LIST OF SPECIFICATIONS

DIVISION 01 – GENERAL REQUIREMENTS (UNDER SEPARATE COVER)

DIVISION 02 – EXISTING CONDITIONS

DIVISION 03 – CONCRETE (NOT USED)

DIVISION 04 – MASONRY (NOT USED)

DIVISION 05 - METALS

05 50 00 Metal Fabrications

05 73 00 Decorative Metal Railings

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES (NOT USED)

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

07 92 00 Joint Sealants

DIVISION 08 – OPENINGS (NOT USED)

DIVISION 09 - FINISHES

09 90 00 Painting and Coating

DIVISION 10 THROUGH 30 (NOT USED)

DIVISION 31 - EARTHWORK

31 11 00 Clearing and Grubbing

31 23 00 Excavation and Fill

31 25 00 Erosion and Sedimentation Control

DIVISION 32 – SITE IMPROVEMENTS

32 05 23 Portland Cement Concrete

32 11 32 Aggregate Base Course

DIVISON 33 - UTILITIES

33 41 00 Storm Drainage System

APPENDIX (NOT USED)

END OF DOCUMENT

SECTION 02 00 00

EXISTING CONDITIONS

PART 1 - GENERAL

1.1 MAINTENANCE OF SITE ACCESS

A. Keep exit roads, entrance/exit gates, and roads and walkways to such gates, open during demolition and construction for access to site by County and building users in addition to requirements of construction personnel. Provide temporary roads and walkways if required for access and exiting.

1.2 SUBMITTALS

A. When conditions encountered differ from those shown, submit proposed remedial methods for approval.

B. Cross-reference to Contract Documents includes shop drawings, samples and product data as appropriate.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials, Manufacturers and Fabrication: Comply with the requirements established by the Contract Documents.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect existing conditions and surfaces that will become substrates for, or contiguous surfaces with, the work under this Contract. Should deviations from tolerances established by the Contract Documents interfere with lines, levels or the tolerances established for the work under this Contract, corrections shall be made prior to commencement of adjacent new work.

B. A written list of conflicts and remedial requirements is required to be submitted within 10 days of the Notice to Proceed. Conflicts not identified at that time will be remedied at the Contractor's expense.

C. Where photographic or video media is utilized to record condition prior to the start of construction, submit two sets of media to the County for its records. See Division 01 for additional requirements.

3.2 WORKMANSHIP

A. Work shall be done in accordance with tolerances established by the Contract Documents.

END OF SECTION 02 00 00

SECTION 02 41 13

SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes all work necessary to successfully complete demolition to prepare site for the phasing and new construction, including the following:
   1. Clean line saw cutting of existing concrete sidewalks, concrete curb/gutter, etc., as specified herein.
   2. Protection from injury or defacement existing building elements to be preserved.
   3. Removal of debris and deleterious materials such as rubbish.
   4. Removal and stockpile of materials for landscaping use at approved location.
   5. Disposal of unwanted or objectionable materials off site.
   6. Disconnecting, capping or sealing, and abandoning site utilities in place.
   7. Disconnecting, capping or sealing, and removing site utilities.
   8. Removing above-grade site improvements within limits indicated.

1.2 REGULATORY REQUIREMENTS:

A. No burning shall be allowed.

B. Do not use explosives.

C. Comply with the following California Code of Regulations:
   1. Title 8: CAL/OSHA, Chapter, Subchapter 4 – Construction Safety Orders.
   2. Title 24: Part 2, California Building Code, Chapter 33, Protection of Pedestrian during Construction or Demolition.
   3. Bay Area Air Quality Management County.

1.3 DEFINITIONS

A. ANSI: American National Standards Institute.

B. CAL-OSHA: California Occupational Safety and Health Administration.

C. ANSI: American National Standards Institute.

D. CFR: Code of Federal Standards.

E. EPA: Environmental Protection Agency.

F. NFPA: National Fire Protection Association.

G. Remove: Detach items from existing construction and legally dispose of them off-site unless they indicated to be removed and salvaged or recycled.

H. Remove and Salvage: Detach items from existing construction, prior to demolition, and deliver them to the County.

I. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or recycled.

1.4 SUBMITTALS

A. Follow Submittal procedure outlined in Division 01.

1.5 PROJECT CONDITIONS

A. In all circumstances ensure that demolition work does not adversely affect adjacent water courses groundwater and wildlife, or contribute to excess air and noise pollution.

B. Do not dispose, of waste or volatile materials such as mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.

C. Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

D. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

E. Protect trees, plants and foliage on site and adjacent properties where indicated.

F. Except for materials indicated to be stockpiled or to remain, cleared materials are the Contractor's property. Remove cleared materials from site and dispose of in lawful manner.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Backfill excavations resulting from demolition operations with on-site or import materials conforming to structural backfill defined in Section 31 23 00 Excavation and Fill.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points during construction.

B. Protect existing site improvements to remain during construction.

C. Provide the following temporary facilities to facilitate the demolition operations, as necessary:
   1. Temp Traffic Controls
   2. Protection of Persons and Property
   3. Protection of Utilities
   4. Protection of Trees
   5. Noise and Dust Abatement
   6. Clear and restore area to its original condition
   7. Protect existing site improvements and adjacent structures from removal and damage.
   8. Protect and maintain benchmarks and survey control points during construction.

3.2 RESTORATION

A. Restore areas and existing works outside areas of demolition to match conditions to their original condition, as acceptable to the County.

B. Restore damaged improvements to their original condition, as acceptable to the County.

3.3 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed or abandoned.

B. Arrange to shut off indicated utilities with utility companies or verify that utilities have been shut off.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by the County or others unless authorized in writing by the County and then only after arranging to provide temporary utility services according to requirements indicated.

D. Coordinate utility interruptions with utility company affected.

E. Do not proceed with utility interruptions without the permission of the County and utility company affected. Notify the County and the utility company affected 14 working days prior to utility interruptions.

F. Excavate and remove underground utilities that are indicated to be removed.

G. Securely close ends of abandoned piping with tight fitting plug or wall of concrete minimum 6-inches thick.

3.4 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove concrete slabs as indicated. Where concrete slabs are designated to be removed, remove bases and subbase to surface of underlying, undisturbed soil.

C. Unless the existing full-depth joints coincide with line of pavement demolition, neatly saw-cut to full depth the length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

D. Remove concrete slabs and sidewalks by saw cutting to full depth. If saw cut falls within 30-inches of a construction joint, expansions joint, score mark or edge, remove material to joint, mark or edge.

3.5 SALVAGED IMPROVEMENTS

A. Salvaged Improvements: Carefully remove items indicated to be salvaged and store where indicated on plans or where designated by the County. Avoid damaging materials designated for salvage.

3.6 DISPOSAL

A. Remove surplus obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off the County's property.

B. Remove: Unless items are otherwise to remain or be reinstalled, remove and dispose of items. Do not store removed items that are of value to the contractor on site.

C. Remove and Reinstall: Remove items; clean, service and otherwise prepare for service; reinstall in the same location (or in the location shown on drawings).

D. Unidentified Materials: If unidentified materials are discovered, including hazardous materials that will require additional removal other than is required by the Contract Documents, immediately report the discovery to the County. If necessary, the County will arrange for any testing or analysis of the discovered materials and will provide instructions regarding the removal and disposal of the unidentified materials.

3.7 CONSTRUCTION WASTE MANAGEMENT

A. Separate reusable and recyclable products from contaminated waste and debris in accordance with the General Contractor's Waste Management Plan. Place recyclable and reusable products in designated containers and protect from moisture and contamination.

END OF SECTION 02 41 13

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Selective demolition and removal of the existing construction to the extent specified or indicated on the Drawings.
   2. Removal, salvage, cleaning, and storage of existing items indicated to be re-installed.
   3. Disconnecting, capping or sealing, and removing of utilities serving areas to be demolished.
   4. Contractor's Demolition Plan.

B. Related Requirements:
   1. Construction and Demolition Waste Management: Section 01 35 13.26.
   2. Existing Conditions: Section 02 00 00.
   3. Selective Site Demolition: Section 02 41 13.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.

B. Remove and Salvage: Detach items from existing construction and deliver them to County as directed. Where items are to be re-installed, they may be stored inside the existing building in area(s) to be designated by the County.

C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Submittals shall conform to the requirements of the following:
   1. County Document governing Hazardous Materials Procedures and Requirements.
   2. Section 01 33 00 Submittal Procedures.
   3. Section 01 35 13.26 Construction and Demolition Waste Management.

B. Pre-demolition Conference: Conduct conference at Project site. Review methods and procedures related to demolition including, but not limited to, the following:
   1. Inspect and discuss condition of construction to be demolished.
   2. Review and finalize Demolition Plan and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Review and finalize protection requirements.

4. Review and finalize a list of items to be salvaged and re-installed.
5. At meeting, County's Representative will designate storage area(s) for salvaged items to be re-installed.

1.4 SUBMITTALS

A. Quality Control:
   1. Landfill Records: If applicable, indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
   2. Receipts for recycled materials that include name of licensed recycling company, dollar value, and date.
   3. Inventory: After demolition is complete, submit a list of items that have been removed, salvaged, and not required to be re-installed.

B. Pre-demolition Photographs: Show existing conditions, including finish materials and adjoining construction to remain, that might be misconstrued as damage caused by demolition operations and work under this Contract.
   1. File Format: Joint Photographic Experts Group (JPEG), unless otherwise directed by County's Representative.
   2. Minimum Resolution: 5 mega pixels.
   3. Provide digital date/time imprint on each picture.
   4. Digital images shall be exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
   5. Submit on recordable compact disks before Work begins.

C. Demolition Plan as specified below.

1.5 DEMOLITION PLAN

A. The Contractor shall submit a complete Demolition Plan detailing procedures and sequence for removing the existing construction in a safe and controlled manner.

B. The Demolition Plan shall consist of the following:
   1. Detailed sequence of demolition and removal work, with starting and ending dates for each activity.
   2. Interruption of utility services.
   3. Coordination for shutoff, capping, and continuation of utility services.
   4. Details and locations of dust barriers or other protective measures in sufficient numbers to ensure that people, property, and improvements will not be endangered.
   5. Arrangements for keeping entrances open during demolition phase, to the extent requested by the County and/or shown on the Drawings.

C. In the event that revisions to the Demolition Plan is required to be submitted for approval, the Contractor shall provide 14 calendar days for the review of substantial procedural and sequence modifications.

D. Review by the County's Representative of the Demolition Plan or field observations performed by the County's Representative will in no way relieve the Contractor of full responsibility for the Demolition Plan and procedure.

1.6 QUALITY ASSURANCE

A. Qualifications: Demolition shall be performed by personnel with experience in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements:
   1. Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
   2. Certifications: Obtain and pay for any necessary permits from governing authorities.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.7 PROJECT CONDITIONS

A. Promptly repair damage caused by demolition operations to existing structure, finishes, and facilities to remain at no cost to the County.

1.8 TRAFFIC

A. Conduct demolition operations and the removal of debris to ensure minimum interference with streets, walks, and adjacent occupied or used facilities and portions of the Building. Do not close or obstruct streets, walks, ramps, stairs, entrances, exit ways, or other occupied or used facilities without permission from authorities having jurisdiction.

B. Existing pedestrian crossings and sidewalks, and stairs and ramps, shall be kept open at all times unless otherwise approved by the County.

