Management Practices (BMPs) for storm water management as may be outlined in the Project Storm Water Pollution Prevention Plan (SWPPP) prepared for this project, or as required by governing agencies.

B. Compaction densities specified for structural fills under footings, slabs, or pavements shall be determined in accordance the plans and specifications.

C. Certification:
   1. The Contractor shall certify source and type of backfill and topsoil proposed to be incorporated into the work, at the request of the Owner's Representative.
   2. The Contractor shall certify elevations of excavations, footings, subgrades, and finish grades with the use of a Licensed Surveyor, at Contractor's expense, at the request of the Owner's Representative.

D. Control of Work: Conform to Section 5 of the Standard Specifications.

E. Control of Materials: Conform to Section 6 of the Standard Specifications.

1.07 PROTECTION

A. Protect all existing structures, fences, roads, sidewalks, paving, curbs, and other items as necessary from earthwork activity.

B. Protect above or below grade utilities which are to remain.

C. Protect trees to remain in accordance with Section 32 01 90 - Existing Tree Protection and Maintenance as applicable.

D. Repair damage to any existing site features which are to remain. Repair and restoration shall be equal to quality and appearance of prior condition and to the satisfaction of the Owner's Representative.

1.08 FIELD CONDITIONS

A. Underground Utilities: Unknown buried utility lines may exist. If encountered, notify Owner's Representative immediately for direction and re-direct work to avoid delay.
   1. Cooperate and coordinate with Owner's Representative and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
   2. Do not interrupt existing utilities serving occupied facilities without proper notification to, and written direction from, Owner's Representative.

B. Wet Conditions: No grading operations shall be conducted when excessively wet conditions exist as determined by the Owner's Representative.

C. Contractor shall provide de-watering equipment as required to continue scheduled operations and provide optimum working conditions at no additional cost to Owner.

D. Dry Conditions: Contractor shall apply sufficient water to materials during construction to properly compact materials and control dust. Contractor shall provide dust control in conformance with Section 10 of Standard Specifications and shall provide water to subgrades as necessary to achieve compaction goals.

1.09 GRADE STAKES AND LINES

A. Grading and subgrading shall be controlled by Contractor-installed intermediate grade stakes and lines necessary to obtain the finished grade elevations shown or implied in the Drawings. Subgrade and finish grade surfaces shall conform to the control planes established by these grade stakes and lines.

B. Protect and maintain all existing benchmarks, monuments, and other reference points. If disturbed or destroyed, they shall be replaced at the Contractor's expense.

C. Contractor shall set temporary benchmarks as necessary to properly complete construction operations.

1.10 SURVEYING

A. Contractor shall be responsible for hiring a licensed professional surveyor to perform all surveying, layout and staking in accordance with requirements specified in Section 01 71 23 - Field Engineering. Contractor shall be responsible for informing Owner's Representative a minimum 2 working days' notice when staking and layout is scheduled so that a review of completed chalk lines and staking can take place.

1.11 TOLERANCES

A. Refer to related specification sections for grading tolerances of specified improvements.

PART 2 - PRODUCTS

2.01 PERFORMANCE CRITERIA

A. Excavations shall not exceed plus or minus 1/10-foot variation from dimensions and elevations shown or noted, unless otherwise accepted by Owner's Representative.

B. Grading Tolerance: Refer to related specification sections for grading tolerances of specified improvements.

2.02 MATERIALS

A. Fill Material: Soil excavated from the site or imported conforming to requirements for fill material contained in applicable portions of Division III Grading, Section 19 - Earthwork of the Standard Specifications, unless modified by recommendations for fill material contained in the Geotechnical Report. Imported fill shall be approved by the Geotechnical Engineer before importation to the site.

B. Topsoil: Excavated material from top 6 inches maximum of existing grade at unpaved areas and/or import material graded free of roots and rocks larger than two inches, subsoil, debris, weeds, large mats of grass, and other deleterious material. Topsoil shall be approved by the Owner's Representative and comply with the additional requirements specified in Section 32 90 00 - Planting.

C. Subsoil: Excavated material below top 6 inches of existing grade, graded free of clay clods larger than 6 inches, rocks larger than 3 inches, and debris.

D. Water: Clean and free from deleterious amounts of acids, alkalis, salts, and organic matter.

E. Additional Materials: As noted in the Geotechnical Report.

PART 3 - EXECUTION

3.01 PREPARATION

A. Identify all required lines, levels, contours, datum, control points and property lines required to properly establish limits of work.

B. Verify elevations of critical existing grades as noted on Drawings and as directed by Owner's Representative. Notify Owner's Representative of discrepancies prior to start of work and re-direct work to avoid delay.

C. Identify all known below grade utilities. Stake and flag locations.

D. Identify and flag surface grades and utilities.

E. Contact Underground Service Alert (USA), 800-642-2444, and local utility companies to verify locations of existing utilities a minimum of 5 working days prior to excavation.

3.02 PROTECTION

A. Maintain and protect existing utilities remaining which pass through work area.

B. Perform excavation work near utilities by hand. Provide necessary protection as the work progresses.

C. Provide and maintain protection for walks, curbs, drains, trees, corners of structures, and other improvement, as necessary to prevent damage.

D. Barricade and/or cover open excavations occurring as part of this work and post with warning lights to the satisfaction of the Owner's Representative. Operate warning lights during hours from dusk to dawn each day and as otherwise required.

E. Keep adjacent properties, streets and drives clean of any dirt, dust, or stains caused by earthwork operations.

F. Upon discovery of unknown utility or concealed conditions, notify the Owner's Representative immediately and re-direct work to avoid delay.

G. Control dust on and near the work, and on and near off-site borrow areas.
   1. Thoroughly moisten surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of any other activities that may occur on the site.
   2. Non-compliance with proper dust control measures will be cause for issuance of a "stop work" order by the Owner until such time as satisfactory measures can be implemented.

3.03 TOPSOIL EXCAVATION

A. Excavate topsoil from areas scheduled for paving or rough grading and stockpile material in neat wind-row(s) and in location(s) previously established and accepted in coordination with the Owner's Representative and which will cause least interference to construction operations.

B. Do not excavate topsoil that has become wetted to, or beyond, the saturation point that would be required for optimum compaction.

C. Stockpile topsoil in wind-row(s) of a height not to exceed 8 feet, protect from erosion, and cover as necessary to prevent formation of dust.

D. Topsoil staging areas shall be clearly defined and protected from other grading and utility operations.

3.04 ROUGH GRADING

A. Grade site subsoil to establish proper subgrade elevations and site contouring as described or implied in the Drawings:

B. Contouring:
1. Construct landforms depicted in the Drawings to the satisfaction of the Owner's Representative.
2. "Round-off" tops of slopes.
3. "Feather" toes of slopes.

C. Compaction:
1. Compact subgrade and engineered fill in accordance with the procedures and to relative compaction 95%.
2. Compact by power tamping, rolling, or combinations thereof as accepted by City Representative.
   a. Where impractical to use rollers in close proximity to adjacent construction, compact by mechanical tamping.
   b. Scarify, moisture condition, and recompact any layer not attaining compaction until required density is obtained.
3. Repeat compaction procedure until proper grade is attained.
4. In planting areas, fill in maximum 8-inch loose lifts compacted to between 85 percent and 88 percent relative compaction.

D. Compaction: Compact subgrade for the specific areas as follows unless otherwise noted:
1. Areas to be Planted: Maximum 8-inch loose lifts to be between 85 percent and 88 percent relative compaction.
2. Areas to be Paved:
   a. Maximum 8-inch loose lifts to at least 95 percent relative density.
   b. Additional lifts should not be placed if the previous lift did not meet the required density, relative compaction, moisture content or if the soil conditions are not stable. The top 12 inches shall be compacted to at least 95 percent relative compaction.
   c. Fill soils shall be compacted to no less than 90 percent relative compaction at moisture content of 2 to 4 percent for pavement area.
   d. Compacted subgrade should be non-yielding under construction traffic, including a loaded ten-wheel truck such as a water or dump truck, in all pavement areas. Removal and subsequent replacement of some material (i.e. areas of excessively wet materials, unstable subgrade, or pumping soils) may be required to obtain the minimum 95 percent compaction to the recommended depth of 12 inches.
   e. Subgrade preparation for pavement areas shall extend laterally for at least two feet beyond the edge of pavement.
3. Areas to Receive synthetic Turf: Shall be as follows:

a. Maximum 8-inch loose lifts to at least 90 percent relative density. The top 12 inches shall be compacted to at least 95 percent relative compaction.
b. Additional lifts should not be placed if the previous lift did not meet the required density, relative compaction, moisture content or if the soil conditions are not stable.
c. Fill soils shall be compacted to no less than 90 percent relative compaction at moisture content of 2 to 4 percent for pavement area.
d. Compacted subgrade should be non-yielding under construction traffic, including a loaded ten-wheel truck such as a water or dump truck, in all pavement areas and synthetic turf subgrade areas. Removal and subsequent replacement of some material including areas of excessively wet materials, unstable subgrade, or pumping soils, may be required to obtain the minimum 95 percent compaction to the recommended depth of 12 inches.

E. Remove all excess subsoil material from site and dispose of in a legal manner. Refer to "Material Storage" below.

F. Entire project or individual field area shall be rough graded at one time. No earthwork operation shall occur for partial field areas without receiving direction from the Owner or prior written approval from the Owner.

3.05 EXCAVATION

A. Remove and dispose of all miscellaneous materials encountered when establishing required grade elevations:
1. Miscellaneous materials can include but are not limited to: pavements and other obstructions, underground structures, utilities, abandoned irrigation materials, and other materials encountered per the discretion of the Owner's Representative.

B. Stability of Excavations:
1. Comply with any applicable recommendations contained within the Project Geotechnical Report and requirements of agencies having jurisdiction.
2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

C. De-watering: Provide and maintain, at all times during construction, ample means and devices with which to promptly remove and properly dispose of water from any source entering structural excavation, pipe trenches, or other excavations. All costs incurred from de-watering activities shall be paid for by the Contractor.

D. Excavation for Structures: Conform to elevations and dimensions shown in the drawings within a tolerance of plus-or-minus 1/10 (0.10) of a foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete form-work, installation of services, and quality review.

E. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations, and grades as shown in the Drawings.

F. Material Storage:
1. Stockpile satisfactory excavated materials where appropriate, until required for use.
2. Stockpile topsoil and subgrade soil in separate piles.
3. Place, grade, and shape stockpiles for proper drainage.
4. Locate and retain stockpiles away from edge of excavations.
5. Dispose of excess soil material in a legal fashion after it has become evident that the material is no longer needed on the project and is of no value to the Owner.

## 3.06 TOPSOIL PLACEMENT

A. Thoroughly cross-rip all subgrade soil to a depth of 12 inches prior to placing the specified thickness of topsoil back into all applicable planting areas. Secure review and acceptance of ripping depth prior to placement of topsoil. Refer to Section 32 90 00 - Planting for this process.

B. Topsoil placement requirements for planting areas shall be as follows:
   1. Planting Areas: A minimum of 6 inches of clean, acceptable topsoil.
   2. Topsoil shall not be placed until all earthwork and utility operations are complete.
   3. Topsoil shall be installed at one time for entire project or entire field area. No partial placements shall occur.

C. Compact topsoil to 84 percent to 89 percent relative density.

D. Maintain slopes and gradients established during subgrade operations and shape landforms to satisfaction of the Owner's Representative.

E. Refer to Section 32 90 00 - Planting for finish grading information and finish grades at edge of planting areas and hardscape.

## 3.07 FIELD QUALITY CONTROL

A. Tolerances: Conform to Conform to Section 19 of the Standard Specifications, unless more stringent requirements in these Contract Documents are provided, in which place the more stringent tolerances shall govern. Refer to Section 01 71 23 - Field Engineering for additional project requirements.

B. The Owner Representative shall review and accept work at the following stages:
   1. Topsoil removal and stockpile.
   2. Grading plan for project. Plan shall provide strategy for grading sequence for entire site at one time or by field. Limits and sequence shall be reviewed and coordinated.
   3. Cross ripping of subgrade shall be reviewed and observed.

END OF SECTION

# SECTION 31 23 00

# EXCAVATION AND FILL

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Trenching, backfilling, and compaction required for, but not necessarily limited to, the following:
   1. Sanitary sewer line installation.
   2. Storm drainage system installation.
   3. Potable water line installation.
   4. Irrigation system installation.

B. Related Requirements:
   1. Section 01 33 00 - Submittal Procedures
   2. Section 01 71 23 - Field Engineering
   3. Section 01 78 39 - Project Record Drawings
   4. Section 02 41 13 - Site Clearing and Demolition
   5. Section 31 20 00 - Earth Moving
   6. Section 32 01 90 - Existing Tree Protection and Maintenance
   7. Section 32 11 00 - Base Courses
   8. Section 32 90 00 - Planting
   9. Section 33 11 00 - Domestic Water Utilities
   10. Section 33 40 00 - Storm Drainage Utilities

### 1.02 REFERENCES

A. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 SEQUENCING AND SCHEDULING

A. Refer to all other Contract Documents, determine the extent and character of related work, and properly coordinate work specified herein with that described elsewhere to produce a complete, operational installation.

### 1.04 CLOSEOUT SUBMITTALS

A. Project Record Drawings:
   1. Conform to requirements specified in Section 01 78 39 - Project Record Documents.
   2. Accurately record locations of utilities remaining, re-routed utilities, new utilities, and newly discovered utilities by horizontal dimensions, elevations, inverts and slope gradients as practical.

### 1.05 QUALITY ASSURANCE

A. Control of Work: Comply with Section 5 of the Standard Specifications.

B. Control of Materials: Comply with Section 6 of the Standard Specifications.

C. Trench Safety: Comply with applicable portions of Sections 5 and 7 of the Standard Specifications and requirements of OSHA and other agencies having jurisdiction).

1.06 FIELD CONDITIONS

A. Wet Conditions: No trenching shall occur when excessively wet conditions exist in the opinion of the Owner's Representative.

B. Dry Conditions: Contractor shall provide dust control in conformance with Section 10 of Standard Specifications and shall provide water to work as necessary to achieve compaction goals.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Materials shall be free of debris, roots, wood, scrap material, vegetative matter, refuse, soft unsound particles, or other deleterious and objectionable materials.

B. Bedding for Utility Piping: Sand conforming to Section 19-3.02F(2) of the Standard Specifications.

C. Backfill for French Drain and Vertical Drain Lines, refer to Section 33 40 00 - Storm Drainage Utilities.]

D. Native Backfill: Native backfill shall be acceptable soil material excavated from the project site. This material will be considered unclassified and no testing other than for compaction will be required. Additional material required for backfill shall be acceptable to the Owner's Representative.

E. Permeable Material: Permeable material shall be Caltrans Class II permeable rock material.

F. Slurry Fill: Controlled low-strength fluid material (CLSM) consisting of water, Portland cement, aggregate, and fly ash with slump of 10 inches or more and an unconfined compressive strength of 200 psi or less.

G. Aggregate Base: As specified in Section 32 11 00 - Base Courses.

PART 3 - EXECUTION

3.01 PREPARATION

A. General:
1. Prior to trenching, the Contractor shall pothole existing utilities at locations indicated or implied on the Drawings, where new piping or utilities will cross existing utilities of uncertain depth to determine the elevation of the utility in question and ensure that the new line will clear the potential obstruction.
2. The Contractor shall mark out construction areas in white with non-permanent paint and contact Underground Service Alert (U.S.A.), 800-642-2444, to locate all known utilities a minimum 48 working hours prior to any excavation.
3. Should an existing crossing utility present an obstruction, the proposed line shall be adjusted as acceptable to the Owner's Representative to clear the existing utility.

3.02 TRENCH EXCAVATION

A. General:
1. Excavation shall include removal of water and materials that interfere with construction. Remove water which may be encountered in the trench by pumping or other methods prior to pipe laying,

bedding and backfill operations. Trenches shall be sufficiently dry to permit proper jointing and compaction.

2. Contractor is responsible for directing vehicular and pedestrian traffic safely through or around the work area at all times.
3. The Contractor shall relocate, replace, reconstruct or repair, to an "as-was" or better condition, surface or subsurface improvements which are in the line of construction or which may be damaged, removed, disrupted or otherwise disturbed by the construction activities. Except as specified in other Sections or shown in the Drawings, this provision applies to all surface improvements of whatever nature such as walls, fences, above-grade utilities, landscaping, paving, structures, or other physical features whether shown in the Drawings or not and to all subsurface improvements such as utilities which may be indicated in the Drawings or marked in the field. The Contractor shall connect modified utilities to existing systems and leave work in an operating condition. The cost of this work shall be considered as included in other items of work and no additional compensation will be allowed.
4. The maximum allowable trench width at the top of pipe shall be 18 inches greater than the pipe diameter.
5. New utility trenches extending deeper than 2 feet below finish grade should be located a minimum of 5 feet away from footings and foundations.

B. Existing Paving Areas:
   1. Existing asphalt paving over new trenches shall be sawcut, removed, and legally disposed. Existing asphalt paving shall be neatly sawcut 1 foot greater on each side than the trench width. If a longitudinal pavement joint or edge of pavement is located within 3 feet of the limit of excavation, intervening pavement shall be removed and replaced after completion of backfilling. If curb, gutter, or similar concrete improvement are to be replaced, the adjacent existing asphalt paving shall be sawcut 2 feet from the edge of concrete.
   2. Existing Portland cement concrete paving over new trenches shall be sawcut to a minimum depth of 1-1/2 inches in straight lines either parallel to the curb or at 90-degree angles to the alignment of the sidewalk prior to being broken out. No section to be replaced shall be smaller than 30 inches in either length or width. If the sawcut would fall within 30 inches of a construction joint, expansion joint, or edge, or within 12 inches of a score mark, the concrete shall be removed to the joint, edge, or mark.

C. Walkway Areas:
   1. Backfill for trenches or other excavations within walkway areas should be compacted in 6-inch maximum layers, unless otherwise noted, with hand-held tampers to assure adequate subgrade support.

D. Compacted Fill Areas:
   1. Where trenches are to be excavated in compacted fill, these trenches shall be backfilled with the fill materials excavated and re-compacted in the layers and to the density specified for the particular area.

E. Open Trench:
   1. No trench shall be left in an open un-protected condition at the end of the day. At the end of the day, open trenches shall be protected in a manner acceptable to the Owner's Representative.
   2. Provisions for trench crossings and access shall be made at all street crossings, driveways, water gate valves, and fire hydrants unless otherwise acceptable to the Owner's Representative.

F. Excavated Material:
   1. Excavated material not required for backfill or of value to the Owner shall be removed and legally disposed of by the Contractor at no additional cost.
   2. Material excavated in streets and roadways shall be laid alongside the trench no closer than 2 feet from the trench edge and kept trimmed to minimize inconvenience to public traffic.
   3. Provisions shall be made whereby all storm and waste water can flow uninterrupted in gutters or drainage channels to drainage structures.

4. Excavated material shall not be stored on existing landscaping or paving without provisions being made to protect the surface below from being stained or otherwise adversely affected.

G. Shoring
1. Should excavations extend more than 4 feet below existing ground surface, shoring will be required.
2. For trenching greater than 4 feet deep side slopes are not to exceed 1-1/2: 1 with a depth of 20' max.
3. When trenching greater than 4 feet deep, provide a trench box or shield approved by a PE or designed with accompanying tabulated data approved by a PE.
4. Provide shoring, bracing, or underpinning when trenching next to adjoining walls, sidewalks, or pavements. There shall be no trenching below the base or footing of a foundation that can reasonably expected to pose a hazard to workers unless one of the mentioned support systems is used.
5. Follow OSHA standards for maintaining, installing, and removing support systems.
6. Utility trenches shall be excavated according to accepted engineering practices following OSHA.

3.03 PIPE BEDDING

A. Stabilization of Trench Bottom:
1. When the trench bottom is unstable due to wet or spongy foundation, trench bottom shall be de-watered as necessary. The Owner's Representative will determine the suitability of the trench bottom and the amount of sand, gravel, or crushed rock needed to stabilize the soft foundation.

3.04 TRENCH BACKFILL AND COMPACTION

A. General:
1. Construct backfill in two operations, initial and final.
2. Do not backfill where the foundation material in trench is already saturated, except as acceptable to the Owner's Representative. Provide a minimum cover as shown or specified.
3. Where settling greater than the tolerance allowed for grading occurs in trenches and pits due to unstable subgrade material, 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.
4. Place final backfill in 6-inch maximum loose lifts for utilities under roads, streets, concrete slabs or other areas to be paved and synthetic turf subgrade areas.
5. Compact backfill surrounding ducts, conduits, pipes and other structures, including the top 12-inches of subgrade to 95 percent maximum density in accordance with ASTM D1557.
6. Backfill to permit the rolling and compacting of the completed excavation with the adjoining material providing the specified density necessary to enable rock placement of paving of the area immediately after backfilling has been completed.
7. Where trenching occurs at chemically treated subgrade, backfill using a controlled low-strength material (CLSM) slurry as specified.

B. Initial Backfill:
1. Prior to trench backfill, the condition of the trench and laying of pipe shall be acceptable to the Owner's Representative.
2. Select backfill material shall be used as initial backfill for all utilities except irrigation piping, except as otherwise noted and specified.
   a. After the pipe has been properly laid and accepted by the Owner's Representative, selected backfill material shall be placed on both sides of the pipe and compacted to the depth shown in the Drawings.
   b. Compaction: The initial backfill material shall be hand tamped in layers not exceeding 4 inches in uncompacted depth and shall be brought up uniformly on both sides of the pipe to avoid bending or distortional stress. After hand-tamping, the relative compaction of the initial backfill material shall be at least 95 percent relative compaction.

3. Where trenching occurs at chemically treated subgrade, backfill using specified controlled low-strength material (CLSM) slurry.
    a. The mixture shall be placed using chutes, conveyors, buckets, or pumps depending upon t accessibility.
    b. Placed in lifts to prevent piping from floating.
    c. Do not vibrate.

C. Final Backfill:
1. Native backfill material shall be used for final backfill, unless otherwise noted.
2. Compaction: Final backfill compaction shall be by mechanical means with backfill material placed in layers not exceeding 6 inches in loose depth. Each layer shall be thoroughly compacted before succeeding layers are placed. The use of machine tampers, except manually held types, shall not be permitted. Final backfill shall be compacted to a relative compaction of 95 percent for paving areas and synthetic turf subgrade areas. In planting areas, provide acceptable topsoil to required depth compacted to 85 percent to 89 percent maximum relative compaction.

D. Jetting: No jetting will be allowed.

3.05 TRENCH SURFACING

A. General:
1. In unimproved areas, the trench surface shall be restored to its original condition. No mounds of earth shall be left along the trench.
2. Backfill shall be flush with adjoining grade in a firm, unyielding position with no visible settling for a period of one year after Final Acceptance.

B. Paved Areas:
1. Temporary surfacing acceptable to the Owner's Representative shall be laid within 1 day after backfilling, except where the Contractor elects to place permanent surfacing within this time period, until permanent paving is installed.

END OF SECTION

# SECTION 32 11 00

# BASE COURSES

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Grading and compaction of subgrade soil for areas to receive pavement, structures, and base material.
   2. Furnishing and placing of aggregate base material.

B. Related Requirements:
   1. Section 01 71 23 - Field Engineering
   2. Section 31 20 00 - Earth Moving
   3. Section 32 12 16 - Asphalt Paving
   4. Section 32 13 13 - Concrete Paving

### 1.02 REFERENCES

A. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Sequencing and Scheduling
   1. Work of this Section shall not proceed until all underground utilities and irrigation sleeving have been installed and accepted.
   2. Contractor shall schedule work so that installation of paving and surfacing occurs no later than 5 working days after placement and proper compaction of base materials. Base materials left un-paved longer than this time period shall be subject to testing and re-compaction at the contractor's expense.

### 1.04 ACTION SUBMITTALS

A. Certificates of compliance, including sieve analyses, for products and materials proposed to be used in work covered by this Section.

### 1.05 QUALITY ASSURANCE

A. Control of Work: Conform to Section 5 of the Standard Specifications.

B. Control of Materials: Conform to Section 6 of the Standard Specifications.

### 1.06 FIELD CONDITIONS

A. Wet Conditions: Do not prepare subgrade or place base material when excessively wet conditions exist as determined by the Owner's Representative.

B. Dry Conditions: Contractor shall provide dust control in conformance with Section 10 of Standard Specifications and shall provide water to subgrades and base courses as necessary to achieve compaction goals.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be stockpiled on site in locations that, in the opinion of the contractor, cause least interference with construction operations and as acceptable to the Owner's Representative.

B. Materials shall not be stockpiled in proposed planting areas.

C. Protect materials from segregation, contamination and wind and water erosion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aggregate Base: Class 2, 3/4-inch maximum material conforming to Section 26-1.02A of the Standard Specifications.

PART 3 - EXECUTION

3.01 SUBGRADE PREPARATION

A. Preparation of subgrade shall conform to Section 6 of the Standard Specifications and as specified in Section 31 20 00 - Earth Moving.

B. Remove unsuitable subgrade material as necessary and replace with suitable material or aggregate base per the discretion of the Owner's Representative.

3.02 BASE MATERIAL PLACEMENT

A. Conform to Section 26 of the Standard Specifications.

B. Obtain acceptance of subgrade preparation work prior to placing base material thereon.

C. Place and compact base material in 6-inch maximum lifts unless otherwise noted. Compaction shall be at least 95 percent relative compaction.