C. Closings, if required, of streets and walks shall be included in the Demolition Plan.

D. See Division 01 for additional temporary signage requirements and traffic requirements of the Site Utilization Plan.

1.9 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

A. If City street lane closures are required, comply with the provisions of Section 12, "Construction Area Traffic Control Devices," of the State of California Caltrans Standard Specifications (hereinafter referred to as the "Standard Specifications"), unless otherwise directed or required.

B. If any component in the traffic control system is displaced or ceases to operate or function from any cause during the progress of the work, the Contractor shall

immediately repair said component to its original condition or replace said component and shall restore the component to its original location.

C. When lane closures are made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators adjacent to the traveled way, shall be removed.

1.10 UTILITY SERVICES

A. Shutting off and disconnection of utilities serving areas to be demolished shall be performed by scheduled shut-downs only. County will perform required survey and be responsible to turn off all utilities.

B. Maintain existing utilities, including fire and life safety, serving other areas of the site and/or building and indicated to remain, keep in service, and protect against damage during demolition operations.

C. Do not interrupt existing utilities serving adjacent occupied or used facilities except when authorized in writing by County.

D. Provide temporary services during interruptions to existing utilities as acceptable to the County.

E. Contractor shall verify that utilities are properly disconnected and sealed before starting demolition operations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to verify extent of demolition required.

B. Inventory and record the condition of any items required to be removed and salvaged.

C. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to County's Representative.

D. Verify that hazardous materials have been remediated before proceeding.

3.2 PREPARATION

A. Existing Utilities: As part of Demolition Plan, locate and identify utilities serving the areas to be demolished.
   1. Arrange to shut off, disconnect, and/or seal utilities as acceptable to the County.

2. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 REMOVED AND SALVAGED ITEMS

A. Where required by the Drawings or specified and when so directed to be salvaged, remove item to be salvaged in the most careful manner possible to avoid damage; and, if damaged, such items shall be restored to conditions satisfactory to the County's Representative.

B. If there are items to be removed and salvaged by Contractor prior to commencement of general demolition operations, they are identified on the Drawings.

C. Comply with the following:
   1. Clean salvaged items of dirt and demolition debris.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to County.
   4. Transport items to County as directed.
   5. Protect items from damage during transport and storage.

3.4 PROTECTION

A. Existing Facilities: Protect adjacent areas of the site and the building, walkways, and other facilities during demolition operations.

B. Temporary Protection: Comply with requirements of Division 01.

C. Protect walls, windows, signage, roofs, site improvements, and other adjacent interior and exterior construction that are to remain and that are exposed to demolition operations.

D. Provide necessary temporary partitions, enclosure coverings, and the like for confining dust and debris to areas in which demolition and/or alterations are being performed.

E. See additional requirements specified in Division 01.

3.5 DEMOLITION

A. Use methods required to complete the Work within limitations of governing regulations and as specified.

B. Do not use cutting torches until work area is cleared of flammable materials. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
   1. Maintain adequate ventilation when using cutting torches in confined spaces.
   2. Locate demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

C. Perform surveys as the Work progresses to detect hazards that may result from demolition activities.

D. Conduct demolition and debris-removal operations to ensure minimum interference with adjacent occupied and used facilities, with site and building access and circulation paths, and with site and City streets and walks.

E. Comply with governing environmental-protection regulations. Do not use water.

3.6 REMOVALS

A. Where required by the Drawings or specified and when so directed to be salvaged and/or reused, remove item to be salvaged in the most careful manner possible to avoid damage; and, if damaged, such items shall be restored to conditions satisfactory to the County's Representative.

B. Materials to be removed and not reused or salvaged shall become the property of the Contractor, who shall be responsible for their timely removal from the Project site and their legal disposal.

3.7 REPAIRS

A. Promptly repair damage to adjacent construction caused by demolition operations.

B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

C. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.8 RECYCLING DEMOLISHED MATERIALS

A. The recycling of demolition materials is encouraged and will be an evaluating item during review of the demolition plan.

B. Separate recyclable demolished materials from other demolished materials to the maximum extent possible. Separate recyclable materials by type.

C. Provide containers or other storage method for controlling recyclable materials until they are removed from Project site.

D. Transport recyclable materials off County's property and legally dispose of them. County's existing recycling collection facilities are not available for use by the Contractor.

3.9 DISPOSAL OF DEMOLISHED MATERIALS

A. Except for items or materials indicated to be recycled, salvaged, or otherwise indicated to remain County's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. County's existing refuse collection facilities are not available for use by the Contractor.

B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3.10 CLEANING

A. Clean adjacent surfaces and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before demolition operations began.

END OF SECTION 02 41 19

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: General requirements for metal work, including as applicable:
   1. Inserts and anchorages for decorative metal railings and bollards.
   2. Miscellaneous framing and supports.

B. Related Requirements:
   1. Decorative Metal Railings: Section 05 73 00.
   2. Painting and Coating: Section 09 90 00.

1.2 ADMINISTRATIVE REQUIREMENTS

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

B. Coordination:
   1. 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.
   2. Coordinate fabrication schedule with construction progress to avoid construction delays.
   3. Coordinate with other construction in order to ensure that actual dimensions correspond to established dimensions.

1.3 ACTION SUBMITTALS

A. Shop Drawings:
   1. Large-scale drawings for fabrication and erection of assemblies not completely shown by manufacturer's product data.
      a. Include, as appropriate, plans, elevations, complete details, thicknesses, sizes, types, grades, classes of metal, connecting and joining methods, anchorages.
      b. Show required field measurements and interface with work of other Sections.
      c. Welds, both shop and field, shall be indicated by AWS "Symbols for Welding, Brazing and Nondestructive Examination," A2.4.
      d. Indicate all required field measurements.
   2. Setting drawings, templates, instructions, and directions for installation of anchorage devices.

B. Product Data: Manufacturer's specifications for manufactured products to be used in the fabrication of work, including paint products, bolts, and other exposed hardware.
   1. Include Material Safety Data Sheets (MSDS).

1.4 INFORMATIONAL SUBMITTALS

A. Certification for each welder.

B. Completed “Procedure Qualification Record” (PQR) and “Welding Procedures Specification” (WPS) forms for the welds to be performed under this Specification in accordance wtih AWS D1.1. Weld procedure qualification shall be for the same paint to be welded through in project work.

C. Mill test reports certifying physical and chemical properties for each lot of A325 and A449 anchor bolts to be delivered to the site.

D. Engineering Data: Before any elements requiring additional framing, support or bracing are fabricated, submit calculations verifying compliance with structural design criteria by design engineer and showing reactions to structure. Although all calculations shall be submitted, only reactions to structure are subject to review.

E. Certification: Submittal drawings, if not signed by design engineer, shall be certified that structural portion of drawings are in compliance with design calculations.

1.5 QUALITY ASSURANCE

A. Design Engineer: Professional structural or civil engineer registered in the State of California or shall otherwise be acceptable to governing authorities. Design engineer shall be experienced in providing engineering services of the kind indicated.

B. Comply with recommended practices of the National Association of Architectural Metal Manufacturers (NAAMM) and Section 10 of the AISC Code of Standard Practice.

C. Welding:
   1. Qualifications: Certified and qualified in accordance with AWS D1.1.
   2. Procedures and operations shall comply with AWS "Standard for Welding Procedure and Performance Qualifications," B2.1.
   3. Comply with AWS publication "Welding Zinc Coated Steel" for galvanized products.
   4. Welding inspector's qualifications shall be in accordance with AWS D1.1.

D. Wedge-type and expansion-nut concrete anchors, resin/adhesive anchors, and headed concrete anchors shall be ICC-ES approved.

E. Testing/inspection agencies shall be in conformance with ASTM E329.

F. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

G. At ramps, platforms, and landings, comply with the requirements of the CBC and ADA for striping. Coordinate with other Sections.
   1. Abrasive strips, if used, shall meet requirements of California Title 24.

H. Mockups: Provide metal fabrications for mockups specified in other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect steel from corrosion.

B. Store packaged materials in original unbroken package or container.

C. Comply with additional requirements specified in Section 01 43 00 Quality Assurance - Materials and Equipment and in Section 01 66 00 Delivery, Storage and Handling.

1.7 FIELD CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on shop drawings. Allow for trimming and fitting wherever taking of field measurements before fabrication might delay work.

B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabrication without field measurements.

PART 2 - PRODUCTS

2.1 DESIGN AND PERFORMANCE CRITERIA

A. Regulatory Requirements:
   1. Comply with the Americans with Disabilities Act (ADA).
   2. Comply with the CBC.

B. Design interface and connections to existing work in such a way as to minimize damage and defacement to existing construction.

2.2 METAL MATERIALS

A. Steel:
   1. Steel Shapes, Bars, and Plates: ASTM A36.
   2. Steel Plates to Be Bent or Cold Formed: ASTM A283, Grade C.
   3. Pipe: ASTM A53, Grade B, Schedule 40.
   4. Steel Bars and Bar-Size Shapes: ASTM A663, Grade 65, or ASTM A36.
   5. Cold-Drawn Steel Tubing: ASTM A500, Grade B.
   6. Hot-Rolled Carbon-Steel Bars: ASTM A575, grade as selected by fabricator.
   7. Steel Castings: ASTM A27, Grade 65-35, medium-strength carbon steel.

2.3 OTHER MATERIALS AND COMPONENTS

A. Pipe Fittings: Malleable iron ASTM A47, grade 32510.

B. Anchors and Anchor Bolts:
   1. Headed: ASTM F1554, Grade 36.
   2. Unheaded and Standard Hex Head Bolts with Hex Nuts: ASTM A307.
   3. Additional Anchors: As indicated on the Structural Drawings.

C. Fasteners:
   1. Provide zinc-coated fasteners with galvanizing complying with ASTM A153 for exterior use or where built into exterior walls.
   2. Select fasteners for type, grade, and class required for installation.

D. Washers:
   1. Plain Washers: ANSI B18.22.1, Type A-W.
   2. Plain Hardened Washers: ASTM F436.
   3. Beveled Washers: IFI B18.23.1.
   4. Exterior standard washers shall be plated.

E. Welding:
   1. Electrodes for Welding: In accordance with AWS Code.
   2. Welding Filler Metal for Carbon Steel: AWS A5.1 or A5.5 E70XX for SMAW welding process, AWS A5.18 ER70S-X for GMAW welding process, AWS A5.17 or A5.23 F7X-EXXX for SAW welding process, and AWS A5.20 E7XT-X for FCAW welding process.

F. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining shrinkage-compensating, and with at least 8,000-psi compressive strength at 28 days; MBT “Sonogrout 10K” by BASF Construction Chemicals, or equal conforming to ASTM C1107.

2.4 GALVANIZING

A. Galvanizing: Provide zinc coating for items exposed to exterior atmosphere, shown on the Drawings, or specified to be galvanized using the hot-dip process after fabrication in accordance with ASTM A385.
   1. Comply with ASTM A153 for galvanizing of iron and steel hardware.
   2. Comply with ASTM A123 for galvanizing of rolled, pressed, and forged-steel shapes, plates, bars, and strips 1/8 inch thick and heavier.
   3. Comply with ASTM A123 for galvanizing of assembled steel products.
   4. Safeguarding against warping and distortion during hot-dip galvanizing of metal fabrications shall be in conformance with ASTM A384.

B. Newly galvanized items shall not be water quenched or chromate quenched after galvanizing if they are scheduled to receive a paint coating.

C. Exterior standard bolts, cast-in-place anchor bolts, turnbuckles, clevises, and nuts shall be galvanized.

2.5 PROTECTIVE COATINGS

A. Products:
1. Galvanizing-Repair Paint: Minimum 95 percent zinc-dust-content in dried film paint for regalvanizing welds in galvanized steel; “Z.R.C. Cold Galvanizing Compound” by ZRC Worldwide, “Cold Galv Primer” by Valspar, or equal. Where repaired galvanizing is to be left exposed, use repair paint that will closely match appearance of hot-dip galvanizing; “Galvilite” by ZRC Worldwide, or equal.
2. Shop Primer for Ferrous Metal - Not Galvanized:
   a. Interior: Modified alkyd; Tnemec Series "FD88 Azeron" or equal, 1.5 to 2.5 DFT.
   b. Exterior: Inorganic, zinc-rich: "Tneme-Zinc 90-97," or equal, 2.0 to 3.5 DFT.
3. Field-Applied Finish Paints: As specified in Section 09 90 00 Painting and Coating.

B. Galvanized Surfaces:
1. Repair zinc coating damaged after fabrication with specified repair paint in accordance with ASTM A780, AHDGA publication, "Recommended Practice for Touch-up of Damaged Galvanized Coatings," and manufacturer’s recommendations for application of repair paint.
2. Zinc-coated surfaces to be painted shall be chemically treated and finished painted as specified in Section 09 90 00 Painting and Coating.

C. Shop Priming:
1. Shop-prime work, except stainless steel, surfaces to be epoxy painted, galvanized, or epoxy-coated, surfaces and anchors encased in concrete, surfaces to be grouted against, and surfaces and edges to be field welded, unless otherwise indicated.
2. Primer paint shall be compatible with required finish coat.
3. Surface Preparation Prior to Priming:
   a. Galvanized Surfaces: SSPC No. 1.
   b. Concealed Items: SSPC No. 2 or No. 3.
   c. Exposed Items: SSPC No. 6.
4. Apply primer within 8 hours of preparation of surface or sooner if necessary to prevent rusting.
5. Primer shall be applied to a minimum dry film thickness of 2 mils.
6. Paint application shall be in accordance with SSPC PA1, “Shop, Field, and Maintenance Painting.”

D. Surfaces to be welded shall be protected from painting by use of masking. Inadvertent overspray on surfaces to be welded shall be removed by wire brushing.

E. Finish Painting: As specified in Section 09 90 00 Painting and Coating. Finish exposed fasteners to match adjacent metal.

F. Protective Coating Schedule: Confer with County's Representative for required coating at items not scheduled.
   1. Exterior Items: Galvanized and field finish painted with standard performance coating.

2.6 FABRICATED ITEMS

A. Miscellaneous Framing and Supports:
   1. Provide miscellaneous steel framing and supports as required to complete the Work.
   2. Fabricate to sizes, shapes, and profiles shown or required.
      a. Except as otherwise shown, fabricate from structural steel shapes, plates, and steel bars, of all-welded construction, using mitered corners, welded brackets and splice plates, and a minimum number of joints for field connection.
      b. Cut, drill, and tap units to receive items anchored to the Work.
   3. Galvanize miscellaneous framing and supports wherever indicated and used in an exterior location.

2.7 FABRICATION - GENERAL REQUIREMENTS

A. Use materials of size and thicknesses shown or required to produce adequate strength and durability in finished product for intended use.

B. Work to dimensions shown on the Drawings or accepted on shop drawings within the allowable tolerances as defined in referenced AISC Code.

C. Use type of materials shown or specified for various items of work.

D. Castings shall be sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance.

E. Form exposed work true to line and level with accurate angles and surfaces and straight, sharp edges. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

F. Weld in accordance with recommendations of AWS.
   1. Welding shall be done in a sequence, which minimizes distortion and shrinkage.
   2. Electrodes preheat and welding process shall meet AWS prequalification requirements and the electrode manufacturer's written recommendations for specific applications.
   3. Headed concrete anchors and deformed bar anchors shall be shop welded in accordance with AWS C5.4 and AWS D1.1

G. Provide anchorage devices and fixings where necessary for securing metal fabrications to in-place construction, including threaded fasteners for concrete and masonry inserts, through bolts, lag bolts, and other connectors as required.

H. Fabricate and space anchoring devices as shown and required to provide adequate support for intended use of work.

I. Metal fabrications shall be fabricated completely in the shop except as otherwise specified or shown on the Drawings.

J. Sheared and flame cut edges shall be true to line and free from rough corners and projections.

K. Reentrant cuts/corners shall be filleted to a radius of not less than 1/2 inch.

L. Holes:
   1. Holes shall be punched, subpunched, and reamed, or drilled in accordance with referenced AISC Specifications. Holes shall not be made by flame cutting.
   2. Holes shall be 1/16 inch larger than the nominal bolt diameter, except holes for cast-in-place anchor bolts and inserts which shall be 3/16 inch larger than the nominal bolt diameter and as otherwise shown on the Drawings.
   3. Fabrication holes and notches not required, oversized, or slotted and not shown on the Drawings shall be subject to prior review by County's Representative.

M. Bent plate shall be in accordance with AISC minimum radius for bending.

N. Fabricated threads shall comply with ANSI B1.1 UNC-2A.

2.8 SOURCE QUALITY CONTROL

A. Metal fabrications shall be inspected after fabrication.

B. Inspection of welding shall be in accordance with AWS D1.1 and the special inspection requirements of the CBC with all welds visually inspected.
   1. Ultrasonic testing shall be in accordance with AWS D1.1.
   2. Magnetic particle testing shall be in accordance with ASTM E709.
   3. Dye penetrant testing shall be in accordance with ASTM E165.
   4. A minimum of 10 percent of indicated welds shall be tested.
   5. Acceptance of welding inspection results shall be in accordance AWS D1.1.

C. Inspection of headed concrete anchor and deformed bar anchor welding shall be in accordance with AWS D1.1 and the special inspection requirements of the CBC.

D. Hot-dip galvanizing shall be inspected after galvanizing in accordance with AHDGA "Inspection of Products Hot-Dip Galvanized after Fabrication."

E. Acceptance of blast cleaning inspection shall be in accordance with SSPC VIS-1, "Pictorial Surface Preparation Standards for Painting Steel Surfaces."

PART 3 - EXECUTION

3.1 FIELD PREPARATION

A. At the time of connecting, bearing surfaces shall be free from loose or non-adherent rust, loose mill scale, oil, grease, dirt, mud, and any foreign matter, coating, or defect that adversely affects the connection.

B. Surface preparation for welding shall be in accordance AWS D1.1, except loose or non-adherent rust, loose mill scale, and paint shall be removed by wire brushing.

3.2 INSTALLATION

A. Install metal fabrications as shown on the Drawings in accordance with reviewed submittals and referenced standards including allowable tolerances as defined in the AISC "Code of Standard Practice for Steel Buildings and Bridges."

B. Cut, drill, and fit as required for installation.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete.

D. Set work accurately in location, alignment, and elevation; plumb, level, true, and free of rack; measured from established lines and levels.

E. Adjust items prior to securing in place so as to ensure proper matching of components and correct alignment.

F. Anchors and Fastening:
   1. Connections shall be as shown on the Drawings. Connections and splices not shown on the Drawings shall be subject to prior review by County's Representative.
   2. Anchor bolts shall be placed within the allowable tolerances as defined in the AISC Code of Standard Practice for Steel Buildings and Bridges.
   3. Cast-in-place miscellaneous metals and fasteners shall be installed and set by template prior to concrete placement.
   4. Concrete anchors shall be installed and tightened to proper torques using proper initial head clearances at expansion nut-type concrete anchors and with nuts initially flush with the end of the bolt at wedge and sleeve-type concrete anchors in accordance with the manufacturer's written instructions and specifications.
   5. Resin/adhesive anchors shall be fully cured prior to use.
   6. Connection parts in connections not slip joints shall be properly drawn together and the bolts tightened to the snugtight condition.

7. Bolts in slip-joint connections shall be provided with lock nuts and initially tightened to the snugtight condition, then backed off half turn.
8. Standard bolt heads and nuts at oversized and slotted holes shall be provided with plain washers.
9. High-strength bolt heads and nuts at oversized and slotted holes shall be provided with plain hardened washers.
10. Bolt heads and nuts at sloped surfaces shall be provided with beveled washers.

G. Holes that require enlarging to admit bolts shall be reamed. Holes shall not be enlarged by flame cutting.

H. Field Welding:
1. 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.
2. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
3. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
4. Protect and clean areas surrounding welds.
5. Welding shall be done in a sequence, which minimizes distortion and shrinkage

I. Field correcting by flame cutting shall not be permitted without prior review by County's Representative.

J. Filler and/or shim plates shall be furnished and installed by the Contractor to provide alignment of members where required due to mill and/or fabrication tolerances.

3.3 FIELD QUALITY CONTROL

A. Metal fabrications and fasteners shall be inspected after installation.

B. Cast-in-place anchor bolts and miscellaneous metal fabrications shall be inspected after they have been placed and prior to concrete placement.

C. Wedge and expansion nut-type concrete anchor and resin/adhesive anchor installation shall be inspected in accordance with special inspection requirements of the CBC.

D. Inspection of welding shall be in accordance with AWS D1.1 the special inspection requirements of the CBC with all welds visually inspected. Acceptance of welding inspection results shall be in accordance with of AWS D1.1.
1. Ultrasonic testing shall be in accordance with AWS D1.1.
2. Magnetic particle testing shall be in accordance with ASTM E709.
3. Dye penetrant testing shall be in accordance with ASTM E165.
4. A minimum of 10 percent of indicated welds shall be tested.
5. Acceptance of welding inspection results shall be in accordance AWS D1.1.

E. A minimum of 10 percent of slip-joint connections shall be inspected.

F. A minimum of 10 percent of all concrete anchor connections shall be tested using a calibrated torque wrench in accordance with the ICC-ES Report.

3.4 ADJUSTMENT AND TOUCH-UP

A. Inspect installed work. Correct deficiencies.

B. Immediately after erection, touch up abraded areas of shop paint, and paint all exposed areas with same material as used for shop painting.
   1. Apply by brush or spray.
   2. Touch up galvanized surfaces as specified.

C. Restore finishes damaged during installation and construction period so that no evidence of correction work remains.

D. Wet storage stains on galvanized steel shall be removed after installation.

3.5 PROTECTION

A. Protect finishes of metal fabrications from damage during construction period as required.

END OF SECTION 05 50 00

SECTION 05 73 00

DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Railings and guardrails at ramps and landings as shown on the Drawings, as follows:
   1. Viva Railings or Equal, TEE System, all stainless steel with cable infill and shop-applied NAAMM No. 4 satin finish.
      a. Cable Infill: 3/16 inch stainless steel cable at 3.25 inches on center.

B. Related Requirements:
   1. Metal Fabrications: Section 05 50 00;
      a. Embedded steel supports and anchorages for decorative metal railings.
      b. General requirements for fabrication and installation of metal work.

1.2 ADMINISTRATIVE REQUIREMENTS

A. 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.
   2. Coordinate sequence of installation with Sections whose work adjoins decorative metal railings.

C. Pre-installation Meeting: Prior to installation of decorative metal railings, Contractor, County's Representative, representative of metal fabricator, installer, and others whose work interfaces with decorative metal work or may affect its quality shall meet at the Project site to coordinate related requirements.
   1. Notify participants at least 5 working days before conducting meeting.
   2. Review material selections and procedures to be followed in performing the work.
   3. Review in detail job conditions, schedule, construction sequence, installation requirements, and quality of completed installation.
   4. Review in detail the means of protecting completed work during remainder of construction period.
   5. Record discussions of meeting and any conflict, incompatibility or inadequacy. Furnish a copy of record to each participant.