D. Base material shall be moisture conditioned to between optimum and 3 percent above optimum prior to placement and compaction.

3.03 TOLERANCES

A. Conform to Section 26 of the Standard Specifications, unless more stringent requirements in these Contract Documents are provided, in which place the more stringent tolerances shall govern.

3.04 CLEAN-UP OF WORK AREA

A. The Contractor shall remove and legally dispose of excess materials, spoils, and debris from the job site on a daily basis.

## 3.05 PROTECTION OF FINISHED PRODUCT

A. The Contractor shall provide lighted barricades, signs, and other devices as necessary to prevent damage to finished base courses.

END OF SECTION

# SECTION 32 13 13

# CONCRETE PAVING

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Concrete flatwork as shown on the Drawings including, but is not necessarily limited to, the following
   1. Curbs and gutters.
   2. Valley gutters and concrete swales.
   3. Mowbands and edge bands.
   4. Accessible ramps.
   5. Driveway aprons.
   6. Walkways.
   7. Expansion and control joints.
   8. Reinforcement.
   9. Finishing.

B. Related Requirements:
   1. Section 01 33 00 - Submittal Procedures
   2. Section 01 71 23 - Field Engineering
   3. Section 32 12 16 - Asphalt Paving
   4. Section 31 20 00 - Earth Moving
   5. Section 32 11 00 - Base Courses
   6. Section 32 32 15 - Landscape Concrete; foundations and formed concrete for planters, seat walls, and other site improvements as shown.
   7. Section 32 33 00 - Site Furnishings

### 1.02 REFERENCES

A. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Pre-Installation Meeting: Conduct meeting at Project site to review scope of concrete paving work and expectations.
   1. Meeting shall be scheduled after approval of mockups and sufficiently in advance of commencement of concrete paving.
   2. Attendees shall include:
      a. Contractor.
      b. Concrete subcontractor.
      c. Owner’s Representatives.

### 1.04 ACTION SUBMITTALS

A. Product Data: Manufacturers' current catalog cuts and specifications for the following:
   1. Expansion joint filler materials.

2. Color admixtures.
3. Curing compounds.
4. Surface retarder.
5. Other items as requested by Owner's Representative.

B. Samples:
1. Concrete materials as required for testing and inspection.
2. Expansion Joint Sealant: Manufacturer's standard bead samples showing full range of colors available.
3. Concrete Panels: Not less than 12 inches by 12 inches for each selected color and finish texture using concrete mix proposed for this Project.
a. Indicate materials and methods used to produce each color and texture.
b. Mockup work shall not commence until a concrete sample panels have been approved.

C. Concrete Mix Design: Submit mix designs and certified compressive strength test reports for each concrete strength, type, additives, and maximum aggregate size required, prepared, and certified by the ready-mix concrete supplier.

1.05 INFORMATIONAL SUBMITTALS

A. Statement of installer/finisher qualifications if requested by Owner's Representative.

B. Mill Certificates and Certifications for reinforcing bars, if used.

C. Delivery tickets for each load of concrete delivered to the site.

D. Results of slip-resistance testing.

1.06 QUALITY ASSURANCE

A. Construction of concrete flatwork, including curbs and gutters, shall conform to Section 73 of the Standard Specifications.

B. Codes and Standards: Comply with the applicable provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
1. California Building Code, Title 24, Part 2, Chapter 19A - Concrete
2. ACI 301 Specifications for Structural Concrete for Buildings
3. ACI 318 Building Code Requirements for Reinforced Concrete
4. ACI 614 Recommended Practice for Measuring, Mixing, and Placing Concrete
5. Concrete Reinforcing Steel Institute, Manual of Standard Practice

C. Contractor shall be responsible for quality of concrete in place and shall bear burden of proof that concrete as placed meets minimum requirements.

D. Slip Resistance: Floor tile shall provide a value equal to or greater than 0.42 when tested in accordance under dry conditions with DCOF AcuTest procedure contained in ANSI A137.1:2012, Section 9.6, and under wet conditions with DCOF AcuTest procedure of ANSI B101.3.

E. Concrete Testing:
1. The Owner may retain, at its expense, a testing laboratory to perform material evaluation tests in accordance with Section 01 45 00 - Quality Control.
2. Testing may include slump tests and securing samples of concrete, cement, aggregates, or other materials for testing. Applicable materials shall be provided by the Contractor at no additional cost to the Owner.

F. When review or observation is required of the Owner's Representative of the concrete work, Contractor shall notify the Owner's Representative not less than 2 working days prior to date when the review or observation is required.

G. Pre-Pouring Review:
   1. Formwork, joint patterns, base material, reinforcement, "dobies," ties, and other installation accessories shall be reviewed and accepted by the Owner's Representative prior to pouring concrete.
   2. Forms, reinforcing, and accessories shall be in place and Contractor shall give a minimum of 5 working day lead-time notice to Owner's Representative when scheduling the review request.
   3. Contractor shall allow a minimum of 2 working days after pre-pour review in Construction Schedule for possible modifications to concrete preparation work, at no cost or delay to the project.

H. The Owner's Representative shall have access to any off-site batch plant or quarry supplying materials at all times for subject project and trucks in route to the project site.

I. Mockups:
   1. General:
      a. Mix design shall match that used on accepted sample panels and proposed for use in final construction including cement and color additive.
      b. Prepare at least one month before start of final concrete work to allow concrete to cure before observation.
      c. Concrete color and finish for mockup appearance shall match color and finish of accepted sample.
      d. Build mockups at the location indicated or, if not indicated, as selected by the Owner's Representative
      e. Notify Owner's Representative 5 working days in advance of dates and times when mockups will be constructed and layouts will be ready for review.
      f. Color and texture shall be approved before starting construction.
      g. Perform specified slip-resistance testing on mockups.
      h. Maintain final accepted mockups in an undisturbed condition as a standard for judging the completed Work.
      i. Retain samples of sands, aggregates, and color additive used in the mockups for comparison with materials used in final work.
      j. Demolish and remove mockups when directed if not incorporated into the final work.
   2. Flat Paving Mockups:
      a. 4-feet x 4-feet sample panels of concrete flatwork for each required color and texture shall be poured by the Contractor at the site for review and acceptance by the Owner's Representative.
      b. Quantity:
         1) Contractor shall allow for preparation of up to 2 flat paving mockups for evaluation and final approval of each concrete.
         2) For mockups demonstrating appearance using specified surface retarder, Contractor shall prepare a mockup using specified retardant level plus additional samples one level higher and one level lower, of applicable, for review by Owner's Representative.
      c. Samples shall include each type and profile of joint, surface texture, and tooled conditions for approval. Contractor shall schedule review well in advance of concrete operations to allow for modifications and preparing an additional mockup panel if necessary.
   3.

1.07 DELIVERY AND STORAGE

A. Deliver concrete reinforcement to job site properly tagged and ready to set. Store above ground surface on platforms, skids, or other supports. Coordinate delivery and storage of all other materials as appropriate.

B. Coordinate delivery so that mixes may be immediately poured upon arrival at site.

1.08 FIELD CONDITIONS

A. Maintain control of concrete dust and water. Do not permit adjacent areas to be contaminated.

PART 2 - PRODUCTS

2.01 BASE MATERIALS

A. Aggregate: As specified in Section 32 11 00 - Base Courses.

2.02 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
   1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less.
   2. Do not use notched and bent forms.

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

2.03 REINFORCING

A. General:
   1. Reinforcing steel shall be cut and bent cold to exact lengths and shapes to comply with Drawings, reviewed shop drawings, and referenced codes and standards.
   2. Comply with the additional requirement shown on the Drawings.

B. Welded Wire Mesh (WWM): 6 x 6 #10, unless noted otherwise in the Drawings, conforming to ASTM A185. Wire mesh shall be "chaired" up with 2-inch x 2-inch x 2-inch concrete blocks to ensure uniform embedment into concrete section to dimension as shown in the Drawings.

C. Reinforcing Steel: Deformed billet steel bars complying with Section 52-1.02B of Standard Specifications, Section 1907 of CBC and ASTM A615.
   1. Provide Grade 60 for No. 4 and larger, Grade 40 for No. 3 and smaller.
   2. Bars shall be in a new, “first-class” condition.

D. Smooth Dowel Steel Bars for Expansion Joints: ASTM A29, Grade 40, No. 3 smooth.
   1. Dowels shall be shop painted with iron-oxide zinc-chromate primer.
   2. Where shown, provide metal dowel sleeve or other approved break-bond method at one end of dowel to permit lateral movement at dowel within concrete section.
   3. Provide for movement which equals joint width plus 1/2 inch.
   4. Bars shall be in a new, “first-class” condition.

E. Dowel Insert System: Single component dowel sleeve with self-locking design; Greenstreak “Speed Dowel” by Sika, or equal selected for dowel profile and diameter indicated on the Drawings.

F. Tie Wire: ASTM A82, black annealed, minimum 16 gauge.

G. Supports for Reinforcement: Provide bolsters, chairs, spacers, and other devices for spacing, support and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications, unless otherwise acceptable.

## 2.04 CONCRETE MATERIALS

A. Cement: ASTM C150, Type II, and shall be provided by one manufacturer.

B. Pozzolan: Class F Fly Ash per ASTM C618 comprising 15-20% of total cementitious materials. Fly Ash may be added to a maximum ratio of 35% of total cementitious materials where testing reports are provided for the mix design review.

C. Coarse Aggregates: Coarse aggregates shall conform to ASTM C33, sizes 57, 67 or 7. Pea gravel aggregate shall not be used.

D. Fine aggregates: Fine Aggregates shall conform to ASTM C33.

E. Water: Clean and not detrimental to concrete.

F. Surface Retarder at specified Concrete Edgebands: Water-based, top-surface retarder and etch; "Top Cast" by Dayton Superior. Contractor shall verify compatibility with concrete mix to achieve desired finish.
   1. Grade: Top Cast #25
   2. Integral Color: Davis Color, Jet Black 8084

## 2.05 CONCRETE ADDITIVES

A. Pigment for Concrete: Synthetic mineral-oxide pigments or colored water-reducing admixtures, color stable, nonfading, and resistant to lime and other alkalis, and complying with ASTM C979; Davis Colors Inc., 800-800-6856, as specified and noted on the Drawings, or equal.
   1. If added to mix at Project site, additive shall be furnished in manufacturer's "Mix-Ready" disintegrating bags.
   2. Dosage Rate: As required to achieve color of approved sample but not exceeding 10 percent of weight of cementitious materials in mix.
   3. Colors:
      a. Darkening Agent: Davis Colors Inc. colorant #8084 Black, or acceptable equal.
         1) Dosage: 1/4-pound per sack of concrete.
      b. Other Colors: As noted on the Drawings.

B. Fiber Reinforcement: 100 percent virgin homopolymer polypropylene fibrillated fibers; "Fibermesh 300" by Propex Concrete Systems Corp., or equal.

C. No admixtures shall be allowed without written acceptance by the Engineer of Record. Admixtures that have a negative impact on concrete finish shall not be used. When more than one admixture is used, admixtures shall be compatible.

## 2.06 ACCESSORIES

A. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days. SIKAGrout 212 or equal.

B. Curing Materials:
   1. Liquid Curing Compounds: ASTM C309, Type 1.
   2. Sheet Material: Waterproofed Kraft paper, ASTM C17, regular type.

C. Joint primer: One component, solvent based; Sonneborn horizontal paving joint primer No. 733, or No. 766, or equal.

D. Fiber Expansion Joint Material: Preformed cellular fiber complying with ASTM D1751; 1/2 inch thick unless otherwise indicated.
   1. Expansion joint material shall be variety with "zip-strip" H-channel joint sealant receptacles. If proposed joint material is not installed with sealant receptacles then, the expansion joint material shall be completely covered with a Sonneborn "Sonofoam" closed cell backer rod or acceptable equal prior to application of joint sealant.
   2. Provide 3/8-inch tooled edges each side of joint material. Refer to Drawings for additional information.

E. Paving Expansion Joint Sealant: One-part, self-leveling polyurethane conforming to ASTM C920, Class 25, Type S, Grade P; Sonneborn "Sonolastic SL 2," or equal.
   1. Color: As selected by Owner's Representative.

F. Cold Joint Form: "Key Kold" by MeadowBurke, or equal.

2.07 CONCRETE MIXING

A. General:
   1. Mix and deliver concrete in accordance with ASTM C94.
   2. Addition of water to the mix after leaving the plant is not permitted.
   3. No admixtures will be allowed without prior acceptance by the Owner's Representative. If accepted, use admixtures according to manufacturer's written instructions.
   4. Ensure equipment and plant will afford accurate weighing, minimize segregation, and will efficiently handle materials.
   5. Deposit concrete into final position within 90 minutes of introduction of cement.

B. Add fiberglass reinforcement into the track trench drain concrete bedding at the batch plant. Specified fibers shall be added at the rate of 1.5 pounds per cubic yard of concrete.

C. Pigments:
   1. Darkening Agent: Add 1/4 pound of specified black colorant per 94 lb. sack of cement to all concrete which will be exposed to view when cured except for drain rims and concrete receiving other colorants.
   2. Other Colors: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

D. Minimum ultimate compression strength of concrete at 28 days is as follows:

| Item | Strength (psi) | Maximum slump | Size of aggregate | Cement (min # of 94 lb. sacks per yard) | W/C Ratio (max) |
|---|---|---|---|---|---|
| Slab-On-Grade | 3,000 | 4" | 3/4"-1" | 5 | 0.50 |
| Curbs / Edgebands | 3,000 | 4" | 3/4"-1" | 5 | 0.60 |

E. Drying Shrinkage Limit at 21 Days: 0.40 percent.

F. Adjustment to Concrete Mixes:
   1. Mix design adjustments may be requested by Contractor when job conditions, weather, test results warrant, or to meet appearance of accepted samples or mockup.
   2. Test data for revised mix design shall be submitted to and accepted by Owner's Representative before using in work.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify requirements for concrete cover over reinforcement.

B. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.02 PREPARATION

A. Prepare joints in previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

B. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

3.03 EXCAVATION

A. In addition to the general grading excavation required, the Contractor shall excavate to the required depths in the locations shown for flatwork and curbs. Excess excavation shall be replaced with concrete poured monolithically with the wall or pavement, at no additional cost to the Owner.

3.04 INSTALLATION OF FORMWORK

A. Formwork shall conform to Section 51 of the Standard Specifications and as follows:
   1. The Contractor shall build forms with a high degree of care and shall select from materials of adequate strength and smoothness to produce smooth, even surfaces of uniform texture and appearance, free of bulges, depressions, or other imperfections per the discretion of the Owner's Representative. Remove any residue remaining on concrete after forms are removed.
   2. Transition of curves to straight lines and of curves to curves shall be formed as smooth, continuous, and uninterrupted with typical 90-degree radius alignment at the points of tangency.

3.05 PLACING REINFORCEMENT

A. General:
   1. When there has been a delay in placing concrete, reinforcement shall be inspected and, if necessary, cleaned, relocated, and tied at no additional cost to Owner.
   2. Wherever conduits, piping, inserts, sleeves, and similar item interfere with placing of reinforcing steel, obtain approval of Owner's Representative of method of procedure before concrete is placed.

B. Reinforcement installation shall conform to the provisions of the Standard Specifications as follows:
   1. Cleaning — Section 52-1.03B
   2. Bending — Section 52-1.03C
   3. Placing — Section 52-1.03D
   4. Splicing — Section 52-6
   5. Lapped Splices — Section 52-6.03B

3.06 PLACING CONCRETE

A. Place concrete in accordance with ACI 301.

B. Notify Engineer of Record and Special Inspector minimum 48 hours prior to commencement of operations. Do not place concrete until forms and reinforcements, as well as other required inspections, have occurred and the Special Inspector is present to perform observations and testing during placement.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

D. Separate slabs on grade from vertical surfaces with 1/2-inch-thick joint filler. Place joint filler to required elevations. Secure to resist movement by wet concrete.

E. Extend joint filler from bottom of slab to within 1/8 inch of finished slab surface.

F. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

G. Place concrete continuously between predetermined contraction joints.

H. Do not interrupt successive placement; do not permit cold joints to occur.

I. Screed slabs on grades shown, maintaining surface to tolerance of 1/4 inch maximum in 10 feet.

3.07 CONCRETE JOINTS

A. General:
   1. Joints shall be constructed as detailed in the Drawings.
   2. Refer to layouts on the Drawings for location of each joint type.

B. Expansion Joints: Install to full depth of slab.
   1. Cold Joints: Install specified cold joint forms in accordance with manufacturer's recommendations. Joints shall not be covered with concrete. Tool joint to remove concrete from edge of metal.
   2. Fiber Expansion Joints: After allowing concrete to fully cure, remove zip strips and install expansion joint sealant as shown and in accordance with manufacturer's instructions.
   3. Install specified dowel sleeves in accordance with manufacturer's instructions and as shown.

C. Score Joints: Tool to a 3/8-inch radius and to a 1-inch depth.

D. Form contraction joints as detailed on plans. Joints shall be formed immediately after final finishing with an approved concrete-sawing machine; "SOFF-Cut" as manufactured by SOFF-Cut International: Corona, California (909) 272-2330, or equal.
   1. Avoid dislodging aggregates.
   2. Unless otherwise indicated or directed, the joints shall be 1/8-inch-wide and 1-inch deep. Do not use zip-strips.
   3. Saw contraction joints to true alignment with "SOFF-Cut" concrete-sawing machines adequate in number and power and with sufficient replacement blades to complete the sawing at the required rate.
   4. Joints shall be cut as the concrete has hardened sufficiently to permit walking on the slab, and as recommended by the saw manufacturer.
   5. Unless otherwise approved, saw joints in the sequence of concrete placement. Remove cutting debris.
   6. Saw cuts shall be made in accordance with manufacturer's instructions.

E. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

1. Cut depth shall be 25 percent of slab depth unless otherwise shown or required to comply with accepted mockup.
2. Layout: As shown on the Drawings.

F. Curb and Edge Band Joint: Locate as follows, unless otherwise noted on the Drawings.
1. Every 5 feet for score joints.
2. Install fiber expansion joints maximum 15 feet on center.
3. Install fiber expansion joints at corners, and beginnings and endings of radii.
4. Align score and fiber expansion joints with proposed fence posts.

3.08 EDGING

A. Edges of slabs, curbs, and other paving shall be tooled with a 1/2-inch radius edging tool, unless otherwise indicated or specified in the Drawings.

B. Trowel marks resulting from tooling of edges shall be carefully troweled out.

3.09 PLACING OF CONCRETE

A. Notify Owner's Representative minimum 5 working days prior to pour.

B. Preparation:
1. Protect finished surfaces adjacent to areas to receive concrete.
2. Valve boxes, electric boxes, drainage inlet structures, manholes, lids, and other similar items shall be covered and protected prior to and during concrete pour. Concrete staining to these items will not be accepted.
3. Verify that the Owner's Representative, if required, has inspected reinforcement.
4. Notify the Owner's testing laboratory at least 2 working days before placing concrete.

C. Placing:
1. Concrete placement shall conform to Section 40-103H of the Standard Specifications.
2. Moisten earth, and spray forms and reinforcement with water before placing concrete.
3. Place concrete in continuous operation to permit proper and thorough integration and to complete scheduled placement.

D. Concrete shall not be dropped freely where reinforcing bars will cause segregation, nor shall it be dropped freely more than six feet. Spouts, elephant trunks, or other acceptable means shall be used to prevent segregation.

3.10 CONCRETE FINISHING - GENERAL

A. Provide formed concrete surfaces to be left exposed with a medium sand-blast finish. Coordinate with Landscape Architect prior to placing concrete.

B. Finish concrete floor surfaces in accordance with ACI 301. Provide non-slip surface where concrete floor surfaces are left exposed, unless noted otherwise.

C. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

3.11 FLATWORK FINISHING

A. General:
1. Provide each concrete finish where shown in the Drawings.

2. Provide samples and mockups as specified of all concrete finishes for review and acceptance prior to pouring concrete.

B. Broom Finish:
1. Broom with medium bristled broom to a uniformly roughened surface. Finished surface shall be clean with uniform and straight lines.
2. Paving with a slope greater than 6 percent shall be heavy broom finish and paving less than 6 percent shall be a medium broom finish.

C. Areas to Receive Surface Retarder:
1. Apply specified surface retarder uniformly to wet concrete after the initial bleed water rises to the surface using low pressure spray equipment in accordance with manufacturer's recommendations.
2. Remove retarded cement matrix with water.
3. Exercise care, and install protective procedures, to prevent rinse water from damaging adjacent materials or entering adjacent soil and planting areas. Should rinse water contaminate soil of planting areas, affected soil shall be removed and replaced with new soil complying with Section 32 90 00 - Planting at no additional cost to Owner.

## 3.12 FIELD QUALITY CONTROL

A. Provide free access to Work and cooperate with Owner's Representatives.

B. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

C. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

D. At a minimum one slump test will be taken for each set of test cylinders taken.

E. Tolerances:
1. Vertical deviation from specified grades shall not exceed 0.04 foot.
2. Surface smoothness deviations shall not exceed 1/8 inch in 8 feet, in any direction.
3. Thickness shall not be more than 0.01 foot less than planned thickness at any point.

## 3.13 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Cure floor surfaces in accordance with ACI 308.

D. Spraying: Spray water over floor slab areas and maintain wet for 7 days.

E. Provide necessary security to protect the concrete from vandalism. Concrete which is defaced or damaged during the course of this Contract shall be replaced by the Contractor at no additional cost to the Owner.

## 3.14 PATCHING

A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

C. Patch imperfections in accordance with ACI 301.

3.15 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements; concrete with excessive honeycombs or other surface or finish defects.

B. Repair or replacement of defective concrete will be determined by the Engineer of Record.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

D. No additional compensation will be allowed for repair of defective concrete.

3.16 CLEANING

A. Remove excess base material, concrete spills, cement stains and all other excess materials from all project areas prior to Final Acceptance.

END OF SECTION

# SECTION 32 18 00

# MISCELLANEOUS PAVING AND SURFACING

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Miscellaneous paving surfacing as shown on the Drawings including, but is not limited to, the following:
   1. Decomposed granite track paving.
   2. Natural aggregate paving.
   3. Poured in place rubber play area surfacing.

B. Related Requirements:
   1. Section 32 33 00 - Site Furnishings
   2. Section 31 20 00 - Earth Moving
   3. Section 32 11 00 - Base Courses

### 1.02 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Sequencing and Scheduling:
   1. Coordinate applicable subgrade preparations, installations of base course materials, and all other work with work of this Section to insure a proper, timely installation.

### 1.03 ACTION SUBMITTALS

A. Samples:
   1. Unless otherwise specified, submit 1-quart size samples of the following:
      a. Decomposed granite.
      b. Mulch.
   2. Poured-in-Place Rubber Surfacing: 1 foot by 1 foot poured sample for each color or color mix of to be used. Approval is required prior to delivery of material to the site.
   3. FlexGrass Synthetic Turf: 1 foot by 1 foot sample of resilient surfacing thickness and turf monofilament.

### 1.04 QUALITY ASSURANCE

A. Materials Source: Sources of materials specified herein shall not be changed during course of work without review and written acceptance by the Owner's Representative.

### 1.05 WARRANTY

A. Manufacturers: Provide Owner with the following manufacturers extended warranties.
   1. Poured in Place Rubber Resilient Surfacing: 10 years.

PART 2 - PRODUCTS

2.01 DECOMPOSED GRANITE PAVING

A. Supplier: TMT Enterprises, Inc., San Jose, CA, 408-432-9040 as specified and the basis of design unless otherwise noted, or equal. Contact: Matt Moore.

B. Binder for Decomposed Granite: Natural, non-toxic, colorless and odorless binding material for use with decomposed granite fines; "PHP Organic Aggregate Binder."
   1. Binder shall be pre-mixed with the track fines by supplier prior to delivery to project site.
   2. Rate: 12 pounds per ton of fines, unless otherwise recommended by fines supplier.

2.02 RESILIENT SURFACINGS

A. Poured in Place Rubber Resilient Surfacing: Wet poured, two-layer rubber-urethane playground surfacing system troweled on site; "EnduraFlex" and FlexGrout by FlexGround, Contact: Sandi Walsh at 916-474-5431, as specified and the basis of design, or approved equal.
   1. Local Supplier: FlexGround, 916-474-5431.
   2. System Components:
      a. Aliphatic Urethane primer.
      b. Basemat: Blend of 100 percent recycled SBR (styrene butadiene rubber) and urethane.
      c. Top Surface: ½" UV stable, urethane adhered TPV granules, 1-4mm TPV granules vulcanized product.
         1) Colors: Shall be solid (one color) as designated on Materials Plan.
   3. Thickness of basemat and top surface shall be IPEMA certified, and adhere to the ASTM F1292 and as recommended by manufacturer for fall height of the equipment.
   4. Performance Requirements:
      a. Dry Static Coefficient of Friction (ASTM D2047): 1.0.
      b. Wet Static Coefficient of Friction (ASTM D2047): 0.9.
      c. Dry Skid Resistance (ASTM E303): 89.
      d. Wet Skid Resistance (ASTM E303): 57.
   5. FlexGrout, medium viscosity grout engineered for the high wear areas, to penetrate and fill the voids between the pad's rubber granules. Colors are to be per plans.