D. In addition, attendance is required at pre-installation meetings specified in other Sections whose work interfaces with work of this Section.

1.3 ACTION SUBMITTALS

A. Shop Drawings:
   1. Large-scale drawings for fabrication and erection of assemblies not completely shown by manufacturer's product data.
      a. Include, as appropriate, plans, elevations, complete details, thicknesses, sizes, types, grades, classes of metal, connecting and joining methods, anchorages.
      b. Show required field measurements and interface with work of other Sections.
      c. Welds, both shop and field, shall be indicated by AWS "Symbols for Welding, Brazing and Nondestructive Examination," A2.4.
      d. Indicate all required field measurements.
   2. Setting drawings, templates, instructions, and directions for installation of anchorage devices.
   3. Coordinate with shop drawing requirements of other Sections whose work adjoins decorative metal railings.
   4. Provide shop drawings for mockups specified below.

B. Product Data: Manufacturer's specifications and installation instructions for manufactured products to be used in the fabrication of work, including paint products, cabling components, fence components, bolts, tie rod ends, and other exposed hardware.

C. Samples:
   1. Exposed metals in selected finishes, 12 inches x 6 inches, or 12 inches long as applicable.
   2. Specified railing assembly, showing specified rail profile. These samples, if accepted, may be installed as mockups and as part of finished construction.
   3. Each type of exposed fastener or hardware.
   4. Full-size samples of castings and forgings.
   5. For products involving selection of texture or design including mechanical finishes.
   6. Additional samples as requested by the County’s Representative.

1.4 INFORMATIONAL SUBMITTALS

A. Qualifications as specified.

B. Report on pre-installation meeting.

C. 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.

D. Delegated-Design Services: Engineering data for railings and guardrails.
   1. Calculations verifying compliance with structural design criteria by design engineer and showing reactions to structure.

2. Drawings shall be signed by design engineer, or certification that structural portion of drawings are in compliance with design calculations shall be submitted.
3. Although all calculations shall be submitted, only reactions to structure are subject to review.

E. Certification: Submittal drawings and engineering data shall be signed by design engineer, or certification that structural portion of drawings are in compliance with design calculations shall be submitted.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Design engineer shall be a structural or civil engineer registered in the State of California.
2. Fabricator/Installer: Documented experience in fabrication and installation of decorative metal railings similar to those indicated for this Project, and with a record of successful in-service performance.
3. Welders: 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.

B. Welding procedures and operations shall comply with AWS B2.1, "Standard for Welding Procedure and Performance Qualifications."

C. Mockups:
1. Provide a full-size mockup of specified railing assembly for review and approval by County's Representative.
2. In addition, first installed example of each configuration of railing, and each installation condition, if not illustrated by above mockup, shall serve as a mockup for review and approval by County's Representative of workmanship, visual effect, and interface with adjacent construction.
3. Each mockup shall consist of a typical assembly in specified finish, complete with mounting devices, and shall be sufficiently large and complete to demonstrate installation and aesthetic effect of completed assembly.
4. If requested by County's Representative, install mockup as directed.
5. If requested, make modifications to mockups without additional charge to County.
6. Do not proceed with remainder of installation until mockups have been approved.
7. Where appropriate and acceptable to County's Representative, approved mockups may become part of the completed Work.

1.6 FIELD CONDITIONS

A. Field Measurements: 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.
1. Allow for trimming and fitting wherever taking of field measurements before fabrication might delay work.

2. Coordinate fabrication schedule with construction progress so as to avoid construction delays.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect steel from corrosion.

B. Store packaged materials in original unbroken package or container.

C. Comply with additional requirements specified in Section 01 43 00 Quality Assurance - Materials and Equipment and in Section 01 66 00 Delivery, Storage and Handling.

PART 2 - PRODUCTS

2.1 DESIGN AND PERFORMANCE REQUIREMENTS

A. Decorative steel shall be considered Architecturally Exposed Steel (referred to as "AES" or "AESS") and 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.

B. Structural Performance of Railing Assemblies, Handrails, and Guardrails:
   1. In engineering stainless steel railing components to withstand structural loads indicated, determine allowable design working stresses of railing materials based on 60 percent of minimum yield strength.
   2. Handrails and Top Rails of Guards:
      a. Uniform load of 50 lb/ft applied in any direction.
      b. Concentrated load of 200 lb applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   3. Infill:
      a. Concentrated load of 50 lb applied horizontally on an area of 1 square foot.
      b. Infill load and other loads need not be assumed to act concurrently.

C. Industry Standards:
   1. Comply with "Metal Rail Manual" of National Ornamental and Miscellaneous Metals Association (NOMMA).
   2. Comply with "Pipe Railing Manual" of National Association of Architectural Metal Manufacturers (NAAMM).

D. Regulatory Requirements:
   1. Comply with the Americans with Disabilities Act (ADA).
   2. Comply with the CBC.

E. If modifications to designs indicated are proposed in order to meet code requirements, indicate them as such on shop drawing submittals. Work with County's

Representative to arrive at an acceptable design that is sufficiently similar to the design indicated.

F. Design interface and connections to existing work in such a way as to minimize damage and defacement to existing construction.

2.2 METAL MATERIALS

A. General: Metal surfaces exposed to view shall not exhibit pitting, seam marks, roller marks, splice marks, mill identification markings, stains, discolorations, or other blemishes and imperfections.

B. Stainless Steel:
1. Alloy: Type 304 at interior, Type 316 at exterior, 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.

C. Cable Infill:
1. Material: 1 x 19, Type 316 stainless steel strand, left-hand lay, per dimensional properties contained in MIL-W-87161.
2. Finish: Mill.
3. Diameter: 3/16 inch, minimum breaking strength of 4000 pounds.
4. Orientation: As indicated on Drawings; typically parallel to handrail and ramp surface.
5. Spacing: Maximum 3.25 inches on center.
6. Cable Hardware Components: Hardware substantially concealed inside end posts wherever practical.

2.3 ADDITIONAL MATERIALS

A. Resilient Pads: Closed-cell neoprene complying with ASTM C864, in black color.

B. Anchor Bolts: ASTM A307, nonheaded type, unless otherwise indicated.

C. Fasteners: Use fasteners of same basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.
1. Fasteners for Exterior Stainless Steel Items: Stainless steel.
2. Provide concealed fasteners for interconnecting decorative metal components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method. Exposed fasteners shall be indicated on required submittals.
3. Provide turnbuckles, sleeves, spacers, and other hardware items as indicated.

4. Provide anchorage devices and fasteners where necessary for securing decorative metal to in-place construction.

D. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, complying with applicable AWS specifications, and as required for color match, strength, and compatibility in fabricated items.

E. Non-Metallic Shrinkage-Resistant Grout: As specified in Section 05 50 00, "Metal Fabrications."

F. Adhesive, Stainless Steel to Other Materials: Epoxy resin type, unless otherwise recommended by metal manufacturer and fabricator.

2.4 DECORATIVE METAL FABRICATIONS AND COMPONENTS

A. Posts and Handrail Brackets: Stainless steel; manufacturer's standard for system specified.

B. Handrails: 1.5 inch diameter round stainless steel with shop-applied NAAMM No. 4 satin finish.

2.5 FABRICATION METHODS - GENERAL

A. Form decorative metal to required shapes and sizes, with true lines and angles. Provide components in sizes and profiles indicated.

B. Use special care so as to avoid bending, twisting, or otherwise distorting individual members.

C. Castings, if used, shall be sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire-brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.

D. Provide rebates, lugs, and brackets as required to assemble units and to attach to other work. Drill and tap for required fasteners, unless otherwise indicated. Use concealed fasteners, unless otherwise indicated on reviewed shop drawings.

E. Joints and Connections:
1. Shop-assemble items to greatest extent possible so as to minimize field splicing and assembly. Disassemble only as necessary for shipping and handling limitations. Clearly mark items for reassembly and coordinated installation.
2. Use connections that maintain structural value of joined pieces.
3. Detail connections to facilitate fabrication and erection in accordance with the referenced AISC code.
4. Mill joints to a tight, hairline fit. Cope or miter corner joints. Form joints exposed to weather so as to exclude water penetration.

5. Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts, lag bolts, and other connectors as required.
6. Fabricate and space anchoring devices as shown and required to provide adequate support for intended use.

F. Welding and Brazing: Comply with AWS-recommended practices.
1. Welds shall be continuous.
2. Weld and braze behind finished surfaces without distorting or discoloring exposed side.
3. Remove flux from exposed welded and brazed joints. Dress exposed and contact surfaces.

G. Finishing:
1. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.
2. Welds, burrs, roller marks, seams, and rough surfaces shall be ground neat and smooth.
3. Mill markings shall be completely removed.
4. Gouges, dents, and other surface abuse shall be filled and ground smooth.
5. 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.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install decorative metal railings and related materials as shown on the Drawings in accordance with reviewed submittals and referenced standards.

B. Cut, drill, and fit as required for installation.

C. Set work accurately in location, alignment, and elevation; plumb, level, and true; and free of rack; measured from established lines and levels.

D. Adjust items prior to securing in place so as to ensure proper matching of components and correct alignment.

E. Field Welding:
1. 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.
2. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
3. Grind exposed welded joints smooth, unless otherwise specified, and restore finish to match finish of adjacent surfaces.

F. Erection Tolerances:
   1. Variation from Slope Shown: Maximum 1/4 inch in any post to post space or 20-foot run, noncumulative.
   2. Offsets in End-to-End or Edge-to-Edge Alignment of Consecutive Members: 1/16 inch.

3.2 RAILING INSTALLATION

A. Cope neatly to fit.

B. Secure posts and rails to metal with welded or bolted connections and to concrete with non-metallic shrinkage-resistant grout as shown on the Drawings and specified in Section 05 50 00 Metal Fabrications.
   1. Longitudinal members shall be parallel to each other, to floor surface, or to slope of ramp as shown.
   2. Center line of members within each railing run shall be in same vertical plane.

C. Protect against galvanic action wherever dissimilar metals are in contact, using zinc-chromate primer on contact surfaces.

D. Adjust railings prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length.
   1. Plumb posts in each direction.
   2. Remove any burrs or protrusions that might snag fingers or clothing, and grind and polish smooth.

E. Cable Infill:
   1. Tension cables to minimum of 400 pounds each.
   2. Ensure that cables are parallel, without kinks and sags.

F. Installation Tolerances:
   1. Maximum variation from level or from indicated slopes: 1/4 inch in 10 feet, noncumulative.
   2. Maximum offset from true alignment of abutting members: 1/16 inch.

3.3 ADJUSTMENT AND TOUCH-UP

A. Inspect installed work, with particular attention to handrails. Correct deficiencies.

B. Restore finishes damaged during installation and construction period so that no evidence of correction work remains.

C. Return items that cannot be refinished in the field to the shop. Make required alterations and refinish entire unit, or provide new units.

3.4 PROTECTION

A. Protect finishes of decorative metal from damage during construction period as required.

END OF SECTION 05 73 00

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Include: Exterior sealants and calking work in areas of new construction and as indicated on the Drawings.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures:
   1. Action Submittals shall be submitted in accordance with Section 01 33 00 Submittal Procedures.
   2. Closeout Submittals shall be submitted in accordance with Section 01 77 00 Contract Closeout and Section 01 78 36 Warranties.

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturer's specifications, recommendations, and installation instructions, including cleaning of joint surfaces, for each sealant material to be used.
   1. Include Material Safety Data Sheets (MSDS).

B. Samples: Color selection for each product exposed to view; manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available.

1.4 CLOSEOUT SUBMITTALS

A. Extended warranty.

1.5 QUALITY ASSURANCE

A. Material Compatibility: Sealant materials shall be compatible with one another and with other specified and existing materials, under conditions of service and application required.

B. Mockups: Provide joint sealants for mockups specified in other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with manufacturer’s labels. Labels on delivered materials shall show manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

C. Comply with additional requirements specified in Section 01 43 00 Quality Assurance – Materials and Equipment and Section 01 66 00 Delivery, Storage and Handling.

1.7 WARRANTY

A. General:
   1. Repair or replace joint sealants that fail to achieve airtight and watertight seal or otherwise fail to perform as intended because of leaking, crumbling, hardening, shrinkage, bleeding, sagging, staining, loss of adhesion or cohesion, or do not cure within the specified warranty periods.
   2. Extended warranties specified in this Section exclude deterioration or failure of joint sealants from the following:
      a. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
      b. Disintegration of joint substrates from natural causes exceeding design specifications.
      c. Mechanical damage caused by individuals, tools, or other outside agents.
      d. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

B. Contractor: Provide County with a written 2-year warranty, co-signed by installer, agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

C. Manufacturer: Provide County with manufacturer’s written 20-year warranty for sealant Types 1A and 1B agreeing to furnish sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty shall include failure due to loss of adhesion, weather seal. In addition, Type 1B sealant warranty shall include staining.
   2. Contractor shall be responsible for scheduling, arranging, and providing any print review and testing required by manufacturer as a condition for issuance of its warranty.

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

A. Colors:
   1. Concealed Material: Any of manufacturer's standard colors.

2. Exposed Material: Manufacturer's standard colors, as selected by the County's Representative.

B. Type 1A - Sealant for General Exposed Exterior Use: One part, neutral cure, gun-grade silicone conforming to ASTM C920, Type S, Grade NS, Class 50; Dow Corning "795 Building Sealant," "SilPruf" by Momentive Performance Materials, or equal.

C. Type 1B - Sealant for Use at Concrete and Other Porous Surfaces: One part, medium modulus, silicone polymer conforming to ASTM C920, Type S, Grade NS, Class 50 and formulated to reduce or eliminate dirt pickup, surface streaking, and substrate staining; Dow Corning "756 SMS," "SCS9000 SilPruf NB" by Momentive Performance Materials, or equal.

D. Type 2A - Exterior Sealant for General Use: ASTM C920, Type S, Class 25, Grade NS, single-component, silyl-terminated polyether; BASF "Sonolastic 150," or equal.

E. Type 3 – Not Used.

F. Type 4 - Concealed Bedding Conditions: One-part butyl-rubber calk conforming to FS TT-S-001657, Type I; Pecora "BC158," or equal.

G. Type 5 - Exterior Small to Medium Width Horizontal Joints Subject to Pedestrian Traffic: One-part, self-leveling polyurethane conforming to ASTM C920, Class 25, Type S, Grade P; Pecora " NR-201," or equal.

2.2 MISCELLANEOUS SEALANT MATERIALS

A. Fiber Expansion Joint Material for Exterior Use: 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.

B. Additional Sealant Materials: As specified in other Specification Sections.

2.3 SEALANT ACCESSORIES

A. Joint Primer/Sealer: As recommended by sealant manufacturer for joint surfaces to be primed or sealed.

B. Sealant Backer Rod: Compressible, rod-stock, polyethylene foam; nongassing, polyethylene-jacketed polyurethane foam; butyl-rubber foam; neoprene foam; or other flexible, permanent, durable, nonabsorptive, closed-cell material as recommended for compatibility with sealant by sealant manufacturer and complying with ASTM C1330.

C. Cleaner for Nonporous Surfaces: Nonstaining chemical cleaner acceptable to manufacturer of sealer and backing materials, harmless to substrates and adjacent nonporous materials.

D. Masking Tape: Nonstaining, nonabsorbent, compatible with joint sealants and adjacent surfaces.

E. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer. Provide self-adhesive tape where applicable.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that joint dimensions are not less than or greater than recommended by joint sealer manufacturer for application indicated.

B. Clean joint surfaces immediately before installation of sealant.
   1. Remove dirt, insecure coatings, moisture, and other substances that would interfere with bond of sealant.
   2. Etch concrete joint surfaces as recommended by sealant manufacturer.
   3. Use cleaning solvent to clean all joint surfaces.
   4. Wipe joints free of solvent, using clean, dry cotton cloths or lintless paper.
   5. Do not permit solvent to air dry.

3.2 INSTALLATION

A. General:
   1. Comply with manufacturer's printed instructions, except where more stringent requirements are shown or specified.
   2. Comply with ASTM C1193 for installation of elastomeric joint sealants.

B. Prime or seal joint surfaces as recommended by sealant manufacturer.
   1. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
   2. Prime anodized aluminum and painted surfaces using primer recommended by sealant manufacturer, unless sealant manufacturer certifies in writing, that primer is not required.

C. Install sealant backer rod for elastomeric sealants, except where recommended to be omitted by sealant manufacturer for application shown.

D. Install bond-breaker tape wherever backer rod is not used and wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.

E. Use only proven installation techniques that will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides.
   1. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces.

2. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

F. Install sealants to depths as recommended by sealant manufacturer, but within following general limitations:
   1. For walkways, floor and similar joints subject to traffic, and other abrasion and indentation exposures, fill joints to a depth equal to 75 percent of joint width but not more than 3/4 inch deep or less than 3/8 inch deep.
   2. For joints not subject to traffic, fill joints to a depth equal to 50 percent of joint width but not more than 1/2 inch deep or less than 1/4 inch deep.

3.3 CLEANING AND CURING

A. Clean adjoining surfaces to eliminate excess sealant.

B. Cure sealants in compliance with manufacturer's instructions and recommendations to obtain high early-bond strength, internal cohesive strength, and surface durability.

END OF SECTION 07 92 00

SECTION 09 90 00

PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Painting and painter's finish to complete the finishing of the work.
   1. Exterior: New surfaces and designated existing surfaces in construction area, except prefinished items and as otherwise noted.

B. Related Requirements:
   1. Metal Fabrications: Section 05 50 00; primers for metal.

1.2 ADMINISTRATIVE REQUIREMENTS

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

1.3 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.
   1. Information shall be grouped by System using same System identification included in these Specifications.
   2. Include Material Safety Data ‘Sheets (MSDS).

B. Color Samples: Only if requested by County’s Representative.

1.4 QUALITY ASSURANCE

A. Field Samples: Request review, by the County’s Representative, of first painted area or item for color, texture, and workmanship.

B. 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 County’s Representative, in writing, of any anticipated problems arising from using specified coating systems with substrates primed by other Sections.

1.5 DELIVERY, STORAGE, AND HANDLING

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

B. Store materials in tightly covered containers within ambient temperature range recommended by coating manufacturer. Maintain containers in a clean condition, free of foreign materials and residue.

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

D. Comply with additional requirements specified in Section 01 43 00 Quality Assurance - Materials and Equipment and in Section 01 66 00 Delivery, Storage and Handling.

1.6 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. Protection: Cover or otherwise protect finished work of other trades and surfaces not being painted concurrently or not to be painted.

1.7 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND COATING PRODUCTS

A. Products are specified under "Exterior Paint Systems" in Part 3 below and are manufactured by Benjamin Moore & Co. and Tnemec as indicated. Equivalent

products manufactured by PPG, Sherwin-Williams, Dunn-Edwards, Kelly-Moore, Behr, or equal are acceptable.

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

2.2 PERFORMANCE CRITERIA

A. Coatings, primers and undercoats shall satisfy the South Coast Air Quality Management District Rule 1113 for architectural coatings.

2.3 MISCELLANEOUS MATERIALS

A. Cementitious Filler: Nonshrink formulations of white Portland cement with fine silicate aggregate, zinc oxide pigment, and reinforcing chemical binder, as accepted.

B. Spackling Compound: Standard gypsum board compound.

C. Thinner: As recommended by each manufacturer for the respective product.

2.4 COLORS

A. Colors will be selected and provided by the County's Representative. Selected colors may have manufacturer identifications other than from the manufacturers products included in the Paints Systems specified. The listing is solely for the purpose of conveying color information and does not imply 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 scheduled and selected colors as specified in Part 1 above. Colors of paints shall match scheduled colors.

C. Areas or surfaces indicated as black, either on the Drawings or in the Specifications, shall be so painted, unless specifically directed otherwise.

2.5 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 County's Representative.

PART 3 - EXECUTION

3.1 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.

3.2 PREPARATION

A. General:
1. Broom-clean rooms and spaces before commencement of the work.
2. Verify that surfaces to be painted are dry, clean, smooth, and free from deleterious materials.
3. Protect hardware, nameplates, switch plates, lighting fixtures, stainless steel, aluminum, and other surfaces that are not to be painted by masking, removal, or by other means to ensure a neat job.
4. Locate and install scaffolding and staging so as not to interfere with the work specified in other Sections.

B. 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.

C. Previously Painted Metal: Prepare in accordance with recommendations of coating manufacturer based on condition of surfaces and the following:
1. Remove loose paint, dirt, and chalk with scraper and strong detergent solution.
2. Abrade shiny surfaces, such as baked enamel.
3. 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.
4. Surfaces shall be clean, dry, smooth, and even.

D. Concrete (If Applicable):
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.

E. Surfaces that cannot be prepared or painted as specified shall be immediately brought to the attention of the County'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 County's Representative.

3.3 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.

3.4 APPLICATION

A. Shop-fabricated and finished metal items shall be shop spray finished to the greatest extent possible.

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

C. Application:
   1. Apply paint with suitable brushes, rollers, or spraying equipment.
   2. 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 County'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.

D. 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.

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

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

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

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

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

J. Equipment adjacent to walls shall be disconnected, using workers skilled in appropriate trades, and moved to permit wall surfaces to be painted. Following completion of painting, they shall be expertly replaced and reconnected.

3.5 CLEANING

A. Touch up and restore finish where damaged.

B. Remove spilled, splashed, or spattered paint from all surfaces.

C. Do not mar surface finish of item being cleaned.

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

3.6 PAINT SYSTEMS

A. General:
   1. Only major areas are scheduled, but miscellaneous and similar items and areas within room or space shall be treated with suitable system.
   2. This Specification shall serve as guide and is meant to establish procedure and quality. Confer with the County's Representative to determine exact finish desired.
   3. 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. Surfaces Not to Be Painted:
   1. Railings and other items with factory-applied final finish.
   2. Concealed ducts, pipes, and conduit.
   3. Surfaces specifically scheduled or noted on the Drawings as not to be painted.

C. Gloss and Sheen Ratings: Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following limits in conformance with Master Painters

Institute, Inc. (MPI) Standards according to 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. The numbers following "EXT" for each System identify substrate to be coated.
   3. The letter following substrate number identifies the general finish coat chemistry summarized as follows:
      a. A: Standard acrylic.
   4. Hyphenated suffix identifies the topcoat gloss level.