B. Bonded Rubber Safety Surfacing: A poured in place single-layer system with porous finished surface capable of being installed at varying thickness to comply with the Critical Fall Height requirements of the playground equipment; "FlexBond" by FlexGround, Contact: Sandi Walsh at 916-474-5431, as specified and the basis of design, or approved equal.
   1. Local Supplier: FlexGround, 916-474-5431.
   2. System Components:
      a. 100% solids urethane primer/sealer.
      b. Minimum 1.5" thick using +4 SBR Mulch Buffings, Sieves 12.5mm (0%) 20 Sieve (98-100%) and the pan (0-2%).
      c. Manufactured from 100% post-consumer waste tire containing no metal or lead.
      d. Rubber to urethane ratio shall be 20%.
   3. Thickness of bonded rubber safety surfacing system shall be in accordance with ASTM F1292 and as recommended by manufacturer for fall height of the equipment.

C. FlexGround FlexGrass
   1. The Synthetic Turf material and resilient cushion should be in accordance with the following:

a. A poured in place system with a synthetic grass wearing layer upper membrane and an underlying impact attenuation cushion layer. The finished surface should be porous and capable of being installed at varying thickness to comply with Critical Fall Height requirements of playground equipment.
b. The cushion layer should be a mixture of black recycled rubber mixed with a 100% solids moisture cured aromatic Polyurethane binder (100 pounds of rubberized cushion layer to 12 pounds of binder) installed at the appropriate thickness. As an alternative, a 5/8" chunk rubber derived only from high quality pre-consumer recycled rubber containing EPDM is available. The cushion layer should be porous.

2. Synthetic Turf shall be:
   a. A 1-1/2" monofilament polyethylene with brown thatch yarn, formulated for superior wear resistance and a secondary proprietary polyethylene thatch. Product must have built-in antimicrobial protection to inhibit the growth of bacteria, mold, mildew, and reduce odor.
      1) The system should be tufted with a minimum of 60 ounce of yarn per square yard. The system should also include a primary woven polypropylene backing and a polyurethane secondary backing. Finish coating shall be at 22 ounces per square yard.
      2) The machine gauge shall be 1/2". Tufted pile height is 1-1/2".
      3) Total fabric weight shall be at least 88 ounces per square yard.
      4) The finished product should also include perforations to ensure drainage greater than 30 inches per hour. Non-perforated systems should not be acceptable alternates for purposes of this specification.
   b. The turf should be delivered in 15' wide rolls.
   c. All lines, numbers and markings indicated on plans should be permanently inlaid. Painted lines should not be an acceptable alternative for purposes of this specification.
   d. The fiber should be green in color to simulate natural grass as closely as possible and treated with UV inhibitor, guaranteed a minimum of eight years.
   e. The infill system should be an a non-expansive engineered coated, clean, dust free and specially sized silicon dioxide beads.
   f. Latex backed turf shall not be acceptable. All adhesives must also be latex free.
   g. Standard of Quality should be FlexGrass Premier Turf no nail system as built by FlexGround, LLC

## PART 3 - EXECUTION

### 3.01 AGGREGATE BASE

A. Install as shown on the Drawings and in accordance with Section 32 11 00 – Base Courses.

### 3.02 DECOMPOSED GRANITE

A. Install base course as specified per Section 31 11 00 - Base Courses.

B. Spread evenly and compact in 2-inch lifts in designated areas.

C. Water lightly and compact with roller.

D. Spread additional material, roll and compact to establish even finished grade at specified elevation.

### 3.03 POURED IN PLACE RUBBER RESILIENT SURFACING

A. Install in accordance with manufacturers specifications at locations shown on the Drawings.

3.04 FLEXGROUND FLEXGRASS

A. Install in accordance with manufacturers specifications at locations shown on the Drawings.

3.05 TOLERANCES

A. Vertical deviation from specified lines, grades, and detail cross sections shall not exceed 0.04 foot for all surfacing specified in this Section.

END OF SECTION

# SECTION 32 32 15

# LANDSCAPE CONCRETE

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Architecturally exposed formed concrete.
   2. Natural site concrete at utility pads.
   3. Subgrade, natural, as-cast concrete for seatwalls foundations, landscape fencing, furnishings and other site improvements.

B. Related Requirements:
   1. Section 31 20 00 - Earth Moving
   2. Section 32 13 13 - Concrete Paving
   3. Section 32 33 00 - Site Furnishings

### 1.02 REFERENCES

A. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Pre-Installation Meeting: Conduct meeting at Project with Owner's Representative and concrete installer at site to review scope of landscape concrete work and expectations.
   1. Meeting shall be scheduled after approval of mockups and sufficiently in advance of commencement of architecturally exposed concrete for the site improvements.
   2. Record discussions of conference and any conflict, incompatibility, or inadequacy. Furnish a copy of record to each participant.

C. Coordination:
   1. Coordinate delivery so that mixes may be immediately poured upon arrival at site.
   2. Coordinate proper installation of accessories and anchorage embedded in concrete and for the provision of holes, openings, and other penetrations necessary to the execution of the work of other trades.
   3. Coordinate mix design and finishing of colored concrete work to assure appearance match with cast-in-place concrete included on the Structural Drawings.

### 1.04 ACTION SUBMITTALS

A. Formwork:
   1. Show joints, edge profiles, form material, and other items that affect appearance of exposed surface. Indicate specified Class.
   2. See Section 32 33 00, "Site Furnishings," for additional requirements.

B. Reinforcing Steel: Fabricators drawings for steel reinforcing showing complete bending and placing details of reinforcement necessary for location of reinforcement.

C. Product Data: Manufacturers' current catalog cuts and specifications for the following:
   1. Formwork panels and board form liners, if used.
   2. Expansion joint filler materials.
   3. Color admixtures.
   4. Curing compounds.
   5. Other items as requested by Owner's Representative.

D. Samples:
   1. Concrete materials as required for testing and inspection.
   2. Expansion Joint Sealant: Manufacturer's standard bead samples showing full range of colors available.
   3. Concrete Panels: Not less than 12 inches by 12 inches for each selected color and finish texture using concrete mix proposed for this Project.
      a. Indicate materials and methods used to produce each color and texture.
   4. Mockup work shall not commence until a concrete sample panels have been approved.

E. Concrete Mix: Mix design and certified compressive strength test report for each concrete strength and type indicating additives and maximum aggregate size required. Report shall be prepared and certified by the ready-mix concrete supplier.

1.05 INFORMATIONAL SUBMITTALS

A. Statement of installer/finisher qualifications if requested by Owner's Representative.

B. Mill Certificates and Certifications for reinforcing.

C. Delivery tickets for each load of concrete delivered to the site.

D. NRMCA Certificate of Conformance: Submit a copy of the NRMCA Certificate of Conformance to the Owner's Testing Agency for the ready-mix plant, equipment, and mix trucks that will supply the concrete for the project.

E. Record of pre-installation meeting.

1.06 QUALITY ASSURANCE

A. Codes and Standards: Comply with the applicable provisions of the following codes, specifications and standards, except where more stringent requirements are shown or specified:
   1. California Building Code, Title 24, Part 2, Chapter 19A – Concrete.
   2. American Concrete Institute (ACI):
      a. ACI 301: Specifications for Structural Concrete for Buildings
      b. ACI 303.1: Standard Specification for Cast-In-Place Architectural Concrete.
      c. ACI 303R: Guide to Cast-In-Place Architectural Concrete.
      d. ACI 318: Building Code Requirements for Reinforced Concrete.
      e. ACI 614: Recommended Practice for Measuring, Mixing, and Placing Concrete.
   3. Concrete Reinforcing Steel Institute, Manual of Standard Practice.
   4. NRMCA - National Ready-Mix Concrete Association, Quality Control Manual – Section 3: Certification of Ready Mixed Concrete Production Facilities.

B. Contractor shall be responsible for quality of concrete in place and shall bear burden of proof that concrete as placed meets minimum requirements.

C. Qualifications:

1. Contractors Design Laboratory: When mixes are proportioned by trial batch method, engage a laboratory conforming to ASTM E329 and under direction of a civil engineer licensed in the State of California.
2. Installer for Formed Surfaces: An experienced concrete contractor who has specialized experience installing cast-in-place architectural concrete similar in quality level, material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance. Installer shall retain a quality-control inspector, experienced in inspecting cast-in-place architectural concrete, and who is an ACI-certified Concrete Construction Inspector or is certified by ICC, as a Reinforced Concrete Special Inspector.
3. Contractor's Testing Agency: An independent testing agency meeting "Recommended Requirements for Independent Laboratory Qualification," published by American Council of Independent Laboratories and basic requirements of ASTM E329, "Use in the Evaluation of Testing and Inspection Agencies as Used in Construction."

D. Concrete Testing:
1. The Owner may retain, at its expense, a testing laboratory to perform material evaluation tests in accordance with Section 01 45 00 - Quality Control.
2. Testing may include slump tests and securing samples of concrete, cement, aggregates or other materials for testing. Applicable materials shall be provided by the Contractor at no additional cost to the Owner.

E. Mockups:
1. General:
   a. Mix design shall match that used on accepted sample panels and proposed for use in final construction including cement and color additive.
   b. Prepare at least one month before start of final concrete work to allow concrete to cure before observation.
   c. Concrete color and finish for mockup appearance shall match color and finish of accepted sample.
   d. Build mockups at the location indicated or, if not indicated, as selected by the Owner's Representative.
   e. Notify Owner's Representative 5 working days in advance of dates and times when mock- ups will be constructed and layouts will be ready for review.
   f. Contractor shall allow for preparation of 1 comprehensive mockup and up to 2 flat paving mockups for evaluation and final approval of each concrete.
   g. Color and texture shall be approved before starting construction.
   h. Perform specified slip-resistance testing on paving mockups.
   i. Maintain final accepted mockups in an undisturbed condition as a standard for judging the completed Work.
   j. Retain samples of sands, aggregates, and color additive used in the mockups for comparison with materials used in final work.
   k. Demolish and remove mockups when directed if not incorporated into the final work.
2. Seatwalls:
   a. Wall Size: Minimum 4 feet long by maximum height and include 2 tie holes, horizontal and vertical corner treatment, and specified texture finishes.
3. Tall Curbs
   a. Curb Size: Minimum 4 feet long by maximum height with specified texture finishes.
4. Edgebands
   a. Edgeband Size: Minimum 6 feet long by maximum width with specified texture finishes.
5. Board Formed Concrete: An on-site mockup is required for the board-formed architectural cast-in-place concrete for verification of concrete appearance using the proposed mix design. Mockup will also be used for final evaluation and approval of appearance, formwork layout, and workmanship
   a. Size: Not less than 4 foot x 4 foot and to include a typical outside corner.
   b. Form release agent, if required in final construction, shall also be used on mock-up.

c. Prepare promptly to allow concrete to cure sufficiently before observation by Owner's Representative.
d. Mockup will be evaluated for visual appearance of concrete with and without water repellent and patching methods.
e. Repairs: Representative areas of concrete shall be intentionally damaged, in the presence of the Owner's Representative, to mimic honeycombing, spalling, and other defects as may be experienced upon stripping of formwork.
f. Repair it to demonstrate materials and methods proposed for repair of surface blemishes.
g. Specific procedures and materials used for patched area shall be thoroughly documented.

F. Lines and levels shall be established by a licensed surveyor or registered civil engineer.

G. Owner's Representative will review all forms and joint layout prior to casting concrete.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery so that mixes may be immediately poured upon arrival at site.

1.08 FIELD CONDITIONS

A. Maintain control of concrete dust and water. Do not permit adjacent areas to be contaminated.

B. For protection of existing trees to remain, see Arborist Report on the Drawings and Section 32 01 90 – Existing Tree Protection and Maintenance.

C. Maintain control of concrete dust and water. Do not permit adjacent areas to be contaminated.

PART 2 - PRODUCTS

2.01 BASE MATERIALS

A. Aggregate: Class 2, 3/4-inch maximum aggregate base, conforming to Section 26 of California Department of Transportation (CDT) "Standard Specifications."

2.02 FORMWORK

A. General:
1. Comply with Section 03 30 00 -Cast-In-Place Concrete and ACI 347, "Recommended Practice for Concrete Formwork," for formwork and other form-facing material requirements.
2. Furnish in largest practicable sizes to minimize number of joints unless otherwise shown on the Drawings.
3. Seal joints to prevent leakage of paste using demonstrated effective method that will not affect appearance of finished surface.
4. Forms may be reused at concealed surfaces. Forms shall not be reused for exposed concrete surfaces if there is any evidence of surface wear or defect that would impair the quality of the surface or if their reuse will evident and produce a noticeable variation in the appearance in the completed work.
5. Formwork Surface Class at Exposed Concrete: Class A. In addition to ACI 303.1 limits on form-facing panel deflection, limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, to 1/8 inch.

B. Forming Materials:
1. Panels at Smooth Concrete: New, manufactured without addition of urea-formaldehyde, minimum 3/4-inch thick, MDO plywood made specifically for forming of Architectural Concrete to achieve

joint pattern shown on Drawings or accepted shop drawings; "PureKor MDO Concrete Formply" by Panel Source International, Inc., or equal.

2. Boards, or Form Liners Providing the Appearance of Boards: Made specifically for forming of Architectural Concrete to achieve board pattern and appearance shown on the Drawings and approved mockup.
3. Form Boards: 2 x 8 with resawn face, sized to net 7-1/4 inch width as required for layouts shown on the Drawings.
4. Unexposed Surfaces of Concrete: Plywood, lumber, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
5. Framing: Contractor option, subject to meeting necessary strengths and surface tolerances.

C. Form Hardware:
1. Ties:
a. Typical: Metal, spreader type, removable to 1-inch from concrete face.
b. Exposed Concrete: Fiberglass rod ties, tinted to color to match concrete; "SuperTie" by RJD Industries, Inc., or equal, in tensile strength as selected by form designer.
2. Wire ties and wood spreaders will not be allowed except that such devices may be permitted for footings, shallow foundations and similar other totally concealed below grade surfaces. Wood spreaders shall not remain in concrete.

D. Form Release Agents:
1. Concealed Concrete: Contractor option.
2. Exposed Concrete: Colorless, free from oils, chemically active, guaranteed to provide clean, stain-free concrete release and not to interfere with future applied coatings and finishes.

2.03 REINFORCING

A. Materials:
1. Reinforcing Steel: Deformed billet steel bars, ASTM A615, Grade 60 for No. 5 and larger, Grade 40 for No. 4 and smaller.
2. Tie Wire: ASTM A82, black annealed.
3. Spacers, Bar Supports, and Other Accessories: In accordance with ACI 315. Galvanize metal items exposed to moisture, or use approved other non-corrodible, non-staining supports.
4. Smooth Dowels for Expansion Joints: ASTM A615, Grade 40 smooth, billet-steel bars, shop painted with iron-oxide zinc-chromate primer.

B. Reinforcing steel shall be cut and bent cold to exact lengths and shapes to comply with Drawings, reviewed shop drawings, and referenced codes and standards.

C. Comply with the additional requirement shown on the Drawings.

2.04 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type II, low alkali brand, with a proven history of successful use with proposed aggregates. Cement shall be same brand and from same source throughout the Project.

B. Hardrock Aggregate: ASTM C33.

C. Water: Clean, potable concrete mixing water free from injurious amounts of salts, oils, acids, alkalis, organic materials or other deleterious matter.

2.05 ACCESSORIES

A. Curing Materials:
1. Liquid Curing Compounds: ASTM C309, Type 1.

2. Sheet Material: Waterproofed Kraft paper, ASTM C17, regular type.

B. Fiber Expansion Joint Material: Preformed cellular fiber complying with ASTM D1751; 1/2 inch thick unless otherwise indicated; "SealTight Fiber Expansion Joint Filler" by W.R. Meadows or equal precut to proper size.

2.06 CONCRETE MIXING

A. General:
1. Mix designs for concrete shall be Contractor-designed at its expense. Designs shall be prepared by a qualified agency approved by the Owner's Representative.
2. Use admixtures according to manufacturer's written instructions.
3. Ensure equipment and plant will afford accurate weighing, minimize segregation, and will efficiently handle materials.
4. Deposit concrete into final position within 90 minutes of introduction of cement.

B. Minimum ultimate compression strength of concrete at 28 days is as follows:

| Item | Strength | Maximum slump | Size of aggregate | Cement (# of 94 lb. sacks per yard) | W/C Ratio |
|---|---|---|---|---|---|
| Slab-On-Grade | 3,000 | 4 inches | 3/4"-1" | 5 | 0.60 |
| Footings | 3,000 | 4 inches | 3/4"-1" | 5 | 0.60 |

C. Adjustment to Concrete Mixes:
1. Mix design adjustments may be requested by Contractor when job conditions, weather, test results warrant, or to meet appearance of accepted samples or mockup.
2. Test data for revised mix design shall be submitted to and accepted by Architect before using in work.

PART 3 - EXECUTION

3.01 PREPARATION

A. Use templates for anchor plates, bolts, inserts and other items embedded in concrete. Accurately secure so that they will not be displaced during placing of concrete.

B. Piping and Conduit: Do not embed piping, other than electrical conduit at irrigation sleeves, in structural concrete.
1. Locate conduit to maintain strength of structures at maximum. Verify size, length, and location of electrical conduit.
2. Provide sleeves for irrigation lines provided under Section 32 84 00 - Irrigation.

C. Aggregate Base Course: Compact base course to thickness shown on Drawings in accordance with recommendations of the Geotechnical Engineer.

3.02 INSTALLATION OF FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
1. Forms shall be tight enough to prevent loss of concrete mortar.
2. Wavy surfaces and bulged vertical or slab surfaces in finished work will be rejected.

B. Ties for exposed concrete surfaces shall be arranged symmetrically and shall be aligned both vertically and horizontally. Do not stagger.

C. Extend forms for all exposed concrete at least 6 inches below finish grade.

D. Do not disturb earth at bottoms of excavations for footings or foundations. Maintain these areas free of water, properly cleaned and leveled off.

E. Assemble forms so that all construction joints appear only as shown on Drawings and as accepted by Owner's Representative Incorporate all formwork joints into required reveal and expansion joints. No exposed form joints will be permitted.

F. Thoroughly clean all formwork prior to pouring concrete. Where no form coating is used, wet down all wood.

G. Place and secure anchorage devices and other embedded items. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

H. Leave no wood in concrete, except pressure-treated nailers.

3.03 PLACING REINFORCEMENT

A. Comply with Comply with CRSI's "Manual of Standard Practice" and additional requirements for placing reinforcement specified for structural concrete on the Drawings.

B. Reinforcement shall be free of paint, oil, dirt, scale, or loose rust or coating that might reduce bond with concrete.

C. When there has been a delay in placing concrete, reinforcement shall be inspected and, if necessary, cleaned, relocated, and tied at no additional cost to Owner.

D. Wherever conduits, piping, inserts, sleeves, and similar item interfere with placing of reinforcing steel, obtain Owner's Representative's approval of method of procedure before concrete is placed.

E. Securely tie and support reinforcement to prevent displacement by construction traffic and during casting of concrete.

F. Splices not shown on the Drawings shall be accepted by Owner's Representative, in writing.

G. Unless permitted in writing, reinforcement shall not be bent after being partially embedded in hardened concrete.

H. Dowels shall be tied securely in place before concrete is deposited.

3.04 PLACING OF CONCRETE

A. Notify Owner's Representative minimum 5 working days prior to pour.

B. Preparation:
   1. Protect finished surfaces adjacent to areas to receive concrete.
   2. Verify that the Project Engineer and City Inspector, if required, have inspected reinforcement.
   3. Notify Project Engineer, City Inspector if required, and Contractor's testing laboratory at least two working days before placing concrete.

C. Placing:
   1. Moisten earth, and spray forms and reinforcement with water before placing concrete.
   2. Place concrete in continuous operation to permit proper and thorough integration and to complete scheduled placement.
   3. Hot-Weather Concreting: Conform to ACI 305 when mean daily temperature rises above 80 degrees F.
   4. Use vibrators for thorough consolidation of concrete.
      a. Provide vibrators at each point of deposit during simultaneous placing to ensure timely consolidation around reinforcement, embedded items, and into corners of forms; ensure availability of spare vibrators in case of failures.
      b. Do not place vibrators against reinforcement, attach to forms, or use to spread concrete.
   5. Distribute concrete in maximum 18-inch layers, unless otherwise accepted.
   6. Space points of deposit to eliminate need for lateral flow.

3.05 REMOVING AND REUSING FORMS

A. Formwork for a given area shall be removed at the same time to enhance uniformity of final appearance.

B. Formwork that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

C. Remove forms for exposed concrete so as to avoid damage to finish. Do not use pinch bars and similar tools for prying against exposed surfaces.

D. Upon removal of forms, remove bolts, wires, and similar metal items not necessary to finished work to minimum 1 inch from surface. Remove them in such a way as to eliminate danger of rust stains from form-tie materials or other unprotected ferrous materials embedded in or adjacent to exposed concrete surfaces.

E. Re-use of forms will only be permitted as specified. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Apply new form-release agent. Align and secure joint to avoid offsets.

3.06 FINISHING FORMED SURFACES

A. Rough-Formed Finish on Unexposed Concrete: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R.

B. Formed Finish on Exposed Concrete: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
   1. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.
   2. Finish appearance shall match concrete on Building.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

D. Adjusting:
   1. Remove projecting fins, bolts, wire, nails, and similar items not necessary for the work, or cut them back 1 inch from the surface and patch in an inconspicuous manner.

2. Immediately after removal of forms, cut off snap ties extending from the face of concrete to at least 1 inch deep in the concrete. Fill or plug as detailed in Drawings.
3. Remove in its entirety and replace defective concrete work which after corrective patching, rubbing, or similar procedures fail to duplicate the appearance of unpatched work, conform to the standards set forth in these Specifications, or is determined as unacceptable by the Owner's Representative.

## 3.07 FLATWORK FINISHING

A. General:
   1. Provide each concrete finish where shown in the Drawings.
   2. Provide samples and mockups as specified of all concrete finishes for review and acceptance prior to pouring concrete.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats.

C. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.

## 3.08 EXPANSION JOINTS

A. General:
   1. Provide construction and expansion joints as shown. Where not shown, coordinate locations with the Owner's Representative.
   2. Form construction and isolation joints and tool edges true to line, with faces perpendicular to surface plane of concrete.
   3. Use only experienced personnel and forms or templates to achieve consistent lines.

B. Unless noted otherwise on the Drawings, expansion shall be 1/2-inch wide, the full depth of the concrete section and conforming to Section 51 of the Caltrans "Standard Specifications."
   1. Extend joint fillers full width and depth of joint.
   2. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
   3. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
   4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
   5. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

C. Sealant Filling of Expansion Joints:
   1. After the curing period, strip out all depth gauge strips and carefully clean expansion joints.
   2. Fill with joint compound in accordance with sealant manufacturer's instructions and ASTM C1193. Avoid spilling compound on adjacent surfaces or overflowing from joint.

## 3.09 PROTECTION AND CURING

A. Protection:
   1. Protect concrete against rapid drying and damage by rain.
   2. Keep concrete moist for at least 7 days.
   3. Protect with liquid curing compound, or a covering that will not stain or discolor finished concrete surfaces.
   4. Obtain acceptance of proposed method prior to use.

B. Curing: Cure concrete in accordance with the ACI Manual of Concrete Practice and all applicable requirements for curing and protection of concrete included in Sections 90-7 and 90-8 of the Caltrans "Standard Specifications."

C. Integral Color Concrete: Cure colored concrete with only products approved by the manufacturer of the integral color pigments.

3.10 FIELD QUALITY CONTROL

A. Samples: Owner's testing agency will take samples for laboratory testing during the course of the work when required by Code. Other specified and required testing shall be by the Contractor's testing laboratory.

B. Contractor shall pay for full costs of removal of rejected concrete and its replacement with concrete of specified strength and retesting.

END OF SECTION

# SECTION 32 33 00

# SITE FURNISHINGS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Site furnishings and installation accessories as shown on the Drawings including, but not necessarily limited to, the following:
      a. Waste and recycling receptacles.
      b. Drinking fountain.
      c. Benches.
      d. Flag Poles.
      e. Tables.
      f. Play Features.
   2. Site Furnishings Product Matrix

B. Related Requirements:
   1. Section 32 13 13 – Concrete Paving

### 1.02 REFERENCES

A. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Scheduling and Sequencing:
   1. Do not install site furnishings prior to acceptance by Owner's Representative of area to receive items.
   2. Coordinate construction timing of installation of site furnishings in conformance with other work interfacing with installation of the site furnishing items.

### 1.04 ACTION SUBMITTALS

A. Shop Drawings: Submit complete shop drawings for all materials or furnishings requiring field or shop fabrication.

B. Product Data: Manufacturer's catalog cut sheets of materials and equipment to be provided.
   1. Include the manufacturer and distributor name, and subcontractor as applicable.
   2. Cut sheets clearly describe the specific product by catalog number and that additional non-specified products that may appear on the same cut sheet are crossed out where applicable.

C. Samples: Colors and finishes for products and furnishings requiring selection by the Owner's Representative.

1.05 INFORMATIONAL SUBMITTALS

A. Statement of qualifications for manufacturers and installer if requested by the Owner's Representative.

1.06 CLOSEOUT SUBMITTALS

A. Provide operation and maintenance data for items with operable, movable, or replaceable parts, for items with mechanical connections, and for other items as applicable.

B. Extended warranties as specified.

1.07 QUALITY ASSURANCE

A. Furnishings shall be reviewed for conformance with the intent of the Contract Documents and accepted by the Contractor prior to installation.

B. Site furnishings shall be in a new, "first-class" condition as determined by the Owner's Representative at the time of Final Acceptance.

C. Field Samples and Mockups: As requested by the Owner's Representative.

1.08 DELIVERY, STORAGE AND HANDLING

A. General:
   1. The Contractor is responsible for coordination of the delivery, acceptance, handling, and storage of site furnishings.
   2. Store and handle site furnishings as acceptable to the Owner's Representative and so that work or access of others is not impeded.
   3. Protect site furnishings from theft or damage until such items have been accepted by the Owner.

B. Packaging and Labeling: Furnish materials in manufacturer's unopened, original packaging, bearing original labels showing quantity, description, and name of manufacturer. Verify that materials and components are adequately padded and securely bound in such a manner that no damage occurs to the product during delivery and unloading at the site.

C. Storage: Damaged materials will be rejected. Remove damaged materials from job site immediately and pay cost of replacement. Determination of damage shall be the sole authority of the Owner's Representative.

D. Painted Finishes: Provide non-scratching, non-staining, firmly bound covering for shop-painted finishes until installed and accepted.

E. Protect wood materials from stains.

1.09 WARRANTY

A. Manufacturers: Provide Owner with manufacturer's written extended product warranties as available for the specified products.

PART 2 - PRODUCTS

2.01 SITE FURNISHINGS - GENERAL

A. In addition to those described in the following Articles, refer to the Site Furnishing Matrix included at the end of this Section for complete list of items to be provided.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to commencement of work described in this Section, carefully inspect installed work, and verify all such work is correct and complete. Immediately notify the Owner's Representative of any discrepancy before proceeding with work.

3.02 INSTALLATION - GENERAL

A. Conform to layout shown on Drawings. Final placement shall be field verified with the Owner's Representative.

B. Installation of products shall be as shown in the Drawings, or according to manufacturer's instructions. If discrepancies are found, or if information is lacking, consult with the Owner's Representative prior to beginning the work.

C. Concrete footings shall conform to requirements of Section 32 32 15 – Landscape Concrete unless noted otherwise.

D. Furnish anchorage and fastening required for installation to ensure proper fit and accurate placements. Bolts, where exposed, shall be cut back to within three threads of the nut.

3.03 TRASH RECEPTACLES

A. Install level and plumb in accordance with manufacturer's instructions at locations indicated on the Drawings.

3.04 CLEANING AND ADJUSTMENT

A. Protect furnishings from damage until acceptance of work. Do not remove protective wrappings from furnishings until so instructed by the Owner's Representative.

B. Clean soiled site furnishings prior to acceptance by Owner.

C. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by the Owner's Representative.

D. Replace damaged items to the satisfaction of the Owner's Representative. Replace missing accessories at no cost to Owner.

3.05 SITE FURNISHINGS MATRIX

| ITEM | DESCRIPTION | MANUFACTURER | MODEL NO. | QTY. | FINISH/COLOR | DISTRIBUTOR/CONTACT |
|---|---|---|---|---|---|---|

| ITEM | DESCRIPTION | MANUFACTURER | MODEL NO. | QTY. | FINISH/COLOR | DISTRIBUTOR/CONTACT |
|---|---|---|---|---|---|---|
| A. | Bench without Back | Dumor | 500-60TX-3AR/S-1 | Per Plan | Wood Grain Recycled Plastic, Stainless Steel: Textured Charcoal | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| B. | Picnic Table, 4-Seater + 1ADA | Dumor | 296-42-40TX/S-1 | Per Plan | Wood Grain Recycled Plastic, Stainless Steel: Textured Charcoal, Surface Mounted | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| C. | Game Table | Dumor | 78-32PL | Per Plan | Wood Grain Recycled Plastic, Stainless Steel: Textured Charcoal, Surface Mounted | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| D. | Trash Receptacle | Dumor | 287-32-SO | 2 | Sudan | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| E. | Recycling Receptacle | Dumor | 287-32-RC-0001 | 2 | Sudan | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| F. | Treasure Chest | UPC Parks | 11101 | 1 | Per Manufacturer | Eileen McKenzie<br>UPC Parks<br>eileen@upcparks.com<br>530-605-2664 |
| G. | Banner Flag | Big Signs | 96”H X 36”W Vinyl Banner with 2” pole pocket on top, standard hem on bottom w/ grommets in both corners. | 3 | Per graphic | Big Signs<br>Isaac Van Hoven<br>isaac@bigsigns.com<br>800-790-7611 |
| H. | Flag Pole | L. Ph. Bolander & Sons | LTJ20’, Standard Ground Set Cone, Tapered Aluminum Flagpole, Cam Cleat Concealed Halyard, Locking Access Door with Keyed Cylinder Lock | 3 | Aluminum Alloy, 100 Grit Satin Polish, Pole Shaft Fabricated from 6063 T4 Aluminum Tube | L. Ph. Bolander & Sons<br>Larry Bolander Jr.<br>bolanderflagpole@aol.com<br>800-434-5611 |
| I. | Drinking Fountain | Most Dependable Fountain | 10145 SMFA | 1 | Textured Sapphire | MDF<br>Kim Rogers<br>kim@mostdependable.com<br>901-867-0039 |
| J. | Dog Waste Station | Anova | GRV05 D001-30 | 2 | Per manufacturer. | Anova<br>Eric Elfrink<br>916-764-9869<br>eelfrink@anovafurnishings.com |

| ITEM | DESCRIPTION | MANUFACTURER | MODEL NO. | QTY. | FINISH/COLOR | DISTRIBUTOR/CONTACT |
|---|---|---|---|---|---|---|
| K. | Welcome Sign | Landscape Structures | Custom DGI Sign | Per Plan | Per Manufacturer | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| L. | Park Entry Sign | Landscape Structures | 217909 | Per Plan | Per Manufacturer | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| M. | Dog Walk Sign | Landscape Structures | 182504 | Per Plan | Per Manufacturer | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| **Play Features** | | | | | | |
| N. | Imagination Play Ship | Landscape Structures | 1171681-01-01-03 | 1 | TBD | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| O. | Whimsy Rider Dolphin | Landscape Structures | 135536 | 2 | TBD | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| P. | Cozy Dome | Landscape Structures | 168099 | 1 | TBD | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| Q. | Small Double Embankment Slide | Landscape Structures | 123331 | 1 | TBD | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| R. | Hillside Rock Climber Hand Grips | Landscape Structures | 155445 | Per Plan | TBD | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| S. | Aqua Spheres | Aquaseal Resurfacing | Aqua Spheres | Per Plan | TBD | SPEC Play<br>Chris Olsen<br>800-475-1071<br>c.olsen@specplay.com |
| T. | Roller Slide | Landscape Structures | 123333 | 1 | TBD | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| U. | Cajon Box | Percussion Play | Unpitched Percussion | 2 | TBD | SPEC Play<br>Chris Olsen<br>800-475-1071<br>c.olsen@specplay.com |
| V. | Sansa Rimba | Percussion Play | C Major Diatonic (C4-C6) | 1 | TBD | SPEC Play<br>Chris Olsen<br>800-475-1071<br>c.olsen@specplay.com |
| W. | Novo Teardrop Counter Table | Burke | 580-1313 | 1 | TBD | SPEC Play<br>Chris Olsen<br>800-475-1071<br>c.olsen@specplay.com |
| X. | KinderBells | Tinkertunes | Octave-Pus | 1 | TBD | Tinker Tunes<br>Tom Kaufman<br>tom@tinkertunes.com |
| Y. | Composite Play Structure | Landscape Structures | 1174169-01-05 | Per Plan | TBD | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |

| ITEM | DESCRIPTION | MANUFACTURER | MODEL NO. | QTY. | FINISH/COLOR | DISTRIBUTOR/CONTACT |
|---|---|---|---|---|---|---|
| Z. | Communication Board | Landscape Structures | 298208 | 1 | TBD | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| AA. | Orb Rocker | Burke | 570-2676 | 1 | TBD | SPEC Play<br>Chris Olsen<br>800-475-1071<br>c.olsen@specplay.com |
| BB. | 3 Bay Swing Set | Landscape Structures | 177332 | Per Plan | TBD | Ross Recreation<br>Casey Hilbert<br>831-689-9110<br>caseyh@rossrec.com |
| CC. | Volta Spinner | Burke | 560-2579 | 1 | TBD | SPEC Play<br>Chris Olsen<br>800-475-1071<br>c.olsen@specplay.com |
| DD. | Inclusive Orbit | Burke | 568-0051 | 1 | TBD | SPEC Play<br>Chris Olsen<br>800-475-1071<br>c.olsen@specplay.com |

END OF SECTION

# SECTION 32 36 00

# LANDSCAPE DECORATIVE METAL

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. The following exterior ornamental metal work:
      a. Fencing and handrails.
      b. Edging and edge restraints:
         1) Aluminum landscape edging.
      c. Other miscellaneous ornamental metal as shown on the Drawings.
   2. Shop applied coatings for decorative metal items.

B. Related Requirements:
   1. Landscape Concrete: Section 32 32 15; foundations for decorative metal items.
   2. Exterior Site Painting: Section 09 91 15; field applied coatings.

### 1.02 REFERENCES

A. American Institute of Steel Construction (AISC):
   1. "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings," including "Commentary on the AISC Specification."

B. American Society for Testing and Materials (ASTM):
   1. A36/A36M: "Specification for Carbon Structural Steel."
   2. A47/A47M-: "Specification for Ferritic Malleable Iron Castings."
   3. A48/A48M: "Specification for Gray Iron Castings."
   4. A53/A53M: "Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless."
   5. A167: "Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate Sheet and Strip."
   6. A176: "Specification for Stainless and Heat-Resisting Chromium Steel Plate, Sheet and Strip."
   7. A240/A240M: “Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.”
   8. A276: "Specification for Stainless Steel Bars and Shapes."
   9. A307: "Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength."
   10. A492: "Specification for Stainless and Heat-Resisting Steel Rope Wire."
   11. A500/A500M: "Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes."
   12. B26/B26M: “Standard Specification for Aluminum-Alloy Sand Castings.”
   13. B247: “Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings.”
   14. C864: "Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers."
   15. A1008/A1008M-09: “Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.”
   16. C1107/C1107M: "Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)."
   17. D6386-10: “Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.”

18. D7396-08: “Standard Guide for Preparation of New, Continuous Zinc-Coated (Galvanized) Steel Surfaces for Painting.”
19. E350-95(2005)e1: “Standard Test Methods for Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron.”

C. American Architectural Manufacturers Associates (AAMA):
1. CW-12: Structural Properties of Glass.”
2. 2605: “Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.”

D. American National Standards Institute (ANSI) /American Welding Society (AWS):
1. ANSI/AWS D1.1/D1.1M: "Structural Welding Code."
2. ANSI/AWS D1.3/D1.3M: "Structural Welding Code - Sheet Steel."

E. Industrial Perforators Association (IPA):
1. “Designers, Specifiers and Buyers Handbook for Perforated Metals”

F. National Association of Architectural Metal Manufacturers (NAAMM)
1. Architectural Metal Products Division (AMP): AMP 500-06, “Metal Finishes Manual for Architectural and Metal Products.”

G. SSPC: The Society for Protective Coatings (SSPC) "Painting Manual":
1. Surface Preparation Specifications:
   a. SSPC-SP 3: "Power Tool Cleaning."
   b. SSPC-SP 6: "Commercial Blast Cleaning."

1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Coordination:
1. Coordinate installation of anchorages. Furnish setting drawings, diagrams, templates, and directions for installing anchorages, including sleeves, inserts, anchor bolts, and items with integral anchors, to be embedded in concrete and masonry.
2. Coordinate with other Sections to ensure proper drainage and watertight interface with adjacent construction.
3. Coordinate sequence of installation with Sections whose work adjoins decorative metalwork.

1.04 DESIGN AND PERFORMANCE REQUIREMENTS

A. Industry Standards:
1. General: Decorative metal shall conform to the recommended practices of the Architectural Products Division (AMP) of the National Association of Architectural Metal Manufacturers (NAAMM), Section 10 of the AISC Code of Standard Practice, and the additional requirements of this Section.
2. Railings and guardrails shall comply with the "Metal Rail Manual" of National Ornamental and Miscellaneous Metals Association (NOMMA).

B. If modifications to designs indicated are proposed in order to meet code requirements, indicate them as such on shop drawing submittals. Work with Architect to arrive at an acceptable design that is sufficiently similar to the design indicated.

C. Design exterior decorative metal items to drain properly, to be watertight where appropriate, and for watertight connection to adjacent construction.

D. Structural Performance of Railing Assemblies, Handrails, and Guardrails:
   1. General:
      a. Stainless Steel: In engineering stainless steel railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on 60 percent of minimum yield strength.
      b. Glass: 25 percent of mean modulus of rupture (50 percent probability of breakage), as listed in "Mechanical Properties" in AAMA's Aluminum Curtain Wall Series CW-12, "Structural Properties of Glass."
   2. Handrails and Top Rails of Guardrails:
      a. Uniform load of 50 lbf/ft applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   3. Infill of Guardrails:
      a. Concentrated load of 50 lbf applied horizontally on an area of 1 square foot.
      b. Infill load and other loads need not be assumed to act concurrently.

E. Regulatory Requirements:
   1. Comply with the Americans with Disabilities Act (ADA) Design Guidelines.
   2. Comply with the CBC and other applicable State and local codes and regulations.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

G. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.05 ACTION SUBMITTALS

A. Shop Drawings:
   1. Prepare and submit large-scale drawings for fabrication and erection of assemblies not completely shown by manufacturer's product data.
      a. Shop drawings are specifically required for the following:
         1) Ornamental fencing
      b. Include, as appropriate, plans, elevations, complete details, thicknesses, sizes, types, grades, classes of metal, connecting and joining methods, anchorages.
      c. Show required field measurements and interface with work of other Sections.
      d. Welds, both shop and field, shall be indicated by AWS "Symbols for Welding, Brazing and Nondestructive Examination," A2.4.
      e. Indicate all required field measurements.
   2. Provide setting drawings, templates, instructions, and directions for installation of base plates and anchorage devices.
   3. Coordinate with shop drawing requirements of other Sections whose work adjoins exterior decorative metalwork.

B. Product Data: Manufacturer's specifications and installation instructions for manufactured products to be used in the fabrication of work, including gate operators, manufactured railings, shop-applied paint products, and hardware.

C. Samples:
   1. Exposed metals in selected finishes, 12 inches or 12 inches long as applicable.
   2. Each type of exposed fastener or hardware.
   3. Samples of products involving selection of color, texture, or design including mechanical finishes.
   4. For custom castings, submit finished samples showing ability to reproduce detail, cast-metal color, and quality of finish. Samples may be of similar previous work.
   5. Additional samples as requested by the Owner's Representative.

1.06 INFORMATIONAL SUBMITTALS

A. Qualifications as specified.

B. Welding:
   1. Statement of qualifications for fabricator, installer, and welders.
   2. Completed "Procedure Qualification Record" (PQR) and "Welding Procedures Specification" (WPS) forms for the welds to be performed under this Section.

C. Delegated-Design: Prepare and submit shop drawings and engineering calculations for railings, guardrails, and to verify compliance with performance and design criteria, and acceptance by the authorities having jurisdiction.
   1. Indicate dimensions, profiles and framing member sizes, anchorage, size and type of fasteners.
   2. Drawings and calculations shall be signed and sealed by the engineer in responsible charge retained by the Contractor. Engineer shall be a California licensed civil or structural engineer.
   3. Although all calculations shall be submitted, review of calculations by Owner's Representative will not relieve Contractor of any responsibilities for providing systems of required strength.

D. Galvanizing: Proposed methods of cleaning and profiling surfaces. Include methods for each decorative item.

E. Fencing Mockup: 24" long panel at specified height, posts at each end, pickets between posts, caps secured to posts, welded conditions, specified finish.

1.07 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications: Documented experience in fabrication and installation of decorative metal similar to that indicated for this Project, and with a record of successful in-service performance.

B. Organic-Coating Powder Coating Applicator Qualifications: A firm experienced in successfully applying coatings of type indicated and employing competent control personnel to conduct continuing, effective quality-control program to ensure compliance with requirements.

C. Welder Qualifications: Certified and qualified in accordance with procedures specified in American Welding Society Standard in accordance with AWS D1.1, using procedures, materials, and equipment of the type required for the work.

D. Welding procedures and operations shall comply with AWS B2.1, "Standard for Welding Procedure and Performance Qualifications." Comply with AWS publication "Welding Zinc Coated Steel" for galvanized products.

E. Mockups: As requested by Owner's Representative Owner's Representative.
   1. Provide a full-size mockup of each type or installation condition of the following items for review and approval by Owner's Representative:
      a. Handrails: Assembled section of central and end post to include 12 inches of top rail and 12 inches of post.
      b. Ornamental Fence: One complete section, post to post.
   2. Include all required anchorages and fasteners.
   3. Mockups shall not be fabricated until submittals, including metal samples, have been submitted and approved.
   4. Each mockup shall consist of a typical assembly in specified finish, complete with mounting devices.
   5. Specified sizes shall be increased if necessary to demonstrate workmanship, welding, and visual effect of completed assembly.
   6. If requested by Owner's Representative, make modifications to mockups without additional charge to Owner.

7. If approved by Owner's Representative, install or leave mockup on Project as directed.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store decorative metal in a protected location on site until ready for installation. Protect from uncured concrete and from soiling and abrasion.

1.09 FIELD CONDITIONS

A. Where decorative metal is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on shop drawings.

PART 2 - PRODUCTS

2.01 METAL MATERIALS

A. General: Provide metals free from surface blemishes where exposed to view in finished unit. Exposed-to-view surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable.

B. Steel: Provide in form indicated, to comply with the following requirements:
1. Plate, Shapes, and Bars: ASTM A36.
2. Sheet: Commercial-quality, cold-rolled, stretcher-leveled, carbon-steel sheet complying with ASTM A1008, Class I, matte finish.
3. Tubing: Cold formed, ASTM A500.
4. Pipe: ASTM A53, Grade B, Schedule 40.
5. Gray-Iron Castings: ASTM A48, Class 30.
6. Malleable-Iron Castings: ASTM A47, grade as recommended by fabricator for type of use indicated.
7. Wrought Iron: Low carbon alloy (less than 0.035 percent), malleable iron with good tensile strength and suitable for shaping and hammering as required by fabricator for use indicated.

C. Stainless Steel:
1. Alloy: Type 316, unless otherwise indicated or specified.
2. Sheet and Plate: ASTM A167 or A240.
3. Bars: ASTM A276.
4. Tubing for Railings and Guardrails: ASTM A554.
5. Finish: American Iron and Steel Institute (AISI) No. 4, satin directional brushed, unless otherwise noted. See Drawings for direction of polish.

D. Galvanized-Steel Sheet: Commercial Quality, ASTM A653.
1. Coating Designation: G90
2. Thickness: As required by SMACNA for specific conditions and as indicated.

2.02 ADDITIONAL MATERIALS AND COMPONENTS

A. Fasteners: As shown and as selected by fabricator. Indicate exposed fasteners on shop drawings.
1. Use fasteners of same basic metal as fastened metal, except as otherwise indicated or specified.
2. Do not use metals that are corrosive or incompatible with materials joined.

B. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, noncorrosive, nongaseous; Sonneborn "Sonogrout 10K" or equal complying with ASTM C1107.

C. Fabricated Ornamental Fence: Monterey Structural Steel Inc., 404 West Beach Street, Watsonville, CA. 95076, (831) 768-1277, or equal.
   1. Pickets: 1 inch by 1 inch, 16 gauge, with pointed picket tops, spaced as shown, gaps between pickets shall not exceed 3 ¾".
   2. Horizontal Rails: 1 ¾" x 1 ¾", 12-gage tube steel.
   3. Posts: 2 ½" x 2 ½" x 1/8" inches, tube steel, located as shown.
   4. Finish: Cold Galvanized Zinc Enriched Primer, Semi -gloss black powder coat.

2.03 FABRICATION - GENERAL

A. Comply with AWS for recommended practices in shop welding and brazing.

B. Mill joints to a tight, hairline fit. Cope or miter corner joints. Form joints exposed to weather to exclude water penetration.

C. Mechanical field connections for railings, and fencing shall be with countersunk screws, sleeves, or routed lapped members. Applied clips, angles, and non-flush fasteners are not acceptable.

D. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.

E. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.

F. Welding and Brazing: Comply with AWS-recommended practices.
   1. Exposed welds shall be continuous.
   2. Welds, burrs, roller marks, seams, and rough surfaces shall be ground neat and smooth. Mill markings shall be completely removed.
   3. Gouges, dents, and other surface abuse shall be filled and ground smooth.
   4. Weld and braze behind finished surfaces without distorting or discoloring exposed side.
   5. Remove flux from exposed welded and brazed joints. Dress exposed and contact surfaces.

G. Stainless Steel: Use electrochemical or mechanical methods or abrasive cleaners to remove weld discoloration on exposed surfaces. Welded area shall match appearance of adjacent surface after cleaning.

2.04 GALVANIZING

A. Provide cold galvanizing zinc enriched coating for ferrous steel after fabrication.
   1. Comply with ASTM A153 for galvanizing of iron and steel hardware.
   2. Comply with ASTM A123 for galvanizing of assembled steel products and rolled, pressed, and forged-steel shapes, plates, bars, and strips 1/8 inch thick and heavier.

B. Minimum Cleaning Requirements Prior to Galvanizing: In accordance with SSPC Specification SP-10, "Near White Blast Cleaning."

C. Newly galvanized items shall not be water quenched or chromate quenched after galvanizing.

2.05 PROTECTIVE PAINT COATINGS

A. General:
   1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
   2. Corrosion Control: Prevent galvanic action and other forms of corrosion by insulating metals from direct contact with incompatible materials.

3. Decorative metals shall be spray finished in shop to the greatest extent possible. Where not shop finished, field finish painting shall conform to requirements of Section 09 90 00, "Painting and Coating."
4. Finish exposed fasteners to match adjacent metal.

B. Products:
1. Shop Primers and Finish Paints: As specified under each coating system.
2. Galvanizing-Repair Paint: Minimum 82 percent zinc-dust-content paint for regalvanizing welds in galvanized steel, complying with FS DOD-P-21035a; Z.R.C. Cold Galvanizing Compound by ZRC Worldwide, International Protective Coatings, or approved equal.

C. Galvanized Surfaces:
1. Surfaces shall be cleaned and profiled prior to receiving applied coatings.
a. Methods shall be selected based on age of galvanized coating, condition of surface and intended paint coating.
b. High spots and rough edges shall be smoothed out.
c. Care shall be taken not to damage the zinc coating.
2. Repair galvanized coating damaged after fabrication during handling, installation, or welding. Use specified repair paint in accordance with ASTM A780, AGA publication, "Recommended Practice for Touch-up of Damaged Galvanized Coatings," and manufacturer's recommendations for application of repair paint.
3. Comply with the additional recommendations included in the AGA document "Duplex Systems: Painting Over Hot Dip Galvanized Steel," and ASTM D6386.

D. Shop-prime work to the greatest extent possible, except surfaces and edges to be field welded.

E. High-Performance Powder Coating on Galvanized Steel: Shop spray-applied Commercial grade polyester resin-based thermosetting powder coat; Series 28 High Performance Architectural Coating by Tiger Drylac, or equal.
1. Prepare, treat, and coat galvanized metal to comply with resin manufacturer's written instructions and as follows:
a. Treat prepared metal with zinc-phosphate pretreatment, rinse, and seal surfaces.
b. Apply thermosetting polyester powder coating with cured-film thickness not less than 1.5 mils per coat.
c. Number of Coats: Two, to achieve a total DFT of 3.5 to 5.0 mils on edges and corners.
2. Color: Solid, standard or custom, as selected by Owner's Representative.
3. Gloss: As scheduled or selected by Owner's Representative.

F. Field-Applied Finish Coatings: As specified in Section 09 91 15 – Exterior Site Painting.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Install metal work as shown on the Drawings in accordance with reviewed submittals.

B. Perform cutting, drilling, and fitting required for installation.

C. Set work accurately in location, alignment, and elevation; plumb, level, true, and free of rack; measured from established lines and levels.

D. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal arc welding, for appearance and quality of welds, and for methods used in correcting welding work. Grind exposed welded joints smooth.

E. Erection Tolerances:
   1. Maximum Variation from Plumb: 1/4 inch.
   2. Maximum Misalignment from True Position: 1/4 inch.

F. Repair galvanizing and shop-applied coatings to match finish of adjacent surfaces.

END OF SECTION

# SECTION 32 80 00

# IRRIGATION

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Landscape irrigation system work is shown on the Drawings including, but not necessarily limited to, the following:
   1. [Water supply to irrigation system.]
   2. Water backflow prevention and flow sensing system.
   3. Automatic irrigation controls and systems.
   4. Line voltage connections to the irrigation controllers and low voltage control wiring from controllers to [master valve], [flow sensor], [hydrometer], [remote control valves].

B. Work Included Under Other Sections:
   1. [Irrigation water stub-out.]
   2. 120 Volt A.C. electrical stub-out for irrigation controller.
   3. Irrigation sleeves.

C. Related Requirements:
   1. Section 31 01 90 - Landscape and Site Maintenance
   2. Section 31 23 00 - Excavation and Fill
   3. Section 32 90 00 - Planting
   4. Section 33 11 00 - Domestic Water Utilities

### 1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. D1785 - Standard Specifications Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40 and 80.
   2. D2241 - Standard Specifications for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
   3. D2464 – Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
   4. D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
   5. D2467 – Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
   6. D2564 - Standard Specifications for Solvent Cements for (PVC) Plastic Pipe and Fittings.
   7. D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.
   8. F512 - Standard Specification for Smooth-Wall Poly (Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation.
   9. D2672 - Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement.