E. Exterior Painting Systems:

EXT 5.1A-5
Acrylic over Shop-Primed Metal - Gloss Level 4

2 coats	"Regal Select" N403	100% Acrylic

EXT 5.3A-3
Acrylic on Galvanized Metal - Gloss Level 4

Pretreatment (SSPC SP-1)		Heavy-duty cleaner (if not shop primed)
1 coat		Primer (if not shop primed)
2 coats	"Regal Select" N403	100% Acrylic

END OF SECTION 09 90 00

SECTION 31 11 00

CLEARING & GRUBBING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes all work necessary to successfully complete demolition, clearing & grubbing to prepare site for the phasing and new construction, including the following:
   1. Protecting existing vegetation to remain.
   2. Clearing vegetation, debris, trash and other materials within limits indicated.
   3. Stripping of topsoil within limits indicated.
   4. Removing above-grade site improvements within limits indicated.
   5. Disposing of objectionable material off site.
   6. Clean line saw cutting of concrete sidewalks, concrete slabs, etc., as specified herein.
   7. Clearing and site preparation. Including removal of site vegetation and other root system.
   8. Protection from injury or defacement of trees and other vegetation and objects to be preserved.
   9. Removal of surface debris and deleterious materials such as rubbish.
   10. Removal and stockpile of materials for landscaping use at approved location.
   11. Disposal of unwanted materials off site.

1.2 RELATED DOCUMENTS

A. Caltrans Standard Specifications, Section 16, Clearing and Grubbing.

B. Section 02 41 13, Selective Site Demolition

1.3 REGULATORY REQUIREMENTS

A. No burning shall be allowed.

B. Comply with the following California Code of Regulations:
   1. Title 8: CAL/OSHA, Chapter, Subchapter 4 – Construction Safety Orders
   2. Title 24: Part 2, California Building Code, Chapter 33, Protection of Pedestrian during Construction or Demolition.
   3. Bay Area Air Quality Management County
   4. Alameda County Water County, Standard Specification and Details.
   5. County of Alameda County Public Works Department, Design Guidelines.

1.4 DEFINITIONS

A. ANSI: American National Standards Institute.

B. CAL-OSHA: California Occupational Safety and Health Administration.

C. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2-inches in diameter; and free of weeds, roots, and other deleterious materials.

D. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.5 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain County's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 SUBMITTALS

A. Submittal procedure shall be as outlined in Division 01.

1.7 QUALITY ASSURANCE

A. Do not remove or prune trees without first securing a permit from the appropriate agency.

B. Prune to the standards of the International Society of Arborists and to ANSI 300.

1.8 PROJECT CONDITIONS

A. Except for materials indicated to be stockpiled or to remain the County's property, cleared materials are the Contractor's property. Remove cleared materials from site and dispose of in lawful manner.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store where indicated on plans or where designated by the County. Avoid damaging materials designated for salvage.

C. Unidentified Materials;
   1. If unidentified materials are discovered, including hazardous materials that will require additional removal other than is required by the Contract Documents, immediately report the discovery to the County.

2. If necessary, the County will arrange for any testing or analysis of the discovered materials and will provide instructions regarding the removal and disposal of the unidentified materials.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Backfill excavations resulting from demolition operations with on-site or import materials conforming to structural backfill defined in Section 31 23 00 Excavation and Fill:
   1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points during construction.

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain during construction.
   1. Restore damaged improvements to their original condition, as acceptable to the County's Representative and/or County. Prior to restoration the contractor shall notify County's Representative and /or County of the damaged improvements.

3.2 TREE PROTECTION

A. Erect and maintain temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.

B. Do not store construction materials, debris, or excavated material within drip line of remaining trees.

C. Do not permit vehicles or equipment within drip line of remaining trees.

D. Do not excavate within drip line of remaining trees, unless otherwise indicated.

E. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation edge as possible.
   1. Cover exposed roots with burlap and water regularly.

2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
3. Coat cut faces of roots more than 1-1/2-inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
4. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.

3.3 TREE PRUNING

A. Prune trees to balance the crown, and eliminate hazards. Perform main work to reduce sail effect through thinning, reducing end weights, shortening long heavy limbs, removing deadwood, weak limbs and sucker growth. Prune limbs back to an appropriate lateral branch.

B. Make final cuts at the outer edge of the branch collar in accordance with the arborist's recommendations.

C. Perform pruning work in a safe and proper manner, adhering to CAL-OSHA and ANSI Standards.

3.4 ROOT PRUNING

A. Do not cut tree roots greater than 3-inch in diameter and less than 12-inches below ground level without approval of the County.

B. Cut tree roots cleanly, as far from the trunk as possible, and not underneath any area where walkways are to be constructed. Root pruning shall be to a depth of 18-inches.

C. Tree root prune using a Vermeer root-cutting machine. Obtain the County's approval before using alternate equipment or techniques.

D. Complete tree root pruning prior to any excavation adjacent to the tree.

E. Do not expose tree roots to drying out. Cover root ends with soil or burlap and keep moist until the final backfill is completed.

3.5 TREE REMOVAL

A. Remove trees designated for removal prior to the construction of new improvements.

B. Perform tree removal work in a safe and proper manner, adhering to CAL-OSHA and ANSI Standards.

C. Remove or grind stumps to a minimum of 18-inches below finish subgrade. Remove surface roots to this depth within 24-inches of the tree trunk. Trees,

plants and roots that are below proposed building footprint or slabs on grade shall be removed in its entirety.

3.6 RESTORATION

A. Restore damaged improvements to their original condition, as acceptable to the County.

B. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, as directed by the County.
   1. Employ a qualified arborist, licensed in jurisdiction where the Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
   2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the County. Clear and grub existing areas only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations.

3.7 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed or abandoned.

B. Arrange to shut off indicated utilities with utility companies or verify that utilities have been shut off.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by County or others unless authorized in writing by the County, and then only after arranging to provide temporary utility services according to requirements indicated.

D. Coordinate utility interruptions with utility company affected.

E. Do not proceed with utility interruptions without the permission of the County and utility company affected. Notify County and utility company affected 14 working days prior to utility interruptions.

F. Excavate and remove underground utilities that are indicated to be removed.

G. Securely close ends of abandoned piping with tight fitting plug or wall of concrete minimum 6-inches thick. All abandoned piping shall be filled with a cementious material, such as controlled low strength material.

3.8 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and

obstructions and grubbing roots.

B. Remove trash, debris, logs, concrete, masonry and other waste materials.

C. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

D. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18-inches below subgrade. Trees, plants and roots that are below proposed building footprint or slabs on grade shall be removed in its entirety.

E. Use only hand methods for grubbing within drip line of remaining trees.

3.9 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Remove trash, debris, weeds, roots, and other waste materials.

D. Stockpile topsoil materials designated to remain on site at a location approved by the County at a location away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

E. Do not stockpile topsoil within drip line of remaining trees.

3.10 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction and in accordance with section 02 41 13 Selective Site Demolition.

B. Remove concrete slabs and sidewalks as indicated. Where concrete slabs and sidewalk are designated to be removed, remove bases and subbase to surface of underlying, undisturbed soil.

C. Unless the existing full-depth joints coincide with line of pavement demolition, neatly saw-cut to full depth the length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

D. Remove concrete slabs and sidewalks by saw cutting to full depth. If saw cut falls within 30-inches of a construction joint, expansions joint, score mark or edge, remove material to joint, mark or edge

3.11 DISPOSAL

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off the County's property.

3.12 TEMPORARY FACILITIES

A. Provide the following temporary facilities to facilitate the demolition operations, as necessary.
   1. Temp Traffic Controls
   2. Protection of Persons and Property
   3. Protection of Utilities
   4. Noise and Dust Abatement.
   5. Clear and restore area to their original condition.
   6. Protect survey markers and monuments, existing improvements, and adjacent structures from removal and damage.

3.13 CONSTRUCTION WASTE MANAGEMENT

A. To the greatest extent possible, separate reusable and recyclable products from contaminated waste and debris in accordance with the General Contractor's Waste Management Plan and Section 01 74 10 Construction Waste Management. Place recyclable and reusable products in designated containers and protect from moisture and contamination.

END OF SECTION 31 11 00

SECTION 31 23 00

EXCAVATION AND FILL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section describes the requirements for earthwork operation, as shown on the Drawings and specified:
   1. Excavation and/or embankment from existing ground to subgrade, including soil sterilant, walks, paths, and any other site improvements called for on the Plans.
      a. Aggregate base.
      b. Lime stabilization.
      c. Dispose off-site waste, excess or unsatisfactory material.

1.2 RELATED DOCUMENTS

A. Caltrans Standard Specifications:
   1. Section 17, Watering.
   2. Section 19, Earthwork.
   3. Section 24, Lime Stabilization.
   4. Section 26, Aggregate Bases.

1.3 RELATED SECTIONS

A. Section 31 11 00 – Clearing and Grubbing

1.4 REGULATORY REQUIREMENTS

A. State of California, Department of Transportation, Standard Specifications 2010 - Section 19

B. Alameda County, Standard Specification and Details.

C. City of Dublin, Standard Specification and Plans.

D. ASTM
   1. D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
   2. D1557-70 for testing in compaction.
   3. D 1586, Method for Penetration Tests and Split-Barrel Sampling of Soils.
   4. D 2487, Classification of Soils for Engineering Purposes.
   5. D 3740, Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

6. D 4318. Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
7. E 329, Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
8. E 548, Guide for General Criteria Used for Evaluating Laboratory Competence.

E. California Building Code, Title 24, Part 2 – California Code of Regulations, Chapter 18 and 18A, Soils and Foundations.

F. CAL/OSHA, Title 8.

1.5 DEFINITIONS

A. Borrow: Approved soil material imported from off-site for use as Structural Fill or Backfill.

B. Excavation: Removal of material encountered above subgrade elevations.
1. Authorized Over-Excavation: Excavation below subgrade elevations or beyond indicated horizontal dimensions as shown on plans or authorized by the County Representative.
2. Unauthorized Over-Excavation: Excavation below subgrade elevations or beyond indicated horizontal dimensions without authorization by the County Representative. Unauthorized excavation shall be without additional compensation.

C. Structural Backfill: Soil materials approved by the County Representative and used to fill excavations resulting from removal of existing below grade facilities, including trees.

D. Structural Fill: Soil materials approved by the County Representative and used to raise existing grades.

E. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material ¾-cubic yards or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2-inches.

F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man made stationary features constructed above or below grade.

G. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below base or topsoil materials.

H. Unsuitable Material: Any soil material that is not suitable for a specific use on the Project. The County Representative will determine if a soil material is unsuitable.

I. Utilities: onsite underground pipes, conduits, ducts and cables.

1.6 SUBMITTALS

A. Submittal procedure shall be as outlined in Division 01.

B. Submit material certificates signed by the material producer and the Contractor, certifying that that each material item complies with, or exceeds the specified requirements.

1.7 QUALITY ASSURANCE

A. Conform all work and materials to the recommendations or requirements of the County Representative.

B. Conform all work to the appropriate portion(s) of Caltrans Standard Specifications, Section 17 and 19, and the appropriate sections of the California Building Code.

C. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D 1557.

D. Excavate and backfill existing areas only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations. Backfill as necessary to achieve rough grade elevations as indicated per plan.

E. Perform excavation, filling, compaction and related earthwork under the observation of the County Representative. Materials placed without approval of the County Representative will be presumed to be defective and, at the discretion of the County Representative, shall be removed and replaced at no cost to the County. Notify the County Representative at least 24-hours prior to commencement of earthwork and at least 48 hours prior to testing.

F. The County Representative will perform observations and tests required to enable him to form an opinion of the acceptability of the Project earthwork. Correct earthwork that, in the opinion of the County Representative, does not meet the requirements of these Technical Specifications.