B. National Sanitation Foundation (NSF), requirements for Seal of Approval.

C. Plastics Pipe Institute (PPI), recommendations for hydrostatic design stresses for PVC pipe.

D. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

E. Permits and Fees: Contractor is responsible to obtain all required permits and pay all associated fees unless otherwise noted.

F. Irrigation Association/American Society of Irrigation Consultants, Landscape Irrigation Best Management Practices, 2014 edition.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Substitutions for specified products shall be submitted for approval in accordance with Section 01 25 00 – Substitution Procedures.

B. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

C. Coordination, Sequencing, and Scheduling:
1. Contractor shall be solely responsible for coordinating, sequencing and scheduling work with applicable trades and subcontractors so as to ensure proper and timely installation of the irrigation system.
2. The entire irrigation system shall be under full automatic operations for a period of two days prior to beginning of planting. Coordinate with Section 32 90 00 – Planting.

D. Permits and Fees: Contractor is responsible to obtain all required permits and pay all associated fees unless otherwise noted.

1.04 ACTION SUBMITTALS

A. Shop Drawings: A diagrammatic drawing of proposed mainline route and equipment locations for approval by the Owner's Representative. The Drawings may be marked and used for marking layout and equipment locations.

B. Product Data: Manufacturer's literature or cut sheets of products specified and to be incorporated into the irrigation system. Specific products being submitted shall be highlighted or shown on boxes on cut sheets to designate which items are being submitted. Submittals not marked appropriately will be rejected.

C. Materials List: Prior to installation, submit a materials list. Include manufacturer, model number, and description of all materials and equipment. List shall also include sealants, cements, lubricants and other proprietary items.

1.05 CLOSEOUT SUBMITTALS

A. Record Drawings as specified.

B. Maintenance equipment as specified.

C. Warranties and Guarantees

1.06 RECORD DOCUMENTS

A. Comply with Section 01 78 39 – Project Record Documents.

B. Accurately record locations of all piping and equipment that varies from what is shown on the Drawings. Locations are to be clearly dimensioned horizontally to within 1 foot and vertically to within 0.5 feet from a hardscape edge or permanent site feature.
   1. The valve size, station number and gallons per minute shall be legible at each valve and shall match how the controller is wired.
   2. Additionally, each valve shall be annotated to describe which type of irrigation it is; rotor, rotator, spray, bubbler, drip tubing or other.
   3. Symbols for valves shall be annotated as: meter (M), backflow preventer device (BFP), master valve (MV), flow sensor (FS), hydrometer (H), quick coupler valve (QCV).

C. Contractor shall record and scan and submit PDF files of full size plan set of Record Drawings (As-builts Drawings) to the Owner's representative, and two sets of color coded plans shall be produced, one for placement at or within the irrigation controller cabinet reduced to 11" x 17", and one full size set for submittal to the Owner or stored at another location selected by the Owner's Representative.
   1. Both sets shall have all the irrigation valve zone lateral lines color-coded so as to readily distinguish between adjacent zones.
   2. The color-coded copies shall then be professionally laminated in minimum 5 mil clear plastic.

1.07 QUALITY ASSURANCE

A. Unless otherwise specified, install all materials in accordance with manufacturer's details, specifications and recommendations.

B. The Contractor shall be responsible to assure the irrigation installer personally or through an authorized and competent representative, supervises the work and retains the same supervisor on the job from commencement to completion.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store PVC pipe in a neat and orderly manner fully supported and protected from sunlight.

B. Equipment and materials shall be delivered, unloaded, and handled so as to protect from damage at all times.

1.09 FIELD CONDITIONS

A. PVC shall not be cemented during wet conditions at the discretion of the Owner's Representative.

B. Trench excavation and backfilling shall not be performed during excessively wet conditions at the discretion of the Owner's Representative.

C. Water Supply: Connections to, or the installation of, the water supply shall be at the locations shown on the Drawings. Minor changes caused by actual site conditions shall be made at no additional expense to Owner.

D. Discrepancies: In the event of discrepancy, immediately notify the Owner's Representative. Do not proceed with installation or irrigation components or system in areas of discrepancy until discrepancies have been resolved.

1.10 MAINTENANCE EQUIPMENT

A. Turn-over Materials: Provide 1 each of the following to the Owner's Representative:

1. One quick coupler attachment key equipped with standard thread hose bib for each 5 quick couplers installed on the project.
2. One key for locking quick coupler covers for each 5 quick coupler valves installed on the project.
3. One key for hose bib operation for each 5 hose bibs installed on the project.
4. One set of keys to irrigation controller and other installed locking cabinets or pedestals.

B. Full set of remaining nozzles for each rotor sprinkler.

1.11 GUARANTY

A. Contractor: Provide Owner with a separate written guaranty for the entire irrigation system against defects in installation, workmanship and equipment, for a period of 1 year from the date of Final Acceptance.

B. Contractor shall make necessary repairs to the system as well as to other work affected by defects in the system during guaranty period. Repairs shall be made at the Contractor's sole expense.

PART 2 - PRODUCTS

2.01 GENERAL

A. Use only new materials of brands shown on Drawings, specified herein or as acceptable to the Owner's Representative.

2.02 PIPE

A. General:
1. Plastic pipe shall be extruded of an improved PVC virgin pipe compound in accordance with ASTM D2672, ASTM D2241 or ASTM D1785.
2. Pipe shall be marked continuously with manufacturer's name, nominal pipe size, schedule or class, PVC type and grade, National Sanitation Foundation approval, Commercial Standards designation, and date of extrusion.

B. Plastic Pipe: Polyvinyl chloride PVC (Type I) 1120.
1. Intermittent-Pressure Lateral Piping: 1120-Schedule 40 PVC plastic pipe with Schedule 40, Type 1, Grade 1, PVC solvent weld fittings.
2. Constant-Pressure Mainline Piping 2 inches and Smaller: Schedule 40 with solvent weld fittings.
3. Constant-Pressure Mainline Piping 2-1/2 Inches and larger: Class 200 SDR-21 or 2-1/2" to 3" Class 315 SDR-14, if requested by Owner, or C900 Class 200 DR-14, if the system is using recycled or well water.
4. Constant-pressure mainline piping 4 inches and larger shall be Class 200 PVC ring-tite with IPS ductile iron fittings and mechanical restraints at all bell fittings and fittings at changes in direction.
5. Constant-pressure mainline piping 3 inches and larger on systems with booster pumps shall be Class 200 PVC ring-tite with IPS ductile iron fittings and mechanical restraints at all bell fittings and fittings at changes in direction.
6. If the system is operated with recycled water, PVC pipe shall be "Purple Pipe.". If specified pipe type is not manufactured in purple color, Contractor shall clearly paint/mark pipe with purple paint regularly, along with purple marking tape to indicate recycled water system.

C. Directional Boring Pipe Applications

1. [HDPE: Pipe: PE Pipe shall be DR 11, IPS diameters, of a 4710 Bimodal Resin with a Cell Classification of 445574C per ASTM D3350 and a Slow Crack Growth Resistance, PENT, of >500 hours per ASTM F1473.]
2. [HDPE piping 3" and less shall be per ASTM D3035 and pressure rated 200 psi when using a Design Factor of .63. Pipe shall be supplied in 40' to 50' straight lengths or may be supplied in coils which must be straightened and re-rounded by the contractor prior to use.]

D. [HDPE piping 3" and larger shall be per ASTM F714 or ASTM D3035 and pressure rated 200 psi when using a Design Factor of .63. Pipe shall be supplied in 40' to 50' straight lengths.]

2.03 FITTINGS

A. PVC Fittings: Polyvinyl chloride (Type I) plastic 1120, Schedule 40 or Schedule 80 where noted on the Drawings.

B. PVC Nipples: Polyvinyl chloride (Type I) plastic 1120, Schedule 80.

C. Joint Restraint for Ductile Iron Fittings: Shall be manufactured of ductile iron per ASTM A536. Gripping surfaces shall be machined serrations. As cast gripping surfaces are not permitted.
1. Sizes 1 ½" to 4": Joint Restraint shall be Knuckle Restraint by The Harrington Corporation or approved equal. Grip Ring shall be one piece residing within a housing that engages the fitting lugs. Grip Ring shall be activated by one bolt.
2. Sizes 4" to 12": Joint Restraint shall be Clam Shell Restraint by The Harrington Corporation or approved equal. Restraint shall not require separate restraining rods. The pipe gripping structure and fitting connection structure shall be integral and one piece.
3. Flange Bolts are to be 316 Stainless Steel.

D. PVC fittings used with UVR pipe shall be Schedule 40 UVR PVC type.

2.04 SWING JOINTS

A. Swing joints for Rotator and pop-up heads shall be as detailed on the Drawings.

B. Swing Joints for rotors shall be by LASCO Fittings, Inc. with ASTM F2768 Standard for Swing Joint ACME Threads, or equal.

2.05 BACKFLOW PREVENTER

A. Device: As specified on Drawings.
1. If the system is using recycled water, label all potable water backflow preventers with tags or labels reading: "potable water" in black letters on blue background, per details.

B. Enclosure: Low profile, vandal-resistant; "Strongbox" Model series SBBC-CR powder coated cold-rolled steel or stainless steel Model series SBBC-SS by V.I.T. Products, Inc., or equal.
1. Enclosure size to be verified with size of installed backflow device by Contractor.

C. Insulation Blanket: "WeatherGuard Blanket" by Best Choice USA, or equal.

## 2.06 VALVES AND SENSORS

A. General:
   1. Each valve shall be installed with unions before and after the valve.
   2. Control Valves shall be labeled with tags denoting the associated controllers and station numbers.
   3. Gate Valves and Ball Valves:
      a. Valves shall have a minimum working pressure of not less than 150 psi and shall conform to AWWA standards.
      b. Provide purple tags on all valves if system is designed for recycled water.

B. Master Valve: As specified on Drawings.

C. Flow Sensors: As specified on Drawings.
   1. Flow Sensor wiring conduit shall be Schedule 80 grey PVC electrical conduit complying with ASTM F512, size as required.

D. [Hydrometers: As specified on Drawings.
   1. Hydrometer wiring conduit shall be Schedule 80 grey PVC electrical conduit complying with ASTM F512, size as required.]

E. Gate Valves and Ball Valves: As specified on Drawings.

F. [Ductile Iron Gate Valves:
   1. Ductile Iron Gate Valves shall have 4710, DR 11 Pipe Ends per ASTM F714 or ASTM D3035 with a minimum pressure rating of 200 psi and comply with AWWA C515. Gate Valves shall be Model 66 series as manufactured by American AVK and supplied by The Harrington Corporation or approved equal.]

G. [Ductile Iron Angle Valves:
   1. Ductile Iron Angle Valves shall be 200 psi rated with integrally restrained ends and a Cv > 90. Inlet end shall be male swivel and outlet end shall be integrally restrained push on gasketed joint with "floating grip ring". Components shall be Ductile Iron and 316 Stainless Steel complying with ASTM A536 and ASTM A276 respectively. Ductile Iron shall be fusion bond epoxy coated. Gasketed joints shall be SBR Rubber and comply with ASTM F477. Internal seals shall be peroxide cured EPDM rubber. Angle Valves shall be as manufactured by The Harrington Corporation or approved equal.]

H. Remote Control Valves: As specified on Drawings.

I. Quick Coupling Valves: As specified on Drawings. Provide purple lid if system is designed for recycled water.

J. Drain Valves:
   1. Drain Valves shall be 2" Nibco T113 or approved equal.

K. Isolation Valves for Air/Vacuum Relief
   1. Isolation valves for air/vacuum relief shall be bronze ball valves.

L. Rain Sensors: As specified on Drawings.

M. [Moisture Sensors: As specified on Drawings.]

N. [Weather Stations: As specified on Drawings.]

O. [Grounding: 5/8"x8' copper grounding rod (one per controller) including #6 solid copper ground wire.]

2.07 [CONCRETE VALVE BOXES

A. General:
1. Manufacturer: Christy as specified and the basis of design, or equal.
2. Valve Boxes shall have bolt down type lids with locking where specified.

B. Master Valve, Rectangular:
1. Valves 1" and 1'1/2": Model equivalent to Christy N16 with N16T bolt down lid.
2. Valves 2" and 3": Model equivalent to Christy N36 with N36T bolt down lid.
3. Boxes shall be labeled as "Irrigation - MV" on lid.

C. Flow Sensor, Rectangular:
1. Sensors up to 3 Inches: Model equivalent to Christy N16 with N16T bolt down lid.
2. Sensors 4 inches and Larger: Model equivalent to Christy N36 with N36T bolt down lid.
3. Boxes shall be labeled "Irrigation - FS" on lid.

D. [Hydrometer, Rectangular:
1. Model equivalent to Christy N36 with N36T bolt down lid.
2. Boxes shall be labeled as "Irrigation - FS" on lid.]

E. Gate Valves and Ball Valves:
1. Valves 1-2 Inches: Christy model N09 box with N9T locking lid and N99HHB-2 bolts.
2. Valves 2-1/2 Inches and Larger: Christy N36 with N36T bolt down lid, or equal.
3. Boxes shall be labeled as "Irrigation – Valve" on lid.

F. Remote Control Valves:
1. Valves 1 and 1-1/2 Inches: Christy model N16 with N16T bolt down lid.
2. Valves 2 inches and larger: Christy model N36 with N36T bolt down lid, or equal.
3. Boxes shall be labeled as "Irrigation - RCV" on lid.

G. Quick Coupling Valves, Round:
1. Model equivalent to Christy Model G05T with G05CT locking Lid.
2. Boxes shall be labeled as "Irrigation – QC" on lid.

H. Valve Boxes: Valve boxes shall have locking or bolt down type lids.

2.08 AUTOMATIC CONTROLLER AND ENCLOSURE

A. Controller: Manufacturer, model, size, and type as specified on Drawings.

B. Enclosure: Manufacturer, model, size, and type as specified on Drawings.

C. Grounding: 5/8"x8' copper grounding rod (one per controller) including #6 solid copper ground wire.

2.09 [COACHES SWITCH AND ENCLOSURE

A. Coaches Switch: Manufacturer, model, size, and type as specified on Drawings.

B. Enclosure: Manufacturer, model, size, and type as specified on Drawings.

C. Grounding: 5/8"x8' copper grounding rod (one per controller) including #6 solid copper ground wire.]

2.10 ELECTRICAL

A. General:
1. Electrical equipment shall be NEMA Type 3, waterproofed for exterior installations.
2. Electrical work shall conform to local codes and ordinances.
3. Remote control wire shall be UL rated for direct burial.
4. Where two or more controllers are used, the control wires shall be a different color for each controller. These colors shall be noted on the "Record Drawings" placed in the controller cabinet.

B. [Flow Sensor Wiring:
1. As per manufacturer's details and recommendations.
2. Flow Sensor conductors shall be installed in 1" Schedule 80 electrical conduit from controller to the Flow Sensor valve box.
3. Control wires from controller to flow sensor: 2 #14-gauge (AWG) wire, not to exceed 2,000 feet.
4. Splice connectors: 3M DBR-Y6 splice connectors, 3M Scotchcast #3570G-N Connector seal packs, or Spears DS-100 connectors with DS-300 sealant.]

C. [Hydrometer Wiring:
1. As per manufacturer's details and recommendations.
2. Hydrometer conductors shall be installed in 1" Schedule 80 electrical conduit from controller to the Hydrometer valve box.
3. Control wires from controller to flow sensor: 2 #14-gauge (AWG) wire, not to exceed 2,000 feet.
4. Splice connectors: 3M DBR-Y6 splice connectors, 3M Scotchcast #3570G-N Connector seal packs, or Spears DS-100 connectors with DS-300 sealant.]

D. Low Voltage Control Valve Wiring:
1. Conductors:
   a. Control Wires: Type UF, 14-gauge wire. Insulating jacket color shall be red.
   b. Common Wires: Type UF, 12-gauge wire. Insulating jacket color shall be white.
   c. Spare Control Wires: Type UF, 14-gauge wire, insulating jacket color shall be blue.
   d. Spare Common Wire: Type UF, 12-gauge wire. Insulating jacket color shall be green.
2. Splice connectors: 3M DBR-Y6 splice connectors, 3M Scotchcast #3570G-N Connector seal packs, or Spears DS-100 connectors with DS-300 sealant.

E. [Two Wire Low Voltage:
1. Conductors:
   a. Control Wires: Type UF, 14-gauge wire decoder cable (up to 10,000 feet from controller to decoder) in common Insulating jacket. Wires shall be blue and red.
   b. Control Wires: Type UF, 12-gauge wire decoder cable (up to 15,000 feet from controller to decoder) in common Insulating jacket. Wires shall be blue and red.
   c. Provide 36" coil of 2 wire in each valve box.

d. 2 wire conductors: Paige P-7354-D Rev 3 or Hunter Jacketed are to be installed in 1" schedule 80 PVC conduit.

2. Splice connectors: 3M DBR-Y6 splice connectors or 3M Scotchcast #3570G-N Connector seal packs.
   a. Maximum of four 14-gauge wires per wire nut.
   b. Two Wire conductors shall not have any splices between controller and first decoder, or between decoders.
3. Two Wire conductors shall be installed in 1" Schedule 80 electrical conduit from controller to first valve box, and between valve box to valve box.
4. Grounding: 5/8"x8' copper grounding rod including #12 solid copper ground wire, to green wire on decoder. Ground rod locations, 1 every 300' or closest controller, and 1 at the end of each 2-wire conductor.
5. Lightning Arrestors: Shall be type, location and installed as per plan and details, or as per decoder manufacturer's recommendation.]

F. [Weather Stations:
1. Wiring: Paige P7171D conductor (maximum length 1,000'). For runs under 100' multi conductor in conduit (4-18-gauge solid copper wires) may be substituted.
2. Splice connectors: 3M DBR-Y6 splice connectors, 3M Scotchcast #3570G-N Connector seal packs, or Spears DS-100 connectors with DS-300 sealant.]

2.11 CONNECTING COMPOUNDS

A. Primer: I Weld-On "P-70" Primer by IPS Corporation.

B. Cement: Solvent cementing shall be in conformance with ASTM D2564 and ASTM D2855.
1. Pipe Diameter up to 6 Inches: Weld-On #705 by IPS Corporation, Low VOC PVC solvent cement for Class 200 PVC or schedule 40 PVC.
2. Pipe Diameter Larger than 6 Inches and Schedule 80 PVC: Weld-On #711 by IPS Corporation, Low VOC PVC solvent cement.
3. Flexible PVC to Rigid PVC Connections: Weld-On #795 by IPS Corporation, Low VOC PVC solvent cement.

2.12 SPRINKLER HEADS

A. Rotors, Rotators and Spray Heads: As specified on the Drawings.

B. Install with purple rotor covers or head caps if system is designed for recycled water.

2.13 TREE AND SHRUB BUBBLERS

A. Bubbler Nozzle Assemblies: As specified on the Drawings.

B. Install bubblers with purple caps if system is designed for recycled water.

2.14 [DRIP LINE

A. Drip line System Components: As described on the Drawings by GPH Irrigation Products, or equal.

B. End Flush Valve: 1/2-inch PVS full port ball valve connected to 1/2-inch algae resistant PVC flex hose. House in a minimum 12-inch round valve box in accordance with manufacturer's instructions.]

## 2.15 ADDITIONAL MATERIALS

A. Tape:
   1. General:
      a. On-site buried recycled water piping shall be identified by warning tape with a minimum width of 3 inches reading “caution – recycled water” (in black or white lettering on purple background). Tape shall run continuously on top of main line piping and shall be attached to piping with plastic tape banded around the warning tape and the pipe every 5 feet on center.
   2. Pipe Detection Tape: 3-inch-wide, detectable type; “Terra Tape” "Sentry Line Detectable” from Reef Industries, Inc., 713.507.4251; or equal.
      a. Text: "Caution Water Line Buried Below."

B. Tracer Wire: Polyethylene insulated, copperclad steel; “SoloShot XTreme Tracer Wire” by Copperhead Industries, LLC. 877-726-5644, or equal.

C. Sleeves: Class 200 PVC. Install sleeves in locations and at the depths shown on the Drawings. Sleeves shall extend a minimum of 6 inches past the edge of the above hard surface for ease of location.

D. Teflon Tape: Variety commonly used for wrapping threaded connections.

E. Valve Tags: Plastic pre-labeled station tags.

F. Drain Rock: 3/4-inch wash drain rock complying with requirement specified in Section 32 11 00 – Base Courses.

G. [Metal Gopher Mesh: Shall be TWP Gopher Control Mesh, galvanized steel, 18 gauge, 1/2” mesh. Model: 002X002DO410W36T. By: TWP, 2831 Tenth Street, Berkeley, CA. PH: 510-548-4434, or equal.]

# PART 3 - EXECUTION

## 3.01 EXAMINATION

A. Prior to starting work, test and verify that water pressure levels meet the requirements specified on the Drawings. Notify the Owner’s Representative immediately of any discrepancies.

B. Irrigation Drawings are diagrammatic. Main lines and lateral lines shown parallel in the Drawings may be placed in a common trench, provided that a minimum horizontal distance of 3 inches is maintained between buried lines, as per Drawings.

C. Sprinkler heads are shown schematically. Suspected discrepancies in coverage or sizes of areas to be irrigated shall be brought to the attention of the Owner’s Representative prior to installation. Contractor shall re-direct work to avoid delay while awaiting resolution.

## 3.02 PREPARATION

A. Contractor shall make provisions and take necessary precautions to protect existing and completed work or features.

B. Layout:

1. Prior to installation, the Contractor shall stake out all pressure supply lines, routing and location of backflow preventer, all valves, sprinkler heads, bubblers, drip tubing, and automatic controller for review by the Owner's Representative.
2. Layout irrigation system and make minor adjustments required due to differences between site and Drawings. Where piping is shown on Drawings under paved areas, but running parallel and adjacent to planted areas, install the piping in the planted areas.

3.03 TRENCHING

A. Conform to Section 31 23 00 – Excavation and Fill.

B. Excavate trenches with vertical walls, uniform bottom, free of deleterious materials, and wide enough for pipes to lay side by side, fully supported on trench bedding. There shall be a minimum 3-inch clearance between all pipes.
   1. No lines shall be installed parallel to and directly over another line.
   2. When lines must cross, the angle shall be forty-five to ninety degrees, and a minimum of three inch (3") vertical clearance shall be maintained.

C. Provide minimum coverage depths as follows:
   1. Mainline: 24 inches in landscape areas, 30 inches in sleeves under paving.
   2. Lateral Lines: 18 inches in landscape areas, 30 inches in sleeves under paving.

D. Hydraulic driving methods shall not be used under paved surfaces.

3.04 PIPE INSTALLATION

A. Comply with manufacturer's instructions as applicable.

B. Rubber Ring Seal Joint:
   1. Use factory-made male end or prepare field-cut male end to exact specifications of factory-made end.
   2. Carefully clean bell or coupling and insert rubber ring without lubricant. Position ring carefully according to manufacturer's specifications.
   3. Lubricate male end according to manufacturer's instructions and insert male end to specified depth. Use hands only when inserting PVC pipe.

C. Thrust Blocks:
   1. Thrust blocks shall be provided on 3 inch and 4-inch main lines where specified and as necessary to resist system pressure on, and pipe movement of, pressurized lines and fittings. Thrust blocks shall be concrete and the size shall be based on an average soil safe bearing load of 3,000 pounds per square foot.
   2. Form thrust blocks in such a manner such that concrete comes in contact only with the fittings, not over the fitting joint. Thrust blocks shall be between solid soil undisturbed and the fitting.
   3. Install thrust blocks as shown in Drawings and as described above.
   4. Main lines of 3 inches and 4 inches with operating pressures of 85 psi or more, and systems with a booster pump, shall have mechanical restraints at all fittings and changes of flow direction.
   5. Main lines 6 inches and larger shall have ductile iron fittings with joint restraints installed at all couplings and changes in flow direction.

D. Solvent Welded Joints:
   1. Assemble above ground where possible.
   2. Cut square, ream, and thoroughly clean shavings and burs from pipe ends.

3. Make joint using specified primer and cement, continuously wiping off excess.
4. Allow 60 minutes of set-up time before handling and 24 hours curing before applying water pressure.

E. Threaded Joints:
1. Use Teflon tape on all pressurized, threaded plastic to plastic and plastic to metal joints.
2. Hand tighten and use only light strap-type friction wrench pressure to complete.

F. Snake pipe to provide a minimum of 1 additional foot for each 100 feet of pipe to allow for expansion and contraction.

G. Pipe shall be installed as specified and generally as shown in Drawings.

H. [Maintain a 10-foot horizontal separation between buried pressurized recycled water irrigation piping and buried potable water piping unless otherwise noted. At pipe crossings, buried pressurized recycled water irrigation piping must be 12 inches below potable water lines. Pressurized recycled water pipelines are allowed over potable water pipelines with a minimum of 12 inches vertical separation if a full standard pipe length is centered over the crossing, or the recycled water pipeline is installed in a pipe sleeve which extends a minimum of 10 feet on either side of the potable water piping. Intermittently pressurized irrigation laterals may be located a minimum of 12 inches above potable water pipelines without sleeving.]

I. Cap or plug pipe openings as soon as pipes have been installed to prevent intrusions of debris.

J. Sleeves:
1. Install pipe sleeves where necessary, where shown and at all points where pipes pass through concrete or masonry. In footings, install sleeving that allows 1-inch minimum clearance around pipes.
2. Each end of sleeve shall extend a minimum of 6 inches beyond edge of paving or structure above. Provide removable non-decaying plug or cap at each end of sleeve, to prevent earth from entering pipe.

K. Thoroughly flush system prior to installing valves, screens and nozzles.

L. Install pipe detection tape and tracer wire above mainline.

3.05 EQUIPMENT AND INSTALLATION

A. Reduced Pressure Backflow Prevention Device: Install in accordance with local codes and as shown on the Drawings.

B. [Master Valve and Flow Sensors:
1. Install as shown in Drawings.
2. Valve boxes shall be set plumb, flush, and square with adjacent structures.
3. Valves shall be installed in valve boxes to provide 2-inch clearance between the highest point of the valve and the bottom of the valve box lid.
4. Install valve tags in an acceptable manner indicating valve station and controller number.
5. Provide 12-inch minimum separation when valve boxes are grouped together, and align in a straight, parallel, even, and orderly manner.
6. Locate all boxes a minimum of 10 feet from striping of any field of play.
7. Locate valves in shrub/ground cover areas whenever possible.]

C. [Hydrometers:

1. Install as shown in Drawings.
2. Valve boxes shall be set plumb, flush, and square with adjacent structures.
3. Valves shall be installed in valve boxes to provide 2-inch clearance between the highest point of the valve and the bottom of the valve box lid.
4. Install valve tags in an acceptable manner indicating valve station and controller number.
5. Provide 12-inch minimum separation when valve boxes are grouped together, and align in a straight, parallel, even, and orderly manner.
6. Locate all boxes a minimum of 10 feet from striping of any field of play.
7. Locate valves in shrub/ground cover areas whenever possible.]

D. Gate Valves and Ball Valves:
1. Install as shown on the Drawings.
2. Valves shall be installed in valve boxes to provide a minimum of 2-inch clearance between the highest point of the valve and the bottom of the valve box lid.
3. Valves shall not be installed in any area that is within the athletic field of play. All valves shall be located within valve boxes set 12 inches from fencing or edge bands as shown.
4. Locate all boxes a minimum of 10 feet from striping of any field of play.

E. Remote Control Valves:
1. Install as shown in Drawings.
2. Valve boxes shall be set plumb, flush, and square with adjacent structures.
3. Valves shall be installed in valve boxes to provide 2-inch clearance between the highest point of the valve and the bottom of the valve box lid.
4. Install valve tags in an acceptable manner indicating valve station and controller number.
5. Provide 12-inch minimum separation when valve boxes are grouped together, and align in a straight, parallel, even, and orderly manner.
6. Locate all boxes a minimum of 10 feet from striping of any field of play.
7. Locate valves in shrub/ground cover areas whenever possible.
8. [Two Wire decoders, as specified, are to be located within the valve boxes with 36 inches of wire coil to allow for easy maintenance and reading of decoder code bar.]

F. Quick Coupler Valves:
1. Install as shown on the Drawings.
2. Quick coupling valves shall be installed in valve boxes to provide 2-inch clearance between the highest point of the valve cover and the bottom of the valve box lid.
3. Locate all boxes a minimum of 10 feet from striping of any field of play.
4. Quick couplers in synthetic fields shall be located against synthetic turf edgeband and curbs.

G. Controller:
1. Install as shown in Drawings.
2. Owner's Representative shall determine final approved controller locations.
3. Label cabinet door exterior with permanent, minimum 1-inch tall letter or number of controller designations corresponding with designations on the Drawings and Record Documents.
4. 120 power, pull/splice box, conduit and sweeps from power source to controller shall be provided and installed by an electrical contractor.
5. All above grade conduit shall be steel electrical conduit.
6. Affix reclaimed water warning on controller enclosure (as applicable).

H. Control Wire:
1. Install control wire along main line, or as shown in Drawings.

2. Connect control wires to controller in sequential arrangement according to identification number in the Drawings. Label each controller station with permanent non-fading labels indicating valve identification number and controlled.
3. Bundle multiple wires with tape or ties at 20-foot intervals maximum. Do not tape wires in sleeves.
4. Make all splices in control valve boxes using only specified connectors.
5. Provide 36-inch wire coil at each remote control valve and at all mainline directional changes.
6. Install 2 spare control wires and one looped spare common wire to run by, and loop into, every remote control valve box of system. Terminate wires inside controller enclosure unconnected and clearly labeled as extra.
7. All wiring under paving shall be installed in a PVC pipe sleeve large enough to allow withdrawal and insertion of individual proposed wires and room for 12 additional wires.
8. Control wire under 2,000 feet in length shall be 14 gauge.
9. If control wire run is over 2,000 feet, shall be 12 gauge.
10. Two Wire decoder cable up to 10,000 feet from controller to decoder shall be 14 gauge.
11. Two Wire decoder cable over 10,000 and up to 15,000 feet from controller to decoder shall be 12 gauge.
12. Distance between Two Wire Decoder and Solenoid shall be in accordance with manufacturer's specifications.
13. Install terminus ends of two wire cable with 36-inch loop in 8-inch round valve box and record location of each box on the Record Drawings.
14. Install Two Wire Lightning Diffusers per manufacturer's details and recommendations.

I. Rotor, rotator and Spray Heads:
1. Install as shown in Drawings.
2. Install plumb with finish grade.
3. Thoroughly flush all lines prior to installing nozzles.

J. Tree Bubbler Assemblies:
1. Install in perforated pipe sump as shown on the Drawings.
2. Coordinate installation with planting operations to ensure timely and proper placement of heads.

K. Shrub Bubbler Assemblies
1. Install as shown on the Drawings.

L. [Drip Tubing:
1. Install as shown on the Drawings.]

## 3.06 FIELD QUALITY CONTROL

A. General:
1. Notify Owner's Representative for the following reviews, with minimum 2 working days' notice:
   a. Pressure testing mains prior to installing heads.
   b. Coverage test prior to planting turf shrubs and or groundcover.
   c. Pre-maintenance observation prior to acceptance of installed irrigation system.
   d. Final observation prior to release of project to Owner.
2. Contractor shall provide all equipment and personnel required to conduct tests.
3. Provide up-to-date Project Record Drawings at each review.
4. If Owner's Representative is called out for review prior to the system being ready as specified, the contractor shall be back charged for the full cost of the review time, report, and travel.

B. Pressure Tests:

1. Testing shall occur with trenches open. Small amounts of backfill between fittings shall be allowed to prevent pipe displacement. All fittings shall be visible prior to testing.
2. Test all pressure supply lines under a minimum hydrostatic pressure of 125 psi. Pipe shall hold pressure for a period of 6 consecutive hours with no more than 5 psi loss in order to pass test.
3. Lateral lines shall be tested under full line pressure for a period of 1 hour prior to backfilling. Cap all heads and center load pipe between fittings prior to testing.
4. Correct all deficiencies revealed by tests to the satisfaction of the Owner's Representative.

C. System Flushing:
1. After lateral lines, swing joints and sprinkler heads are in place and connected, and prior to installation of sprinkler nozzles, thoroughly flush all lines with water to completely clean lines of debris.
2. Install sprinkler filters and nozzles only after lines have been flushed to the satisfaction of the Owner's Representative.

D. Coverage Tests:
1. Perform coverage tests after systems are completed and operational, after finish grading as specified in Section 32 90 00 - Planting has been completed, but prior to any planting, in the presence of the Owner's Representative.
2. Correct all deficiencies to the satisfaction of the Owner's Representative prior to planting.
3. No overspray or runoff of recycled water is allowed on any non-approved use area.

## 3.07 BACKFILLING

A. General:
1. Backfill only after specified tests have been performed and accepted.
2. Clean trenches of debris and deleterious material before backfilling.
3. Backfill as shown on the Drawings with native material granular in nature and free from deleterious material rocks and clods 2" or larger.
4. Install pipe detection tape over entire run of mainline as shown in Drawings.
5. Compact trenching to 95 percent relative density under pavement and 85 percent relative density within planting areas.
6. Dress off and compact trench surfaces with finish grade in a manner to ensure no settling of trenches will occur. If settling occurs, contractor is to bring in additional topsoil, recompact and grade to be flush with adjacent finish grade.
7. Comply with additional requirements specified in Section 31 23 00 – Excavation and Fill.

## 3.08 ADJUSTING

A. Adjust and balance system to eliminate overspray, fogging or misting and as directed by Owner's Representative.

## 3.09 DEMONSTRATION

A. Instruct Owner's personnel in complete and proper operation and maintenance of system prior to Final Acceptance.

## 3.10 MAINTENANCE

A. Contractor shall service and maintain irrigation system during specified Landscape Maintenance Period as specified in Section 31 01 90 - Landscape and Site Maintenance.

B. The entire irrigation system shall be under fully accepted automatic operations for a period of 2 days prior to commencement of planting.

C. Final Acceptance and start of guaranty period shall occur no later than the end of the specified Landscape Maintenance Period.

3.11 FINAL REVIEW

A. Provide Owner's Representative with Record Documents and other specified closeout submittals prior to Final Review.

END OF SECTION

# SECTION 32 90 00

# PLANTING

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Landscaping as shown on the Drawings including, but not be limited to the following:
   1. Soil preparation.
   2. Fine grading of landscape areas.
   3. Turf planting.
   4. Plant material.
   5. Turf Establishment Period.
   6. Landscape Maintenance Period.

B. Related Requirements:
   1. Section 02 41 13 - Site Clearing and Demolition.
   2. Section 31 01 90 - Landscape and Site Maintenance.
   3. Section 32 80 00 – Irrigation.

### 1.02 REFERENCES

A. American Joint Committee on Horticulture Nomenclature (AJCHN): Standardized Plant Names.

B. American Association of Nurserymen, Inc. (AAN): American Standard for Nursery Stock.

C. Sunset Western Garden Book, Lane Publishing Company.

D. Agricultural Code of California.

E. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Coordination:
   1. Irrigation and drainage systems shall be inspected and tested before start of any Work of this Section. Before covering subsurface drains and any subsurface drainage weeps, Contractor shall inspect and be responsible for their performance.

### 1.04 ACTION SUBMITTALS

A. Plant Materials and Products:
   1. Thirty days prior to planting, submit 4 copies of documentation that plants specified have been ordered. Include names and addresses of suppliers.
   2. Substitutions: If substitutions are required, they shall be brought to the attention of the Owner's Representative, at time of submittal. Refer to Section 01 25 00 – Substitution Procedures for additional requirements.

B. Product Data:
   1. Manufacturer's descriptive literature for products proposed for use.
   2. Certified chemical analysis of the following:
      a. Fertilizers.
      b. Herbicides.

C. Samples: Submit 4 samples of the following in minimum 1-quart size "zip-lock" plastic bag:
   1. Soil amendment. Include current evaluation and sieve analysis.
   2. Bark mulch top dress.
   3. Topsoil, as applicable.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Perform work in accordance with all applicable laws, codes, and regulation required by authorities having jurisdiction over such work and provide for all review and permits required by Federal, State, and local authorities in furnishing, transporting, and installing materials.
   2. Certificates of review required by law for transportation shall accompany invoice for each shipment of plants. File copies of certificates with the Owner's Representative after acceptance of material. Review by Federal or State governments at place of growth does not preclude rejection of plants at project site.
   3. Control of Work: Comply with Section 5 of the Standard Specifications.
   4. Control of Materials: Comply with Section 6 of the Standard Specifications.

B. Contractor shall employ on-site supervisor at all times during execution of the planting. Supervisor shall be thoroughly familiar and experienced with the materials and products being installed and proper methods of their installation. Notify the Owner's Representative immediately of changes in supervisory personnel.

C. Products and materials shall be new, first quality, and acceptable to the Owner's Representative.

D. Tree, Shrubs and Plants: Provide trees, shrubs and plants of quantity, size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock." Provide healthy, vigorous stock, grown in a recognized nursery in accordance with good horticultural practice and free of disease, insects, larvae, and other defects such as girdling or bound roots, knots, sunscald, injuries, abrasions, and disfigurement.

E. Analysis and Standards: Package standard products with manufacturers certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

F. Quality Review: The Owner's Representative will review trees and shrubs before planting for compliance with specified requirements for genus, species, variety, size and quantity. Owner's Representative retains right to further review trees and shrubs for size and condition of root systems, trunks, stems branches or structure, buds, and other required features, and to disqualify unsatisfactory or defective material at any time during the progress of work. Remove disqualified trees or shrubs immediately from project site and replace with materials acceptable to Owner's Representative.

1.06 DELIVERY, STORAGE, AND HANDLING

A. General:
   1. Ship plant material and seed with certificates of inspection required by governing authorities. Comply with regulations applicable to plant materials.
   2. Handle and store all products of this Section in such a manner as to protect them from damage at all times.

3. Storage of products on-site shall be coordinated by the contractor in an orderly manner so as not to unnecessarily impede the work or reasonable use of project site.

B. Plants:
1. Delivery: Coordinate with Owner's Representative. Provide proper identification for landscape labor force and vehicles at all times while on site.
2. Storage: Coordinate with Owner's Representative. Provide exposure as required by plant variety and provide wind protection for all plants. Water regularly to maintain thorough moisture in root zone. Temporary, automatic irrigation system will be required at discretion of Owner's Representative if extended storage period becomes necessary. Protect dark colored plant containers from direct exposure to the sun.
3. Labeling: At least one plant of each variety or type shall be legibly labeled at all times clearly indicating correct plant name as indicated on Drawings. Labels shall be durable with waterproof ink.

C. Fertilizers:
1. Deliver in original, unopened containers with original labels intact and legible which state the guaranteed chemical analysis.
2. Fertilizer, lime, soil sterilant, and all other potentially toxic products shall not be stored with any other landscape materials.

D. Bulk Material:
1. Coordinate delivery and storage of bulk material with Owner's Representative.
2. Confine materials to neat piles in areas acceptable to the Owner's Representative.

1.07 FIELD CONDITIONS

A. Planting operations shall not be conducted under the following conditions, subject to the discretion of the Owner's Representative:
1. Freezing weather.
2. Excessive heat.
3. High winds.
4. Excessively wet conditions.

1.08 WARRANTY

A. Contractor shall warrant work executed and all materials provided or used under this Section shall be free of defects and poor workmanship for a period of 1 year after Final Acceptance.

B. Contractor wall warrant plant materials shall be in a healthy and thriving condition 1 year after Final Acceptance, unless it can be proven that the unhealthy or non-thriving material is due to causes other than the Contractor's materials or workmanship.
1. Replace dead plants and plants not in vigorous condition immediately upon notification by Owner's Representative during Warranty Period.
2. Replaced plants shall be subsequently guaranteed by the Contractor for an additional year following date of replacement.
3. Repair defective materials and work shall be acceptable to the Owner's Representative.

1.09 TURF ESTABLISHMENT PERIOD

A. Turf Establishment period shall include complete germination of turf and at least 2 mowings as specified herein, prior to the commencement of the specified Landscape Maintenance Period.

1.10 MAINTENANCE PERIOD

A. Refer to Section 31 01 90 - Landscape and Site Maintenance for information.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. [Topsoil shall be clean on-site material that has been previously stripped from the top 6 inches of original grade or import material as applicable. Acceptable topsoil shall be free from rocks, stones, rubble, and clay clods over 1.5 inches in diameter, roots, toxins, and other deleterious materials.]

B. Imported topsoil shall have an agricultural suitability test by a qualified soils laboratory, dated within 30 days of purchase.
   1. Import topsoil proposed for use shall be submitted to the Owner's Representative for review and acceptance prior to delivery to the Project site.

2.02 FERTILIZERS

A. General:
   1. Fertilizers shall be of an acceptable brand with a guaranteed chemical analysis as required by USDA regulations.
   2. Fertilizers shall be dry and (except plant tabs) free flowing.

B. Pre-Plant Fertilizer: Shall be of the following chemical analysis:

| | |
|---|---|
| Nitrogen: | 6 percent. |
| Phosphoric Acid: | 20 percent |
| Soluble Potash: | 20 percent |

C. Post-Plant Fertilizer: Shall be of the following chemical analysis:

| | |
|---|---|
| Nitrogen: | 16 percent |
| Phosphoric Acid: | 6 percent |
| Soluble Potash: | 8 percent |

D. Plant Tabs: 7-gram tabs designed for 12-month slow release with the following chemical analysis by weight; "Gro-Power" or equal:

| | |
|---|---|
| Nitrogen: | 12 percent |
| Phosphoric Acid: | 8 percent |
| Soluble Potash: | 8 percent |
| Humus: | 20 percent |
| Humic Acid: | 4 percent |
| Sulfur: | 3.5 percent |
| Iron: | 2 percent |
| Micronutrients | |

2.03 SOIL ADDITIVES

A. Soil Amendments: Organic Humus Compost
   1. Fully composted aerobic humus compost without presence of decomposition products. The organic matter content shall be at least 50% on a dry weight basis. Humus material shall have an acid-soluble ash content of no less than 6% and no more than 20%.
   2. The pH of the material shall be between 6% and 7.5%.

3. The salt content shall be less than 10 millimho/cm @ 25° C in a saturated paste extract.
4. Boron content of the saturated extract shall be less than 1.0 parts per million.
5. Silicon content (acid-insoluble ash) shall be less than 50%.
6. Calcium carbonate shall not be present if to be applied on alkaline soils.
7. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.
8. Composted wood products are conditionally acceptable [stable humus must be present]. Wood based products are not acceptable which are based on red wood or cedar.
9. Sludge-based materials are not acceptable.
10. Carbon:nitrogen ratio is less than 25:1.
11. The compost shall be aerobic without malodorous presence of decomposition products
12. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen for soil amending.
13. Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

| | | | | | |
|---|---|---|---|---|---|
| Arsenic | 20 | Lead | 200 | Silver | 10 |
| Cadmium | 15 | Mercury | 10 | Vanadium | 500 |
| Chromium | 300 | Molybdenum | 20 | Zinc | 200 |
| Cobalt | 50 | Nickel | 100 | | |
| Copper | 100 | Selenium | 50 | | |

14. Soil Amendments for consideration are listed below:

    a. Soil Amendment: “Super Humus” Compost available from BFI Organics Inc., 1995 Oakland Road, San Jose, CA, 408-262-1401;

    b. “Organic Compost” available from Z-Best Products Inc. 705 Los Esteros Road, San Jose CA, 408-934-6152;

    c. Forest Floor Humus
    Aguiñaga Fertilizer
    (949) 786-9558

    d. Washed Steer Humus/WCP33
    Earthworks
    (951) 782-0260

    e. Garden Humus
    Agromin
    (805) 432-5265

    f. Superior Compost
    Whittier Fertilizers
    (562) 699-3461

    g. Humic Compost
    Agri Service
    (760) 643-4041

    h. Or approved equal.

    Soil amendment submittal shall include sieve analysis as well as an agronomic soil analysis using a saturation extraction test. prepared by a qualified soil lab. Upon direction of owner’s representative, contractor to provide, at contractor’s sole cost, updated testing results for review and approval that are dated within 1 month of submittal date and prior to delivery of product to site.

B. Soil Conditioner: 4 percent sulfur; “Gro-Power Plus (5-3-1) by Gro-Power Inc., 800-473-1307, or equal.

C. Soil Sulphur: Agricultural grade, 99 percent pure, pelletized or granular form, not powdered.

D. Iron Sulphate: Non-staining iron with micro-nutrients, soil penetrant, trace minerals, and humic acids; “Gro-Power Premium Green” by Gro-Power Inc., 800-473-1307, or equal.

2.04 BIORETENTION SOIL MIX

A. Bioretention soil mixture in rain gardens shall have the following general characteristics:
   1. Properties of bioretention soil mix:
      a. Consisting of the following mixture, measured by volume:
         1) 60-70% Sand
         2) 30-40% Compost
      b. Supportive of vigorous plant growth
      c. Able to achieve a long-term, in-place infiltration rate of at least 5 in/hr. and no more than 10 in/hr.
   2. Supplier: ‘Biotreatment soil mix’ by TMT Enterprises. Contact: Matt Moore (408) 432-9040

2.05 MULCH TOP DRESS

A. Material: Medium-sized, 3/4 inch to 2 inches, decorative chipped wood, homogenous in appearance, free of deleterious and inorganic material, sticks, shredded, stringy, and fibrous materials; “Golden Nuggets” from Sun Up, 800-222-255; “MBC Red” from My Bark Company, Inc., 209-786-4042; or equal.

2.06 PLANTS

A. General:
   1. Plants shall conform to the species and minimum sizes shown on the Drawings.
   2. Quantities shown on the Drawings are for the Contractors convenience only. Contractor shall provide plant material to fulfill the intent of the Planting Plan at the discretion of the Owner’s Representative.

B. Condition: Plants shall conform to the following minimum requirements:
   1. Nursery grown unless otherwise specified.
   2. Supplied in appropriate container, balled and burlapped, or bare root as specified on Drawings.

2.07 TURF SOD

A. Harvest and Delivery:
   1. Harvest from source and deliver to project site within 24 hours.
      a. Deliver only as much sod as can be installed in one day's work.
      b. Sod not transplanted within this time period shall be reviewed prior to installation.
   2. Comply with requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in Turfgrass Producers International’s (TPI) "Guideline Specifications to Turfgrass Sodding."
   3. Protect sod from breakage and drying.

B. Sod shall be as follows:
   1. West Coaster Tall Fescue (Fescue/ Blue)
   2. Sod shall have a 1/2 inch cut or thickness.
   3. Sod shall be large roll cut.
   4. Sod shall have a peat or sand / peat base.

C. Source: West Coast Turf, Pacific Sod, Delta Bluegrass, or equal.

2.08 DRILLED SEEDING

A. Drill seed with seed machine. Do not broadcast or drop seed.
   1. Evenly distribute seed by sowing equal quantities in two directions.
   2. Broadcast fertilizer.
   3. The seed shall be uniformly distributed with a turf grass drill seeder, such as a Brillion or approved equal. The areas shall be drilled from two directions with at least a 45 degree difference in angle approach.
   4. After seeding, all areas shall be cultipacked to a minimum of 85 percent compaction.
   5. Contractor shall reseed as necessary to ensure 95 percent coverage.

B. Sow seed at a total rate of 10lbs/1000 square feet.

C. Apply a nitrogen based fertilizer, 15 15 15 at a rate of 10lbs/1000 square feet.

D. After seeding, all areas shall be cultipacked to a minimum of 85 percent compaction.

E. Protect seeded areas from hot, dry weather or drying winds by applying peat mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16-inch, and roll surface smooth.

F. During first week after planting, water daily

2.09 HERBICIDES

A. Pre-Emergent: “Ronstar-G” pelletized, “Surflan” liquid, or equal.

B. Other Herbicides: Submit for review and accepted by Owner’s Representative prior to use.

2.10 ADDITIONAL MATERIALS

A. Water: Clean, fresh, and free of substances or matter which could inhibit vigorous growth of plants.

B. General: Products and materials shall be new, first quality as acceptable to the Owner’s Representative.

C. Tree Stakes and Ties: As shown and specified on the Drawings.

D. Header Board: As shown and specified on the Drawings.

E. Root Barriers: Model #UB 24-2 “Universal Barrier” by Deep Root Partners L.P, 800-458-7668, or equal.

F. Weed Barrier: “Pro Weed Barrier” Model 24003080 DeWitt Co., Sikeston MO, 800-888-9669, or equal.
   1. Roll Size: 12 feet by 250 feet.
   2. Anchorage: 8 inch jute staples.

PART 3 - EXECUTION

3.01 TOPSOIL INSTALLATION

A. Subgrade soil shall be cut or filled to the depth required such that after placement of required amount of topsoil and specified preparation procedures have been accomplished, specified finish grades will be attained.

B. Subgrade soil shall be cross-ripped as specified.

C. Planting areas shall contain a minimum of 6 inches of acceptable topsoil applied as applicable and where required. Only previously accepted topsoil shall be installed.

D. Refer to Section 31 20 00 – Earth Moving for rough grading information.

3.02 PREPARATION

A. Make provisions and take necessary precautions to protect existing and new improvements from damage during execution of planting work.

B. Initial Preparations:
1. Prior to beginning of planting, thoroughly cross-rip, with second rip shall be performed at 90 degrees to first rip, planting area soil to a depth of twelve 12 inches.
2. Remove all rocks, sticks, clods, debris, and other deleterious materials over one-half (1/2) inch in diameter from top 6 inches of soil.
3. Float, rake, and roll all planting areas as necessary to establish smooth, clean, non-yielding planting beds.
4. Prevent erosion of the soil between completion of soil preparation and planting.

C. Concrete Mowbands and Wood Header Boards: Install in accordance with the Drawings and repeat specified initial preparations as necessary.