G. Upon completion of the construction work, certify that all compacted fills and foundations are in place at the correct locations, and have been constructed in accordance with sound construction practice. In addition, certify that the materials used are of the types, quality and quantity required by these Technical Specifications. The Contractor shall be responsible for the stability of all fills and backfills constructed by his forces and shall replace portions that in the opinion of

the County Representative have been displaced or are otherwise unsatisfactory due to the Contractor's operations.

H. Do not mix or place cement treated base when the temperature is below is below 36 degrees F or when the ground is frozen.

I. Finish surface of material to be stabilized prior to lime treatment shall be as specified in Section 24-1.04 of Caltrans Standard Specifications and as required by these Technical Specifications.

J. Finish surface of the stabilized material after lime treatment shall be as specified in Section 24-1.08 of Caltrans Standard Specifications and as required by these Technical Specifications.

K. Identify and protect existing utilities.

L. Finish soil grade tolerance at completion of grading:
1. Paved areas: +0.05
2. Other areas: ±0.10 feet.

1.8 PROJECT CONDITIONS

A. Promptly notify the County and the County Representative of surface or subsurface conditions differing from those disclosed in conformance with Division 01.

B. Protect open excavations, trenches, and the like with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.

C. Prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

D. Temporarily stockpile fill material in an orderly and safe manner and in a location approved by the County.

E. Provide dust and noise control in conformance with Division 1.

F. Environmental Requirements: When unfavorable weather conditions necessitate interrupting earthwork operation, areas shall be prepared by compaction of surface and grading to avoid collection of water. Provide adequate temporary drainage to prevent erosion. After interruption, compaction specified in last layer shall be re-established before resuming work.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrowed soil materials when sufficient satisfactory soil materials are not available from on-site excavations.

B. Obtain approval of on-site soil materials and borrowed materials to be used for structural fill or structural backfill from the County Representative.

C. On-Site Structural Fill and Structural Backfill: Soil or soil-rock mixture from on site excavations, free from organic matter or other deleterious substances. On-site structural fill and backfill shall not contain rocks or rock fragments over 3 inches in greatest dimension.

D. Imported Structural Fill and Structural Backfill: Conform to the requirements of on-site structural fill. Material shall also be a non-expansive and predominantly granular soil or soil-rock mixture with plasticity index of 8 or less, has a liquid limit less than 25, and an R-Value of 25 or greater.

2.2 SOIL STERILANT

A. Commercial chemical for weed control, registered by EPA. Provide granular, liquid or wet-able powder form.

2.3 AGGREGATE BASE

A. Material: Caltrans Standard Specification Section 26.
   1. Class 2, 1-1/2-inch Maximum: Section 26-1.02A.
   2. Class 2, 3/4-inch Maximum: Section 26-1.02A.
   3. Class 3: Section 26-1.02B.

2.4 LIME STABILIZATION

A. Lime Treatment Material: Conform to Section 24-1.02 and 24-1.03 of Caltrans Standard Specifications.

PART 3 - EXECUTION

3.1 GENERAL

A. Conform to Section 19, Earthwork, Caltrans Standard Specifications as modified by the Contract Documents.

B. Placement and compaction of material by flooding, ponding, or jetting will not be permitted.

C. The use of explosives will not be permitted.

3.2 CONTROL OF WATER AND DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding the site and surrounding area. Provide dewatering equipment necessary to drain and keep excavations and site free from water.

B. Dewater during backfilling operation so that groundwater is maintained a least two feet below level of compaction effort.

C. Obtain the County Representative's approval for proposed control of water and dewatering methods.

D. Protect subgrades from softening, undermining, washout and damage by rain or water accumulation.

E. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations.

F. Maintain dewatering system in place until dewatering is no longer required.

3.3 WET WEATHER CONDITIONS

A. Do not prepare subgrade, place or compact soil materials if above optimum moisture content.

B. If the County Representative allows work to continue during wet weather conditions, conform to supplemental recommendations provided by the County Representative.

3.4 EXCAVATION

A. Excavate earth and rock to lines and grades shown on drawings as prepared by a licensed professional engineer and to the neat dimensions indicated on the Plans, required herein or as required to satisfactorily compact backfill.

B. Remove and dispose of large rocks, pieces of concrete and other obstructions encountered during excavation.

C. Where forming is required, excavate only as much material as necessary to permit placing and removing forms.

D. Provide supports, shoring and sheet piles required to support the sides of excavations or for protection of adjacent existing improvements.

3.5 REMOVAL OF EXISTING FILLS AND UNSUITABLE MATERIAL

A. Over-excavate areas of existing fills and other unsuitable material encountered during grading and as directed by the County Representative.

B. Conform with Division 01.

3.6 GRADING

A. Uniformly grade the Project to meet existing conditions.

B. Finish ditches, gutters and swales to the sections, lines and grades indicated and to permit proper surface drainage.

C. Round tops and bottoms of slopes as indicated or to blend with existing contours.

3.7 SUBGRADE PREPARATION

A. Prepare subgrades under paved areas, curbs, gutters, walks, structures, other surface facilities and areas to receive structural fill.

B. Prepare subgrades for paved areas, curbs and gutters by plowing or scarifying surface at least 9 inches in one lift below final subgrade elevations and 1-foot beyond edge of pavement unless specified otherwise by the County Representative. Uniformly moisture condition to obtain optimum moisture contents. Break clods and condition surface by harrowing or dry rolling. Remove boulders, hard ribs and solid rock. Prepare earth uniform for full depth and width of subgrade.
   1. Surface soil that has a moisture content of less than 22 percent (average, approximate plastic limit of the soil) should be excavated, moisture-conditioned to at least three percent above optimum moisture content, and compacted to between 88 and 93 percent relative compaction to reduce its expansion potential; maximum depth of required excavation for moisture conditioning is about two feet.

C. Protect utilities from damage during compaction of subgrades and until placement of final pavements or other surface facilities.

D. Obtain the County Representative's approval of subgrades prior to placing pavement.

E. Subgrade preparation will not be required in areas where lime treatment is used.

3.8 PLACEMENT OF STRUCTURAL FILL

A. Obtain the County Representative's approval of surface to receive structural fill prior to placement of structural fill material.

B. Place structural fill on prepared subgrade.

C. Spread structural fill material in uniform lifts not more than 8-inches in un-compacted thickness and compact.

D. Place structural fill material to suitable elevations above grade to provide for anticipated settlement and shrinkage.

E. Overbuild fill slopes, as required by the County Representative, to obtain required compaction. Remove excess material to lines and grades indicated.

F. Do not drop fill on structures. Do not backfill around, against or upon concrete or masonry structures until structure has attained sufficient strength to withstand loads imposed and the horizontal structural system had been installed.

3.9 TEMPORARY AND PERMANENT SLOPES

A. Temporary slopes less than 10 feet high should be inclined no steeper than 1.5:1 (horizontal to vertical).

B. Shallow, permanent, cut and fill slopes shall be constructed no steeper than 2:1 (horizontal to vertical).

3.10 AGGREGATE BASE

A. Watering, Spreading and Compacting: Section 26-1.035, 26-1.04 and 26-1.05 of Caltrans Standard Specifications.

3.11 LIME STABILIZATION

A. Performing the stabilization shall conform to Section 24-1.05, through 24-1.09 of Caltrans Standard Specifications and the following:
   1. Add lime in the amount specified by the County Representative.
   2. Lime treat subgrade soils from back of curb to back of curb to a depth specified by the County Representative.
   3. Mix in two mixing periods, both with the tines lowered to the same depth. Both mixing periods shall be monitored and verified by the County Representative. The second mixing shall occur at about 24 hours after the initial mixing.
   4. Compact and grade the lime mixed subgrade immediately after the second mixing.
   5. Compact the lime treated subgrade to 93 percent as determined by ASTM D1557.
   6. After application of the curing seal, do not allow traffic on the lime treated material for a period of 7 days in lieu of the 3 days specified in Section 24-1.03 of Caltrans Standard Specifications.

7. Proof-roll the stabilized subgrade after compacting to confirm that a non-yielding surface has been achieved. Yielding areas, if any, shall be mitigated. Mitigation could consist of over-excavation, utilization of stabilization fabric, or chemical treatment. Each case shall be addressed individually in the field by the County Representative.

3.12 COMPACTION AND TESTING

A. Do not compact by ponding, flooding or jetting.

B. Compact soils at optimum water content. Aerate material if it is too wet. Add water to material if it is too dry. Thoroughly mix lifts before compaction to ensure uniform moisture distribution.

C. Perform compaction using rollers, pneumatic or vibratory compactors or other equipment and mechanical methods approved by the County Representative.

D. Compaction requirements:
1. Compact structural fills less than 5-feet thick to 90 percent compaction.
2. Compact structural fill 5-feet thick or greater to 95 percent compaction.
3. Compact the upper 6 inches of subgrade soils beneath pavements, curbs and gutters to 95 percent compaction. Extend compaction 2-feet beyond pavement edges unless specified otherwise by the County Representative.
4. Compact the upper 6-inches of subgrade soils under walks, structures and areas to receive structural fill to 90 percent compaction.

3.13 SOIL STERILIZATION

A. Apply soil sterilant to areas indicated, such as beneath asphalt concrete pavement, brick pavement, concreter pavement and at grade concrete slabs, including sidewalks, curbs and gutters. Also where indicated apply soil sterilant below expansion and control joints and at areas where pipes, ducts or other features penetrate slabs.

B. Apply soil sterilant uniformly and at the rates recommended by the manufacturer.

C. Apply soil sterilant to prepared subgrade, or after installation of aggregate base as recommended by the manufacturer.

3.14 DISPOSAL

A. Lawfully dispose of all unsuitable and excess or surplus material off-site at no cost to the County.

END OF SECTION 31 23 00

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section describes the requirements for providing and installing temporary erosion and sedimentation control structures as specified.

1.2 SUBMITTALS

A. Follow Submittal procedure outlined in Division 01.

B. The contractor shall submit an erosion and sedimentation control plan prior to construction.

1.3 REGULATORY REQUIREMENTS:

A. California Stormwater Quality Association (CASQA) "Stormwater Best Management Practice Handbook for Construction".

B. State Water Resources Control Board (SWRCB) standards.

C. California Stormwater Quality Association "Stormwater Best Management Practice Handbook" for Construction and Industrial and Commercial Development, latest edition.

PART 2 - PRODUCTS

2.1 GENERAL

A. Furnish and install the products as specified and as required by the SWRCB required to eliminate potential erosion and sedimentation during construction works. Products which shall be installed, but are not limited to, are the following:

1. Siltation fences
2. Outlet structure, basins, ditches
3. Filter fabric, and/or mesh
4. Hydroseeding
5. Wattle and/or Gravel bags

PART 3 - EXECUTION

3.1 GENERAL

A. An Erosion and Sedimentation Control Plan in accordance with the SWRCB application will be required by the Contractor while onsite. The Contractor shall prepare erosion and sediment control plans that are site specific that show the application of BMPs.

B. Erosion and sedimentation control measures are to be installed in areas only to extent required by new construction and as indicated or as directed by governing regulations.

C. The Contractor shall provide inspection and repair of established BMP applications.

END OF SECTION 31 25 00

SECTION 32 05 23

PORTLAND CEMENT CONCRETE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Materials for Portland cement concrete.