3.03 SOIL PREPARATION AND FINISH GRADES

A. Soil Preparation:
1. Thoroughly roto-till the following additives into the top 6 inches of planting area soil at the following rates per 1,000 square feet:
   a. Soil Amendment: 6 Cubic Yards.
   b. Soil Conditioner: 200 Pounds.
   c. Pre-Plant Fertilizer: 35 Pounds.
   d. Soil Sulfur: 20 Pounds.
2. The above additive recipe shall be used by Contractor for establishing the cost of soil additives in the Contract sum.
   a. A site specific fertility test will be performed by the Owner's Representative at the Owner's cost after rough grading and applicable topsoil placement or replacement operations are complete.
   b. The results of the testing will be reviewed by the Owner Representative and confirmation of the amendment additives ratio will be provided to the Contractor.
   c. The Contract sum will be modified, in accordance with the procedures for changes in the work included in the Contract, if there is a variance from the above additives or quantities.
3. After additives are fully incorporated into the soil, the Owner's Representative will perform further testing at the Owner's expense to verify conformance with the newly recommended materials and quantities. If deficiencies are found, the Contractor shall be solely responsible for the cost of adding deficient material as necessary and re-testing required to verify conformance.

4. The Contractor shall notify the Owner's Representative a minimum of 2 working days prior to the completion of finish grading and soil preparation operations so that fertility testing can be arranged. Contractor shall also schedule 7 working days after soil samples have been taken to allow for receipt and evaluation of soil tests with no cost or delay to the project.]

B. Planting Area Finish Grades:
1. After tilling in additives and re-compaction to 85 percent relative compaction, rake planting areas smooth and set finish grades as follows.
2. After soil preparation, finish grades of planting areas shall be 1 inch below adjacent paving, headers, utility boxes, irrigation boxes, and other in-grade items. Finish grade slopes shall be consistent.
3. Drainage structures, including catch basins, area drains, and concrete swales, shall be flush with finish grade to allow for proper drainage. Soil shall be sloped consistently from spot elevations provided to drain.
4. In planting areas to receive mulch, depth of mulch shall taper within 3 feet of paving edge to a depth from 3 inches to 1 inch at edge of pavement.
5. Irrigation head elevation relative to finish grade shall be installed as shown.
6. After sand channel drainage system, finish grade shall be re-established.
7. Infield fines and warning tracks shall be graded to be flush with depth of sod soil. If sod is at 3/4 inches, then that will be the difference of the sod subgrade to the infield fines finish grade prior to placement of the sod.

## 3.04 NATIVE GRASS AND WILDFLOWER HYDROSEEDING

A. Verify that soil is prepared and finish graded as specified prior to hydroseeding.

B. Slurry preparation shall be performed at job site.
1. Water, mulch, fertilizer and other ingredients shall be added to the tank simultaneously so that the finished load is a homogenous mix of specified ingredients.
2. Seed shall be added last and shall be discharged in 2 hours.
3. Slurry held over 2 hours shall be recharged with 1/2 the seed rate before application.
4. Once fully loaded, the complete slurry shall be agitated for 3-5 minutes to allow for uniform mixing.

C. Apply hydroseed evenly and uniformly over areas to be seeded at rates specified. Apply in a sweeping motion to form a uniform application and form a mat at the specified rates.

D. Seeding shall occur before first germinating rains in the fall.

E. If mixture remains in the tank for more than 8 hours it shall be removed from the job site.

F. Remove or clean areas not intended to receive hydroseed treatment.

## 3.05 TURF SEED INSTALLATION

A. General:
1. Soil preparation and fine grading shall be as specified.
2. Prior to seed installation, irrigation shall be tested, coverage test approved and be fully operational.
3. The turf bed shall be reviewed and accepted by the Owner's Representative prior to seed installation.

B. Seed to be installed using a mechanical drill seeder; Brillion type or equal.

C. Provide and install temporary fencing around completed seeded areas. Using 6 foot tall construction fencing as specified for project.

D. Refer to Section 31 01 90 – Landscape and Site Maintenance for mowing and maintenance procedures. As applicable, the Contractor shall remove turf, re-grade any areas that have been rutted from mowers or otherwise damaged, and replace turf to the satisfaction of the Owner's Representative.

E. Until project Final Acceptance, should it become evident that certain areas have not grown, re-seed the areas immediately with seed of the same type as originally used and maintain as specified.

3.06 SOD INSTALLATION

A. General:
1. Soil preparation and fine grading shall be as specified.
2. Prior to sod installation, roll turf bed until a smooth, firm surface with uniform grade has been produced.
3. The turf bed shall be reviewed and accepted by the Owner's Representative prior to sod installation.

B. Placement:
1. Sod shall be unrolled into place with careful attention to tight joints with no overlapping or stretching.
2. Stagger the joints in each new row like rows of bricks with a minimum 18 inch minimum stagger. Use a sharp knife for shaping around trees, flower beds or borders. Immediately after placement, soak sod areas with water.
3. Roll sod after watering to smooth out bumps and air pockets, and roll again if sod is not even.
4. Water frequently for the first 10 to 14 days with enough water to saturate soil to a depth of 4 inches.
5. Do not allow sod dry out.

C. Provide and install temporary fencing around completed sod areas if not protected by other fencing. Use 6 foot high temporary fence for protection.

D. Refer to Section 31 0190 – Landscape and Site Maintenance for mowing and maintenance procedures. As applicable, the Contractor shall remove sod, re-grade any areas that have been rutted from mowers or otherwise damaged, and replace sod to the satisfaction of the Owner's Representative.

E. Until project Final Acceptance, should it become evident that certain sod areas have not grown, re-sod the areas immediately with sod of the same type as originally used and maintain as specified.

3.07 TURF ESTABLISHMENT PERIOD

A. Prior to commencement of specified maintenance period, turf shall be completely germinated and established, and a minimum of 2 mowings shall have taken place as follows:
1. First mowing shall take place when turf has reached a height of 3 inches and turf shall be mown to 2 inches. Submit written request to the Owner's Representative for acceptability of initiating first mowing.
2. Thereafter, turf shall be mown weekly until turf is sod-like in appearance and quality, and all other contract requirements shall be fulfilled prior to allowing the maintenance period to commence.
3. Contractor will receive a written notice of acceptance of turf establishment and to commence with landscape maintenance period.
4. Owner's Representative will approve any phasing of turf areas to commence into the maintenance period. Areas may be approved in stages but will require contiguous areas of turf that are completely established.

3.08 TREE, SHRUB AND GROUND COVER PLANTING

A. These areas shall receive specified topsoil and soil amendments prior to commencing with tree, shrub and ground cover planting.

B. Layout: Coordinate layout of plants with Owner's Representative for review and acceptance.

C. Plant Pit Excavation:
1. Excavate pits to sizes indicated in Drawings.
2. Thoroughly scarify all sides of plant pits to remove "auger slick" and encourage root penetration.

D. Set trees and shrubs in pit on tamped backfill base as per Details. Set plumb and face for best appearance. Thoroughly scarify all plant root balls to eliminate any circling roots and to encourage root growth. Set plant so root crown will level with or be slightly above surrounding grade after settlement.

E. Backfilling:
1. Backfill mix for 1 gallon size and larger shall consist of 100 percent native site soil with plant tabs added per manufacturer's recommendations.
2. Tamp backfill mix under and around root balls.
3. Flood plant pit when half backfilled; allow to drain.
4. Complete backfilling. Tamp as necessary, do not over compact.

F. Palm Pit Backfilling:
1. Fill the hole with washed plaster sand.
2. Water in as you fill hole with sand to wash the material around the exposed roots.
3. Avoiding leaving any air pockets or voids that will allow the roots to dry out.
4. The sand backfill should ensure good drainage plus provide rigidity so you may not have to brace the tree.

G. Watering:
1. Thoroughly water plants immediately after planting.
2. Construct water basins as specified in Drawings.

H. Finish Grade Restoration: Restore finish grades by hand raking. Dispose of excess subgrade soil.

3.09 TREE STAKING

A. Stake trees as shown in the Drawings.

B. Set stakes plumb, without damage to rootball and sufficiently deep to provide necessary support.

C. Tree ties shall be tied loosely enough to allow movement, yet taut enough to support tree.

3.10 HERBICIDE APPLICATION

A. Apply in accordance with manufacturers' recommendations.

B. Apply pre-emergent herbicide to soil prior to placement of bark mulch top-dress.

3.11 MULCH TOP DRESS

A. Install weed barrier in all planters to receive mulch. Weed barrier is to be installed prior to mulch installation and after acceptance of finish grade operations. Install with stakes 24" on-center.

B. Apply 3 inches of specified bark mulch top dress to all non-turf and hydroseeded planting areas and other areas as may be specified in the Drawings. Trees in hyrdoseeded areas shall receive the tree well and mulch in the well.

C. Rake mulch top dress evenly to create a uniform surface and pull bark mulch top dress away from trunks or stalks of plants 1 to 2 inches.

D. Mulch shall dictate finish grade in planting areas.

3.12 INSTALLATION OF ADDITIONAL MATERIALS

A. Header Board: Install as shown on the Drawings.

B. Root Barriers: Install as shown on the Drawings.

3.13 FIELD QUALITY CONTROL

A. New turf areas shall be fenced off during turf establishment and specified Landscape Maintenance Period subject to the discretion of the Owner's Representative.

B. The Owner's Representative will review and accept the following prior to the Contractor proceeding with subsequent work:
   1. Preparation: At completion of finish grading and prior to planting, grading tolerances and soil preparation will be checked for conformance to Contract Documents.
   2. Layout of plants, header board, and other major items shall be as directed and accepted by the Owner's Representative.
   3. Pre-Maintenance Review: At completion of planting, work shall be reviewed for conformance with Contract Documents. Acceptance shall mark beginning of the specified maintenance period. If acceptance is not given, a punch-list of items requiring attention will be issued to the Contractor. One more review will be allowed after Contractor certifies in writing that the punch-list has been completed. Punch-list shall be completed to the satisfaction of the Owner's Representative prior to commencement of the Specified Maintenance Period.

C. Costs incurred from repeat reviews required due to Contractor not being prepared and other non-conformance with Contract Documents will be back charged to the Contractor.

END OF SECTION

# 33 11 00

# DOMESTIC WATER UTILITIES

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Domestic water and fire system work is shown on the Drawings including, but is not necessarily limited to, the following:
   1. Intermediate staking and layout for domestic water system.
   2. Pipes, fittings, valves, valve boxes, connections, and fire hydrants for systems.
   3. Field testing and disinfection.

B. Related Requirements:
   1. Section 32 11 00 - Base Courses
   2. Section 32 23 00 - Excavation and Fill
   3. Section 32 80 00 - Irrigation
   4. Section 32 90 00 - Planting

### 1.02 REFERENCES

A. American Water Works Association: Current edition of Standards as specified.

B. California Plumbing Code: Current Edition.

C. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Sequence and Scheduling:
   1. Refer to other Contract Documents, determine the extent and character of related work, and properly coordinate work specified herein with that described elsewhere to produce a complete, operational installation.
   2. Contractor shall be solely responsible for coordinating, sequencing, and scheduling work with other trades and subcontractors to insure proper and timely performance of the work under this Section.

### 1.04 ACTION SUBMITTALS

A. Product Data: Manufacturer's "cut-sheets" for products proposed for use.

### 1.05 INFORMATIONAL SUBMITTALS

A. Certification that ductile iron pipe supplied for this Project has been manufactured in compliance with all requirements of AWWA C151.

B. Certification that PVC pipe supplied for this project has been manufactured in compliance with all requirements of AWWA C900.

1.06 CLOSEOUT SUBMITTALS

A. Project Record Drawings that provide accurately record locations of utilities remaining, re-routed utilities, new utilities, and newly discovered utilities by horizontal dimensions, elevations, inverts, and slope gradients. Comply with additional requirements specified in Section 01 78 39 – Project Record Documents.

B. Warranty as specified.

C. Results of field testing of completed system.

D. Certificate of Compliance for disinfection.

1.07 QUALITY ASSURANCE

A. Unless otherwise specified, install materials in accordance with manufacturer's recommendations.

B. Contractor shall make necessary repairs to the domestic water system and other work affected by defects in the system through project Final Acceptance and specified warranty period. Repairs shall be made at the Contractor expense and at no additional cost to Owner.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store pipe in a neat and orderly manner fully supported and protected from sunlight.

B. Do not dump pipe off truck. Pipes are to be delivered, unloaded and handled so as to prevent damaging the material.

1.09 FIELD CONDITIONS

A. PVC pipe shall not be cemented during wet conditions as determined by the Owner’s Representative.

B. Trench excavation and backfilling shall not be executed during excessively wet conditions as determined by the Owner’s Representative.

1.10 WARRANTY

A. Contractor: Provide Owner with a special written 1-year warranty covering entire water system against defects in installation, workmanship, and equipment from date of final acceptance.
   1. Contractor shall make necessary repairs to the system as well as to other work affected by defects in the system during warranty period.
   2. Repairs shall be made at the Contractor's sole expense.

1.11 MAINTENANCE

A. Service: Contractor shall service and maintain domestic water system as necessary until project final acceptance.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS

A. General:

1. Pipe materials for domestic and fire water lines shall be in conformance with the California Plumbing Code and local governing agencies.
2. Plans and details, if shown, are schematic in nature and do not necessarily identify all fittings and appurtenances required to provide a complete installation. The Contractor is responsible for providing complete and functional systems.
3. Materials and procedures not specifically addressed herein shall comply with the appropriate AWWA standard.
4. Materials proposed for use shall be in a new, "first class" condition unless otherwise noted.

B. Water Lines 3 Inches and Greater Diameter:
   1. Ductile Iron Pipe (DIP): Cement lined, of domestic manufacturer complying with ANSI/AWWA C151/A21.5, minimum Class 52; "Tyton Joint" by U.S. Pipe, Pacific States, or acceptable equal.
      a. Cement mortar lining shall comply with ANSI/AWWA C104/A21.4.
      b. Buried ductile iron pipe and fittings shall be wrapped in an 8-mil thick polyethylene film sleeve.
   2. Polyvinyl Chloride Pipe (PVC): Conform to AWWA C900, Class 200, of domestic manufacture, and meeting cast iron outside diameter sizes; C900 Series North American Specialty Products, JM Eagle, or acceptable equal.
      a. Pipe shall be furnished with integral bells.
      b. Spigot end pipe with separate double hub couplings is not acceptable.

C. Water Lines 2 Inches and Smaller Diameter: One of the following.
   1. Annealed (soft) Type "K" copper (Cu).
   2. Polyvinyl chloride (PVC) conforming to ASTM D1785, Schedule 80 PVC, of domestic manufacture, and meeting cast iron outside diameter sizes; ASTM D1785 Series North American Specialty Products, JM Eagle, or acceptable equal.
      a. Pipe shall be furnished with integral bells.
      b. Spigot end pipe with separate double hub couplings is not acceptable.

D. Couplings and Sleeves:
   1. General:
      a. Couplings and sleeves shall be a minimum of 200-psi working pressure-rated unless except as otherwise noted.
      b. Couplings and sleeves shall be mechanical joint type.
      c. Couplings, sleeves, and accessories shall be of domestic manufacture; "Trim Tyton" by U.S. Pipe, Union Foundry, Tyler Pipe and Couplings, or acceptable equal.
   2. DIP and PVC Pipe 3 Inches thru 12 Inches:
      a. Unless otherwise noted, couplings and sleeves for DIP and PVC shall be ductile iron conforming to AWWA C153, and shall be 350 psi working pressure rated.
      b. Unless otherwise noted, flanges on all DIP spools shall conform to ANSI/AWWA C115/A21.15.
   3. PVC Pipe 2 1/2 Inches and Smaller: Schedule 40, solvent-weld PVC socket couplings.
   4. Copper Tubing: "Mueller 110" compression connections by Mueller Company Ltd., or acceptable equal.

E. Gate Valves:
   1. Use gate valves designed for a working pressure of not less than 150 psi.
   2. Provide connections as required for the piping in which they are installed.
   3. Provide an arrow on the operating nut or wheel, cast in metal, indicating direction of opening.

F. Thrust Blocks: Class "A" concrete construction with dimensions conforming to the California Plumbing Code.

G. Valve Boxes:
   1. Size: 10 inches round boxes for gate valves.
   2. Box lid shall be labeled with "water" and shall be bolted down.

3. Boxes located in landscape areas shall be round plastic; Carson Model 910-10 with 910-4 lid, or equal.
4. Boxes located in paving shall be concrete with concrete lid.

H. Pipe Detection Tape: 3 inch wide, detectable type; “Terra Tape” "Sentry Line Detectable” from Reef Industries, Inc., 713.507.4251; or equal.
1. Text: "Caution Water Line Buried Below."

I. Tracer Wire: Polyethylene insulated, copperclad steel; “SoloShot XTreme Tracer Wire” by Copperhead Industries, LLC. 877-726-5644, or equal.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to starting work, test and verity that water pressure levels meet the domestic water system requirements. Notify the Owner’s Representative immediately of any discrepancies and re-direct work to avoid delay.

B. The utility plan and the piping details on the Drawings are diagrammatic. Pipe lines shown parallel in the Drawings may be placed in a common trench, provided that a minimum horizontal distance of 6 inches is maintained between buried lines, except for sanitary sewer lines, which require 10 feet horizontal clearance.

3.02 HANDLING

A. Handle pipe accessories so as to ensure delivery to the trench in sound, undamaged condition.

B. Use pinch bars or tongs for aligning or turning the pipe only on the bare end of the pipe.

C. Thoroughly clean interior of pipe and accessories before lowering pipe into trench. Keep clean during laying operations by plugging or other acceptable method.

D. Before installation, inspect each piece of pipe and each fitting for defects.

E. Replace material found to be defective, both before or after laying, with sound material meeting the specified requirements and without additional cost to the Owner.

F. Rubber gaskets: Store in a cool dark place until just prior to time of installation.

3.03 PIPE CUTTING

A. Cut pipe neatly and without damage to the pipe.

B. Unless otherwise recommended by the pipe manufacturer, cut pipe with mechanical cutter only.

C. Use wheel cutters when practicable.

D. Cut pipe square, and remove all burrs prior to use.

3.04 TRENCHING

A. Conform to requirements specified in Section 31 23 00 – Excavation and Fill and the following.

B. Excavate trenches with vertical sides uniform bottom, free of deleterious materials, and wide enough for pipes to lay side by side, fully supported on bottom.
   1. No lines shall be installed parallel to and directly over another line.
   2. When lines must cross, the angle shall be 45 to 90 degrees, and a minimum of 6 inch vertical clearance shall be maintained.

C. Provide minimum coverage for pressurized service as follows:
   1. Landscape Areas: 24 inches.
   2. Paved Areas: 30 inches.

3.05 PLACING AND LAYING

A. General:
   1. Lower pipe and accessories into trench by means recommended by the manufacturer.
   2. Except where necessary in making connections to other lines, lay pipe with the wide bell end opening facing source.
   3. Rest the full length of each section of pipe solidly on the pipe bed, with recesses excavated to accommodate wells, couplings, and joints.
   4. Replace pipe that has been disturbed after laying.
   5. Do not lay pipe in water, or when trench conditions are unsuitable for the work. De-water trench until jointing is completed.
   6. Securely close open ends of pipe and valves when work is not in progress.
   7. Where any part of coating or lining is damaged, repair at no additional cost to the Owner.
   8. Follow manufacturer's detailed instructions in installing and assembling pipe.

B. Plastic Pipe:
   1. Position pipe and fittings in trench in a manner that identifying markings will be readily visible for inspection.
   2. Cutting and joining:
      a. Protect against abrasion from serrated holding devices.
      b. Remove burrs and glosses from surfaces to be jointed; use abrasive paper, file, or steel wool.
      c. Remove dirt, dust, and moisture by wiping clean with dry cloth.
   3. Align pipe system components without strain.
   4. Support plastic pipe in trenches with a 2 inch minimum layer of bedding Provide a minimum 3 inch bedding sand cover. Allow no rocks, debris, or potentially damaging substances within 6 inches of plastic pipe in trenches.

C. Connections: Use appropriate fittings to suit the actual condition where connections are made between new work and service points.

3.06 JOINTING

A. Mechanical Joints and Push-On Type Joints: Install in accordance with AWWA C600, modified as necessary by the recommendation of the manufacturer, to provide for special requirements of specified pipe.

B. Make connections between different types of pipe and accessories with transition fittings.

C. Rubber Gaskets:
   1. Handle and install in strict accordance with the recommendations of the manufacturer.
   2. Lubricants for gaskets shall be manufactured by or approved by the pipe manufacturer for use under the conditions found in the field.

3.07 SETTING VALVES AND VALVE BOXES

A. Center valve boxes on the valves, setting plumb.

B. Tamp earth fill around each valve box to a distance of four feet on all sides, or to be undisturbed trench face if less than four feet.

C. Tighten mechanical joints, and fully open and close each valve to assure that all parts are in working condition.

3.08 THRUST BLOCKS

A. Provide and install thrust blocks in accordance with California Plumbing Code requirements and installation guidelines.

3.09 TESTING, INSPECTING, AND DISINFECTION

A. General:
   1. Do not allow or cause the work of this Section to be covered up or enclosed until after it has been completely inspected, tested, and has been accepted by the Owner's Representative and governing authorities when applicable.
   2. Perform tests and disinfection in a manner acceptable to governmental agencies having jurisdiction.

B. Testing:
   1. Except for joint material setting, or where concrete reaction backing necessitates a five day delay, pipelines joints, or couplings may be subjected to hydrostatic pressure, inspected, and tested for leakage at any time after partial completion of backfill.
   2. Testing of water service shall be in accordance with the requirements of AWWA C600 for hydrostatic testing.
   3. Contractor shall keep records of each piping test, including date and time of test, name of witnessing Owner Representative, test pressure, description of piping tested, and clarifying comments including those related to leaks and repairs made.
   4. Tests shall last 4 hours and be tested at 200 psi.

C. Disinfection:
   1. Before acceptance of the domestic water system, disinfect each unit of completed service line in accordance with AWWA C601 and criteria of the local governing jurisdiction.
   2. Proposed method for disinfection shall be submitted to the Owner's Representative for review and acceptance.
   3. Furnish two copies of a Certificate of Compliance to the Owner.

3.10 BACKFILLING

A. Backfill only after specified tests have been performed and accepted.

B. Clean trenches of debris and deleterious material before backfilling.

C. Backfill, as specified or shown in Drawings, shall be free from deleterious material.

D. Compact trenching to 95 percent relative compaction under pavement and 85 percent relative compaction within planting areas.

E. Trench surfaces shall be flush with finish grade. Trench settlings shall be corrected by the Contractor at no additional cost to the Owner.

F. Install pipe detection tape and reinforced tracer wire above pressurized lines.

3.11 DEMONSTRATION

A. Contractor shall instruct Owner's personnel in complete and proper operation of domestic water system per prior to Contract closeout.

3.12 FINAL REVIEW

A. Provide Owner's Representative with specified closeout submittals prior to Final Review.

END OF SECTION

# SECTION 33 30 00

# SANITARY SEWERAGE UTILITIES

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Site sanitary sewerage and related work as shown on the Drawings and specified including, but is necessarily limited to, the following:
   1. Sanitary sewerage system installation for drinking fountains.

B. Related Requirements:
   1. Section 31 20 00 - Earth Moving
   2. Section 31 23 00 - Excavation and Fill
   3. Section 32 11 00 - Base Courses
   4. Section 32 32 15 - Landscape Concrete
   5. Section 32 33 00 - Site Furnishings
   6. Section 33 11 00 - Domestic Water Utilities

### 1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. C700 Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
   2. D3034: Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

B. American Water Works Association (AWWA):
   1. C110: Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm Through 1,219 mm) for Water.
   2. C111: Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   3. C151: Ductile-Iron Pipe, Centrifugally Cast, for Water.

C. California Plumbing Code, current edition, Sections as specified.

D. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

E. “The Greenbook: Standard Specifications for Public Works Construction,” current edition.

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Sequencing and Scheduling:
   1. Refer to all other Contract Documents, determine the extent and character of related work, and properly coordinate work specified herein with work included under other Sections to produce a complete, operational installation.
   2. Contractor shall be solely responsible for coordinating, sequencing, and scheduling work with applicable trades and subcontractors to insure proper and timely performance.

1.04 ACTION SUBMITTALS

A. Product Data: Manufacturers' data sheets for the following:
   1. Piping materials and fittings.
   2. Special pipe couplings.
   3. Precast concrete cleanout boxes and box covers.

1.05 INFORMATIONAL SUBMITTALS

A. Design Mix Reports and Calculations: Submit for each class of cast in place concrete.

B. Field Test Reports: Indicate and interpret test results for compliance with specified performance.

1.06 QUALITY ASSURANCE

A. Control of Work: Conform to Section 5 of the Standard Specifications.

B. Control of Materials: Conform to Section 6 of the Standard Specifications.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store pipe neat and orderly stacked and blocked to prevent damage. Cracked, checked, spalled or otherwise damaged pipe shall be removed from site.

B. Use of chain slings shall not be permitted.

C. Pipe, fittings, precast sections, cast iron fittings, covers and all other materials shall be carefully handled at all times.

D. All pipelines and fittings shall be kept clean and closed during construction.

1.08 FIELD CONDITIONS

A. Make provisions to take the necessary precautions to protect existing work from damage during execution of this work.

B. Work of this Section shall not be executed when site conditions are detrimental to quality of work as determined by the Owner's Representative.

C. PVC pipe shall not be solvent welded during wet conditions.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS

A. General: Pipe and fittings shall be clearly and permanently marked to identify manufacturer, type, class, or schedule and NSF approval as applicable.

B. Polyvinyl Chloride Pipe (PVC) and Fittings: SDR 26 bell and spigot, Type I PVC 1120, and complying with ASTM D3034.

C. Ductile Iron Pipe (DIP) Joints and Fittings: Class 50, rubber gasket push-on type, in compliance with AWWA C151, C111, and C110.

D. Vitrified Clay Pipe (VCP) and Fittings: Extra strength, unglazed for socket and spigot joint, complying with ASTM C700.

2.02 STRUCTURES

A. Clean Outs: As detailed on Drawings and as follows.
   1. Non-Vehicular Travel Areas: Christy "F8" by Oldcastle Precast clean out boxes, or equal.
   2. Vehicular Travel Areas: Christy "G5" Oldcastle Precast clean out boxes, or equal.

2.03 MISCELLANEOUS MATERIALS

A. Crushed Rock: 3/4-inch bedding rock as specified in Section 32 11 00 – Base Courses as conforming to Section 200.1.2 of the "Standard Specification for Public Works Construction", commonly referred to as the "Greenbook."

B. Mortar: Conform to applicable sections of the Standard Specifications. Mixture shall be a 1:2 Portland cement to sand mixture with a minimum of water.

C. PVC Solvent Cement: Conform to pipe manufacturer's recommendations.

D. PVC Primer: Conform to pipe and solvent cement manufacturer's recommendations.

E. Reinforcing Bars: Refer to Section 32 32 15 – Landscape Concrete.

F. Minor concrete shall comply with Section 32 32 15 – Landscape Concrete and applicable sections of the Standard Specifications.

PART 3 - EXECUTION

3.01 PIPE LAYING

A. General:
   1. The Owner's Representative will review and accept pipe prior to installation.
   2. Pipe shall be installed in conformance with Section 31 23 00 – Excavation and Fill.
   3. Sanitary sewer installations shall be reviewed and accepted by the Owner's Representative prior to backfilling.

B. Pipe:
   1. Pipe shall be laid in trench to specified lines and grades fully and evenly supported layer of bedding material as specified and identified on the Drawings. Excavate bedding so bell fittings are clear from soil 6 inches on each side of joint and to a depth sufficient to avoid contamination of joint. Refer to Drawings for additional information.
   2. Pipe shall be laid beginning at the outlet and proceeding with each bell end opening facing upgrade.
   3. Cut pipe square and ream to remove burrs prior to use.
   4. Connections:
      a. Thoroughly clean and dry all components to be joined.
      b. Apply primer and sufficient cement to coat joint surfaces of both components and fill gaps but not in excess.
      c. Join pipe, wipe off excess cement, and fully support pipe until joint has cured.

C. Provide sleeving where shown, and where pipes penetrate walls, using schedule 40 PVC pipe minimum 1/4-inch diameter larger than pipe or other method acceptable to the Owner's Representative.

3.02 STRUCTURES AT GRADE

A. General:
   1. Set rim or cover elevations to specified grades.
   2. Adjust as required to set flush with proposed grades and pavement sections.

B. Clean Outs:
   1. Excavate as required.
   2. Set on firm unyielding base. Set on compacted select backfill material unless otherwise indicated.

3.03 SANITARY SEWER CONNECTIONS

A. Sanitary sewer connections to existing sewer mains shall be made watertight, straight, and true to line, grade and "crown to crown" unless noted otherwise.

3.04 FIELD QUALITY CONTROL

A. The Owner's Representative shall review and accept work at the following stages:
   1. Excavated trench with bedding in place prior to any pipe being laid.
   2. Pipe laid prior to backfilling. Any pipe covered prior to acceptance shall be uncovered for review and re-backfilled at contractor's expense.

B. The Contractor shall furnish the necessary labor, equipment and materials necessary to perform air tests of the completed sewerage project before the system is placed in operation or connected to other lines.

C. In no case shall the Contractor place the newly constructed sewer in operation without acceptance by the Owner's Representative.

3.05 PIPELINE TESTING AND FLUSHING

A. New sections of sanitary sewer main shall be air tested using the following procedures:
   1. Test is conducted between 2 consecutive manholes, or as directed by the Owner's Representative.
   2. The test section of the sewer line is plugged at each end. One of the plugs used at the manhole must be tapped and equipped for the air inlet connection for filling the line from the air compressor.
   3. Service laterals, stubs and fittings into the sewer test section should be properly capped or plugged and carefully braced against the internal pressure to prevent air leakage by slippage and blowouts.
   4. Connect air hose to tapped plug selected for the air inlet. Then connect the other end of the air hose to the portable air control equipment which consists of valves and pressure gauges used to control the air entry rate to the sewer test section, and to monitor the air pressure in the pipe line. More specifically, the air control equipment includes a shut-off valve, pressure regulating valve, pressure reduction valve and a monitoring pressure gage having a pressure range from 0-5 psi. The gage shall have minimum divisions of 0.10 psi and an accuracy of 0.40 psi.
   5. Connect another air hose between the air compressor, or other source of compressed air, and the air control equipment. This completes the test equipment set-up. Test operations may commence.
   6. Supply air to the test section slowly, filling the pipeline until a constant pressure of 3.5 psi is maintained. The air pressure must be regulated to prevent the pressure inside the pipe from exceeding 5.0 psi.
   7. When constant pressure of 3.5 psi is reached, throttle the air supply to maintain the internal pressure above 3.0 psi for at least 5 minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall. During this stabilization period it is advisable to check all capped and plugged fittings with a soap solution to detect any leakage at these connections. If leakage is detected at any cap or plug, release the pressure in the line and tighten all leaky caps and plugs. Then start the test operation again by supplying air. When it is

necessary to bleed off the air to tighten or repair a faulty plug, a new 5-minute interval shall be allowed after the pipeline has been refilled.

8. After the stabilization period, adjust the air pressure to 3.5 psi and shut-off or disconnect the air supply. Observe the gage until the air pressure reaches 3.0 psi. At 3.0 psi commence timing with a stopwatch which is allowed to run until the line pressure drops to 2.5 psi at which time the stopwatch is stopped. The time required, as shown on the stopwatch, for a pressure loss of 0.5 psi is used to compute the air loss.
9. If the time, in minutes and seconds, for the air pressure drop from 3.0 to 2.5 psi is greater than that shown in the following table for the designated pipe size, the section undergoing test shall have passed and shall be presumed to be free of defects. The test may be discontinued at that time.
10. If the time, in minutes and seconds, for the 0.5 psi drop is less than that shown in the following table for the designated pipe size, the section of the pipe shall not have passed the test; therefore, adequate repairs must be made and the line retested.

| Requirements for Air Testing: | | |
|---|---|---|
| Pipe size in Inches | Time | |
| | Minutes | Seconds |
| 4 | 2 | 32 |
| 6 | 3 | 50 |
| 8 | 5 | 06 |
| 10 | 6 | 22 |
| 12 | 7 | 39 |
| 14 | 8 | 56 |
| 15 | 9 | 35 |
| 16 | 10 | 12 |
| 18 | 11 | 34 |
| 20 | 12 | 45 |
| 21 | 13 | 30 |
| For larger diameter pipe use the following:<br>Minimum time in seconds = 462 x pipe diameter in feet | | |

11. For 8 inch and smaller pipe, only: If, during the five-minute saturation period pressure drops less than 0.5 psi after the initial pressurization and air is not added, the pipe section undergoing test shall have passed.
12. Multi-Pipe Sizes: When the sewer line undergoing test is 8 inches or large diameter pipe and includes 4 inch or 6 inch laterals, the figures in the Table for uniform sewer main sizes will not give reliable or accurate criteria for the test. Where multi-pipe sizes are to undergo the air test, compute the average size in inches which is then multiplied by 38.2 seconds. The results will give the minimum time in seconds acceptable for a pressure drop of 0.5 psi for the averaged diameter pipe.
13. Adjustment Required for Groundwater:
    a. An air pressure correction is required when the ground water table is above the sewer line being tested. Under this condition, the air test pressure must be increased 0.433 psi for each foot the ground water level is above the invert of the pipe.
    b. Where ground water is encountered or is anticipated to be above the sewer pipe before the air testing will be conducted, the following procedure shall be implemented at the time the sewer main and manholes are constructed.
        1) Install a pipe nipple, threaded one or both ends and approximately 10 inches long, through the manhole wall directly on top of one of the sewer pipes entering the manhole with threaded end of nipple extending inside the manhole.
        2) Seal pipe nipple with a threaded cap.
        3) Immediately before air testing, determine the ground water level by removing the threaded cap from the nipple, blowing air through the pipe nipple to remove any obstructions, and then connecting a clear plastic tube to the pipe nipple.
        4) Hold plastic tube vertically permitting water to rise in it to the groundwater level.

5) After water level has stabilized in plastic tube, measure vertical height of water, in feet, above invert of sewer pipe.
6) Determine air pressure correction, which must be added to the 3.0 psi normal starting pressure of test, by dividing the vertical height in feet by 2.31. The result gives the air pressure correction in pounds per square inch to be added.

Example: If the vertical height of water from the sewer invert to the top of the water column measures 11.55 feet, the additional air pressure required would be:

(11.55) / (2.31) = 5.0 psi

Therefore, the starting pressure of the test would be 3.0 plus 5 or 8.0 psi, and the 0.5-pound drop becomes 7.5 psi. There is no change in the allowable drop (0.5 psi) or in the time requirements established for the basic air test.

B. After the line has passed the air test, it shall be balled and flushed with water to clean. A metal screen shall be used downstream at the point of connection to the existing system to collect and remove rock and other debris that is flushed out during cleaning.

END OF SECTION

# SECTION 33 40 00

# STORM DRAINAGE UTILITIES

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes: Storm drainage system improvements and related work as shown on the Drawings and specified including, but is necessarily limited to, the following:
   1. Pipe and fittings.
   2. Nonpressure transition couplings.
   3. Pressure pipe couplings.
   4. Expansion joints and deflection fittings.
   5. Cleanouts.
   6. Drains.
   7. Encasement for piping.
   8. Channel drainage systems.
   9. Catch basins.
   10. Stormwater inlets.
   11. Stormwater detention structures.
   12. Pipe outlets.
   13. Dry wells.

B. Related Requirements:
   1. Section 31 20 00 - Earth Moving
   2. Section 31 23 00 - Excavation and Fill
   3. Section 32 11 00 - Base Courses
   4. Section 32 32 15 - Landscape Concrete
   5. Section 32 33 00 - Site Furnishings
   6. Section 33 10 10 – Reclaimed Water Systems
   7. Section 22 11 00 – Domestic Water Utilities

### 1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. C478: Standard Specification for Circular Precast Reinforced Concrete Manhole Sections.
   2. C923: Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
   3. D2321-20: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
   4. D2412-21: Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
   5. D2729-21: Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
   6. D3034-21: Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
   7. D3350-21: Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
   8. D4101-11: Standard Specification for Polypropylene Injection and Extrusion Materials.

B. California Building Code, Current Edition.

C. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

1.03 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Coordinate work of this section with all other work contained in the Contract Documents.

1.04 ACTION SUBMITTALS

A. Shop Drawings:
   1. Catch basins, stormwater inlets, and, dry wells. Include plans, elevations, sections, details, frames, covers, and grates.

B. Product Data: Manufacturer's cut-sheets of products to be used.

1.05 INFORMATIONAL SUBMITTALS

A. Field Test Reports indicating and interpreting test results for compliance with performance.

1.06 CLOSEOUT SUBMITTALS

A. Record Drawings:
   1. Accurately record location of new piping, drain structures, and connections to existing systems using horizontal dimensions, elevations, inverts, and slope gradients as applicable.
   2. Comply with the additional requirements of Section 01 78 39 – Project Record Documents.

1.07 QUALITY ASSURANCE

A. Control of Work: Conform to Section 5 of the Standard Specifications.

B. Control of Materials: Conform to Section 6 of the Standard Specifications.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store pipe neatly and orderly, stacked and blocked to prevent damage. Cracked, checked, spalled, or otherwise damaged pipe and precast concrete units shall be removed from site.

B. Use of chain slings shall not be permitted.

C. Piping, fittings, and related materials shall be carefully handled. Comply with manufacturer's rigging instructions for precast items. Use of chain slings is not be permitted.

D. All pipelines, fittings and drainage structures shall be kept clean and closed during construction.

1.09 FIELD CONDITIONS

A. Make provisions for, and take the necessary precautions to, protect existing and new work from damage during entire life of project.

B. Work of this Section shall not be executed when site conditions are detrimental to quality of work as determined by the Owner's Representative.

C. Do not interrupt service to facilities occupied or used by Owner without the Owner's written permission.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS

A. General:
1. Pipe and fittings shall be clearly and permanently marked to identify manufacturer, type, class, or schedule and NSF approval as applicable.
2. Unless otherwise noted, Contractor has option of using either CHDPE or PVC pipe as specified.

B. Corrugated High Density Polyethylene (CHDPE) Pipe: Dual wall, perforated and solid with an integrally formed smooth waterway; "N-12 "drainage pipe by Advanced Drainage Systems, Inc., 510-913-2211, or equal.
1. Nominal sizes shall have a full circular cross-section, with an outer corrugated pipe wall and an essentially smooth inner wall (waterway).
2. Corrugations may be either annular or spiral.
3. Sizes shall conform to the AASHTO classification "Type S."
4. Pipe manufacturer for this specification shall comply with the requirements for test methods, dimensions, and markings found in AASHTO Designations M252 and M294.
5. The minimum parallel plate stiffness values when tested in accordance with ASTM D2412 shall be as follows:

| Diameter | Pipe Stiffness |
|---|---|
| 4 inch (100 mm) | 50 psi (340 kPa) |
| 6 inch (150 mm) | 50 psi (340 kPa) |
| 8 inch (200 mm) | 50 psi (340 kPa) |
| 10 inch (250 mm) | 50 psi (340 kPa) |
| 12 inch (300 mm) | 50 psi (340 kPa) |
| 15 inch (375 mm) | 42 psi (290 kPa) |

6. Fittings: Virgin PE compounds conforming with the requirements of ASTM D3350, cell class 324420C, and supplied or recommended by the pipe manufacturer.
a. The fittings shall not reduce or impair the overall integrity or function of the pipeline.
b. Common Corrugated Fittings:
1) Couplers, reducers, and other in-line joint fittings.
2) "Tees", "wyes", end caps, and other branch or complimentary assembly fittings.
c. Acceptable Installation Methods: Snap-on, screw-on, bell and spigot, and wrap around.
d. Couplings shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joints.
e. Where designated on the Drawings and as required by the manufacturer, a neoprene or rubber gasket shall be supplied.

C. Smooth Polyvinyl Chloride Pipe (PVC) and Fittings: SDR 26, spigot end, Type I PVC 1120, NSF approved, and complying with ASTM D3034.

D. Smooth Polyvinyl Chloride (PVC) Perforated Drain Pipe and Fittings: Bell and non-pressure rated PVC SDR 35 pipe with two rows of perforations 120 degrees apart on bottom of pipe 5 inches on center, conforming with ASTM D2729 or ASTM D3034 and Section 68 of the Standard Specifications.

E. Reinforced Concrete Pipe (RCP) and Fittings: Conform to Section 65 of the Standard Specifications and AASHTO M 170 Class III, unless otherwise shown on the Drawings.

F. Flat Panel Pipe: Perforated HDPE pipe with internal pillars for structural support; "AdvanEDGE" by Advanced Drainage Systems, Inc., 510-913-2211 as specified, or equal.

1. Size: 1.5 inches by 12 inches [or 18"] wide.
2. Couplers, Wyes, Tees, End Caps, and Round Pipe Adapters: "AdvanEDGE" components.

2.02 DRAINAGE STRUCTURES

A. Precast Catch Basins/Drain Inlets:
1. General:
a. Grates in paved areas shall conform to ADA Standards for Accessible Design.
b. All catch basins to have locking mechanism or screw down grate to frame.
c. Provide two grade rings at each catch basin.
2. Square Basin Product Matrix:

| ITEM | DESCRIPTION | MANUFACTURER | MODEL NO. | GRATE INFORMATION |
|---|---|---|---|---|
| A. | CB | NDS Nyloplast, or equal, 770-932-2443 | Catch Basin Series | Square Galvanized Steel Bar Grate, ADA compliant (pedestrian applications), Locking Frame and Cover bolted to Drain Basin. |
| B. | CBRS | NDS Nyloplast, or equal, 770-932-2443 | Catch Basin Series | Square Galvanized Steel Bar Grate, Locking Frame and Cover bolted to Drain Basin. |
| C. | CBL | NDS Nyloplast, or equal, 770-932-2443 | Catch Basin Series | Nyloplast Drain Basin with Dome Grate, Integrated Ductile Iron Gate to match Basin O.D., black, Locking frame and cover bolted to drain basin |

B. PVC Catch Basins: Nyloplast, 866-888-8479, or equal.
1. Basin Bodies: PVC.
2. Connection to corrugated pipes shall be made with flexible rubber gasket meeting requirements of ASTM F477.
3. Casting shall be ductile iron.
4. Flashboards shall be constructed of a corrosion-resistant material.
5. Inlet and Outlet Size: As indicated on the Drawings

C. Extensions: Provide box extensions, junction boxes and grade rings compatible with structures as necessary to finish at the proper elevation and to facilitate future elevation adjustments as noted below.

D. Clean Outs: All cleanout boxes shall be Christy G5 Oldcastle Precast Cleanout Box, or equal. Cleanout lids shall be Christy G05CT Bolt Down Cast iron Lid, or equal.

E. Drop Inlet: 12 inches, Model #1240 by NDS, Inc., 888-825-4716, or equal.

F. Drinking Fountain Drain: Square with cast iron body and bronze grate; Z415 Series floor drain Model Z415SH by Zurn, or equal.
1. Size: 8 inches by 8 inches.

G. Drywell: "Flo-Well" Model FWAS24 WH by NDS, Inc., 888-825-4716, or equal.

2.03 ADDITIONAL MATERIALS

A. Permeable Rock Beneath Synthetic Turf Area: As specified in Section 32 18 14 – Synthetic Turf Base.

B. Drain Rock:

1. Drain Rock shall conform to requirements of Subdrain Trench Drain Rock beneath Synthetic Turf Area: As specified in Section 32 18 14 – Synthetic Turf Base

2. Shall be 3/4-inch x 1/2-inch crushed virgin, un-recycled, washed rock, meeting the following general gradation requirements:

| Sieve Size | Percent Passing |
|---|---|
| 1” | 100 |
| 3/4” | 90-100 |
| 1/2” | 10-40 |
| 3/8” | 0-15 |
| #4 | 0-5 |

3. Soft rock materials, including sandstone, limestone, and shale, are not suitable. Rock supplier shall certify that all supplied rock will be void of this type of rock.
4. Supplier: Stevens Creek Quarry, Inc., Cupertino, or TMT Enterprises, Inc., San Jose, or equal.]

C. Pea Gravel:
1. Pea gravel shall conform to the following gradation requirements:

| U.S. Standard Sieve Mesh | Allowable Range Percent Retained on Sieve |
|---|---|
| 1/2 inch (12.5 mm) | 95% passing |
| 1/4 inch (6.3 mm) | 45% passing |
| 10 mesh (2.0 mm) | No more than 10% passing |
| 18 mesh (1.0 mm) | No more than 5% passing |

2. Supplier: Harbor Sand & Gravel, Redwood City, TMT Enterprises, Inc., San Jose; or equal.

D. Sand for Perforated Drain Pipe (Slit Sand) Applications: Washed sand that meets USGA Greens Specifications with the following characteristics and sieve range.

1. Characteristics:
   a. 100 percent passing a #4 screen and no more than 4 percent passing a #200 screen.
   b. A total silt and clay percent of no more than 5 percent.
   c. Crushed or naturally angled sand. Rounded silica sand is not permitted.
2. Sieve Range:

| Classification | Sieve Number | Particle Size (mm) | Allowable Range (Percent Retained on Sieves by weight) |
|---|---|---|---|
| Fine Gravel | 10 | >2.00 | |
| V. Coarse Sand | 18 | 1.00 – 2.00 | 0% to 10% |
| Coarse Sand | 35 | 0.5 – 1.0 | 82% to 100% |
| Medium Sand | 60 | 0.25 – 0.5 | |
| Fine Sand | 140 | 0.1 – 0.25 | |
| V. Fine Sand | 270 | 0.05 – 0.1 | 0% to 8% |
| Silt & Clay | -- | <0.05 | |
| Note: 50 percent to 75 percent of particles shall be within diameter of 0.25 to 0.75 mm. | | | |

3. Product and Supplier: The following, or equal.
   a. “G-8 Sand” by Brown Sand, Inc., 209-234-1500.

b. TMT Enterprises, Inc. Contact: Matt Moore 408-432-9040.

E. Sand Bedding for Storm Drain Piping: Sand conforming to Section 19-3.02F(2) of the Standard Specifications.

F. Top Dress Sand
1. Sand conforming to the following sieve range:

| Sieve Size | USGA Spec |
|---|---|
| | Individual % Retained |
| #4 (4.75mm) | 0 |
| #10 (2mm) | 0 |
| #18 (1mm) | <5 |
| #35 (0.5mm) | Minimum 60% Combined |
| #60 (.25mm) | |
| #100 (.15mm) | 20% Maximum |
| #140 (.1mm) | 5% Maximum Combined |
| #270 (.05mm) | |
| Silt (.05-.002mm) | 3% Maximum Combined |
| Clay (<.002mm) | |

2. Supplier: 'G-8 Top Dress Sand' by TMT Enterprises. Contact: Matt Moore (408) 432-9040

G. Bioretention soil mixture in rain gardens shall have the following general characteristics:
1. Properties of bioretention soil mix:
   a. Consisting of the following mixture, measured by volume:
      1) 60-70% Sand
      2) 30-40% Compost
   b. Supportive of vigorous plant growth
   c. Able to achieve a long-term, in-place infiltration rate of at least 5 in/hr. and no more than 10 in/hr.
2. Supplier: Biotreatment soil mix' by TMT Enterprises. Contact: Matt Moore (408) 432-9040

H. Permeable Filter Fabric : Mirafi 140N, or equal.

I. Impermeable Fabric:

J. Filter Fabric Fasteners: Metal clip type staple.

K. Mortar: A 1:2 Portland cement to sand mixture with a minimum of water conform to the applicable sections of the Standard Specifications.

L. Steps at Manhole: Manufacture from deformed, 1/2-inch steel reinforcement rod complying with ASTM A615/A615M and encased in polypropylene complying with ASTM D4101. Include pattern designed to prevent lateral slippage off step.

M. Structural Adhesives for Manholes, Catch Basins, and Junction Boxes: "Ram-Nek" by Henry Company, 800-523-0268, or equal as available.

N. Reinforcing Bars: As specified in Section 32 32 15 – Landscape Concrete.

O. Minor Concrete: Comply with requirements of Section 32 32 15 – Landscape Concrete.

PART 3 - EXECUTION

3.01 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 31 20 00 - Earth Moving.

3.02 PIPING INSTALLATION

A. General:
1. Pipe shall be installed per manufacturers' instructions and in conformance with the Contracts Documents.
2. Installation of thermoplastic pipe shall be in accordance with ASTM D2321.

B. CHDPE Pipe:
1. Pipe shall be installed with a minimum cover under the H-20 live load equal to 12 inches to the top of subgrade elevation.
2. Minimum compaction for pipe subject to H-20 live load is 90 percent in accordance with Section 19, Standard Specifications.
3. CHDPE pipe shall be laid and jointed in accordance with generally accepted practice and the following provisions to provide the required work.

C. Flat Panel Piping:
1. Install per the layout indicated on the Drawings and in strict compliance with Manufacturer's written recommended installation instructions.
2. Contractor shall exercise caution to not crush or damage the piping during installation of the permeable rock base.

3.03 INSTALLATION OF DRAINAGE STRUCTURES

A. General: Set rim or cover elevations to specified grades utilizing a minimum of two grade rings (or extensions) at top of drainage structure to facilitate potential elevation adjustments in the future.

B. Catch Basins: Install as shown in the Drawings and as follows:
1. Excavate as required.
2. Set on firm, unyielding base. Set on compacted select backfill material if directed by Owner's Representative.
3. Prefabricated units not having a bottom shall be set on a poured-in-place concrete slab with smooth trowel finish. Mortar and properly seal unit to slab, making a watertight connection.
4. Install pipe inlets and outlets to specified elevations. Grout and/or seal all joints to a watertight condition with material per manufacturer's recommendation.

C. Manholes: Install per manufacturer's recommendations and as shown in the Drawings.

D. Cleanouts: Install as shown in the Drawings.

E. Nyloplast Basins:
1. For at-grade or raised conditions (in biotreatment areas or similar), Nyloplast risers shall be painted from rim down to 6" below finish grade with UV resistant exterior paint suitable for PVC applications. Contractor shall submit product for approval.
2. For buried applications in softscape, Nyloplast basin rims/covers shall be minimum 12" below finish grade to allow for proper plant growth.
3. For buried applications in synthetic turf, install as shown in the Drawings.

F. Trench Drains: Install as shown in the Drawings and in accordance with the manufacturer's written recommendations.

G. Drywells, Drinking Fountain Drains, Atrium Drains and Drop Inlets: Install as shown in the Drawings and in accordance with the manufacturer's written recommendations.

3.04 IDENTIFICATION

A. Materials and their installation are specified in Section 31 20 00 - Earth Moving. Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

B. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.05 FIELD QUALITY CONTROL

A. The Owner's Representative shall review and accept work at the following stages:
   1. Excavated trench with bedding in place prior to any pipe being laid.
   2. Pipe laid prior to backfilling. Pipe covered prior to review and acceptance shall be uncovered and re-backfilled at Contractor's expense.
   3. Drainage device location and pipe connection.
   4. New drainage system shall be flood tested and clean of debris.

END OF SECTION