B. Aggregate and aggregate grading for Portland cement concrete.

C. Water for Portland cement concrete.

D. Admixtures for Portland cement concrete.

E. Proportioning for Portland cement concrete.

F. Mixing and transporting Portland cement concrete.

G. Formwork for cast in place Portland cement concrete.

H. Embedded materials for Portland cement concrete.

I. Steel reinforcement for Portland cement concrete.

J. Placing and finishing Portland cement concrete.

K. Curing Portland cement concrete.

L. Protecting Portland cement concrete.

1.2 RELATED SECTIONS

A. Section 31 11 00, Clearing and Grubbing

1.3 RELATED DOCUMENTS

A. ASTM:
1. A 82, Cold Drawn Steel Wire for Concrete Reinforcement.
2. A 185, Steel Welded Wire Fabric, Plain for Concrete Reinforcement.
3. A 615, Deformed and Plain Billet Steel Bars, for Concrete Reinforcement.
4. C 94, Specification for Ready-mixed Concrete.
5. C 114, Method for Chemical Analysis of Hydraulic Cement.
6. C 150. Portland Cement.
7. C 618, Fly Ash and Raw or Calcined Natural Pozzolan for use as Natural Admixture in Portland Cement.

8. C 1751, Preformed Expansion Joint Fillers for Concrete. Paving and Structural Construction (Non-extruded and Resilient Bituminous Types).

B. Caltrans Standard Specifications:
   1. Section 51: Concrete Structures.
   2. Section 73: Concrete Curbs and Sidewalks.
   3. Section 90: Concrete.

1.4 DEFINITIONS

A. ASTM: American Society for Testing Materials

1.5 SUBMITTALS

A. Submittal procedure shall be as directed by Division 01.

B. Concrete Mix Design: Have all concrete mixes designed by a testing laboratory and approved by the County's Representative. Conform all mixes to the applicable building code requirement, regardless of other minimum requirements listed herein or on the drawings. Submit mix designs for review before use. Show proportions and specific gravities of cement, fine and coarse aggregate, and water and gradation of combined aggregates.

C. Mock Ups: To ensure consistency of the product, the Contractor shall:
   1. Obtain each color, type, and variety of concrete, aggregates, sand, joint materials, and other materials, from a single source with resources to provide products and materials of consistent quality in appearance and physical properties without delaying the Work.
   2. Prior to the installation of any Work as indicated herein this Section, the Contractor shall erect Field-Constructed Mock-up Samples for each type and pattern of concrete required. Build Field-Constructed Mock-up Samples to comply with the following requirements, using materials and same base construction including special features for expansion joints, construction joints, form work, surface finishes, textures, color(s), and contiguous work as indicated for final unit of Work. Contractor shall provide additional test panels as described herein to determine final finish:
      a. Locate Field-Constructed Mock-up Samples on the Project Site in location as approved by the Engineer.
      b. Notify the Engineer, in writing, at least one (1) week in advance of the dates and times when Field-Constructed Mock-up Samples will be erected.
      c. Demonstrate quality and range of aesthetic effects and workmanship in the Field-Constructed Mock-up Samples that will be produced in final unit of Work. Arrange mock-up samples adjacent to mock-up samples of other paving materials and finishes that will be adjacent in the final work.
      d. Obtain the Engineer's acceptance of Field-Constructed Mock-up Samples, in writing, before start of installation of Work.

e. Retain and maintain Field-Constructed Mock-up Samples during construction in an undisturbed condition as a standard for judging the completed unit of Work.
f. Each mock up paving sample within this Section shall measure a minimum of two feet (2') wide and two feet (2') long, to compare the aesthetics of material colors, textures, and finishes. The contractor shall assume 3 mock ups are necessary for the finishes specified in this Section.
g. Prior to preparation of Field-Constructed Mock-up Samples, provide a 12" x 12" sample of all colors and finishes to the County for approval.
h. Prior to the start of construction, the Contractor shall submit Material Safety Data Sheets (MSDS) for all products used on site.

1.6 QUALITY ASSURANCE

A. Concrete shall be subject to quality assurance in accordance with Section 90 of Caltrans Standard Specifications.
1. Slump tests: Have available, at job site, equipment required to perform slump tests. Make one slump test for each cylinder sample, from same concrete batch. Allowable maximum slump shall be 4 inches for walls and 3 inches for slab on grade.

B. Certifications:
1. Provide County's Representative at the time of delivery with certificates of compliance signed by both Contractor and Supplier containing the following statements:
a. Materials contained comply with the requirements of the Contract Documents in all respects.
b. Proportions and mixing comply with the design mix approved by the County's Representative. Design mix shall have been field tested in accordance with the herein requirements of the Caltrans Standard Specifications and produces the required compressive strength under like conditions.
c. Statement of type and amount of any admixtures.
2. Provide County's Representative, at time of delivery, with certified delivery ticket stating volume of concrete delivered and time of mixing, or time of load-out in case of transit mixers.

C. Conform to the applicable provisions of Section 51, 73 and 90 of the Caltrans Standard Specification and these Technical Specifications.
1. Conform construction of Portland cement concrete surface improvements (including curbs, gutters, medians, valley gutters, walks, pads) to the requirements of Section 73 of the Caltrans Standard Specifications unless otherwise required in these Technical Specifications or shown on the Plans.
2. Conform other construction of Portland cement concrete items to the requirements of Section 51 of the Caltrans Standard Specifications unless otherwise required in these Technical Specifications or shown on the Plans.

1.7 DESIGNATION

A. General: Whenever the 28-day compressive strength is designated herein or on the Plans is a 3,600psi or greater, the concrete shall considered to be designated by compressive strength. The 28-day compressive strength shown herein or on the plans which are less than a 3,600psi are shown for design information only and are not considered a requirement for acceptance of the concrete. Whenever the concrete is designated by class or as minor concrete herein or on the Plans, the concrete shall contain the cement per cubic yard shown in Section 90-1.01 of the Caltrans Standard Specifications.

B. Unless noted otherwise herein or on the Plans, the minimum compressive strength for Portland cement concrete at 28 days for this Project shall be 3,600 psi.

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT

A. General: Type II (modified) cement conforming to section 90-2.01 of the Caltrans Standard Specifications.

B. Provide a coloring equivalent to ¼ pound of lampblack per cubic yard. Add to the concrete at the central mixing plant. Liquiblack concrete colorant, or approved equal, may be used in lieu of lampblack. One pint of Liquiblack shall be considered equal to one pound of lampblack.

2.2 AGGREGATE AND AGGREGATE GRADING

A. General: Conform to the requirements of Section 90-2.02, 2.02A and 2.02B of the Caltrans Standard Specifications.

B. Aggregate Size and Gradation: Conform to the requirements of Section 90-3 of the Caltrans Standard Specifications for 1-inch maximum combined aggregate.

2.3 WATER

A. General: Conform to the requirements of section 90-2.03 of the Caltrans Standard Specifications. For mixing and curing Portland cement concrete and for washing aggregates.

2.4 EXPANSION JOINT MATERIAL

A. Material for expansion joints in Portland cement concrete improvements shall be pre-molded expansion joint fillers conforming to the requirements of ASTM Designation D 1751. Expansion joint material shall be shaped to fit the cross section of the concrete prior to being placed. Suppliers certificates showing conformance with this specification shall be delivered with each shipment of materials delivered to the job site.

Unless noted otherwise herein or on the Plans expansion joint thickness shall be as follows:

1. Curbs, Curb Ramps, Sidewalks, and Gutter Depression: ¼-inch
2. Gutter Lining, Ditch Lining and Channel Lining: ½-inch.
3. Structures: As indicated.

2.5 REINFORCEMENT AND DOWELS

A. Bar reinforcement for concrete improvements shall be deformed steel bars of the size or sizes called for on the plans conforming to the requirements of ASTM Designation A 615 for Grade 60 bars. Size and shape for bar reinforcement shall conform to the details shown or called for on the Plans. Substitution of wire mesh reinforcement for reinforcing bars will not be allowed.

B. Slip dowels, where noted or called for on the plans or detail drawings shall be smooth billet-steel bars as designated and conforming to the requirements of ASTM Designation A 615 for Grade 60 bars. Ends of bars inserted in new work shall be covered with a cardboard tube sealed with cork; no grease or oil shall be used.

C. Mesh for reinforcement for concrete improvements shall be cold drawn steel wire mesh of the size and spacing called for on the plans conforming to the requirements of ASTM Designation A 82 for the material and ASTM Designation A 185 for the mesh. Size and extent of mesh reinforcement shall conform to the details shown or called for on the plans.

D. Tie wire for reinforcement shall be eighteen (18) gauge or heavier, black, annealed conforming to the requirements of ASTM Designation A 82.

E. Suppliers certificates showing conformance with this specification shall be delivered with each shipment of materials delivered to the job site.

2.6 COLOR FOR DECORATIVE SURFACES

A. Colors for decorative surfacing shall be CHROMIX admixtures as manufactured by the L. M. Scofield Company, Schedule A-312.05 or approved equal. The specific color shall match the existing concrete paving at the adjacent slab. See Architectural Plans.

2.7 ACCESSORY MATERIALS

A. Conform water stops and other items required to be embedded in of portland cement concrete structures to the applicable requirements of Section 51 of the Caltrans Standard Specifications unless otherwise specifically noted or called for on the Plans or detail drawings.

B. Curing Compounds:
   1. Regular Portland Cement Concrete: "Non-Pigmented Curing Compound - Chlorinated Rubber Base-Clear" conforming to the requirements contained in Section 90-7.01B, of the Caltrans Standard Specifications.
   2. Color Conditioned Decorative Portland Cement Concrete: LITHOCHROME colorwax as manufactured by the L. M. Scofield Company or approved equal.

2.8 FORMS

A. Conform to the requirements of Section 51-1.05 of the Caltrans Standard Specifications.

2.9 PRECAST CONCRETE STRUCTURES

A. Conform to the following Sections of Caltrans Standard Specifications:
   1. 51-1.02, Minor Structures.
   2. 70-1.02H, Precast Concrete Structures.

PART 3 - EXECUTION

3.1 STRUCTURAL EXCAVATION

A. Structural excavation may be either by hand, or by machine and shall be neat to the line and dimension shown or called for on the plans. Excavation shall be sufficient width to provide adequate space for working therein, and comply with CAL-OSHA requirements.

B. Where an excavation has been constructed below the design grade, refill the excavation to the bottom of the excavation grade with approved material and compact in place to 95% of the maximum dry density.

C. Remove surplus excavation material remaining upon completion of the work from the job site, or condition it to optimum moisture content and compact it as fill or backfill on the site, if the material is approved by the Civil Consultant.

3.2 SOIL STERILANT

A. Furnish and apply to areas indicated in accordance with Section 31 23 00, Excavation and Fill.

3.3 BRACING AND SHORING

A. Conform to California and Federal OSHA requirements.

B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the facility being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.

C. Be solely responsible for all bracing and shoring and, if requested by the County's Representative, submit details and calculations to the County's Representative. The County's Representative may forward the submittal to the Civil Consultant, the County's Representative and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations related to the proposed facility shall precede a response to the submittal by the County's Representative.

D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the position or operation of the facility being constructed or adjacent utilities and facilities.

3.4 PLACING CONCRETE FORMS

A. Form concrete improvements with a smooth and true upper edge. Side of the form with a smooth finish shall be placed next to concrete. Construct forms rigid enough to withstand the pressure of the fresh concrete to be placed without any distortion.

B. Thoroughly clean all forms prior to placement and coat forms with approved form oil in sufficient quantity to prevent adherence of concrete prior to placing concrete.

C. Carefully set forms to the alignment and grade established and conform to the required dimensions. Rigidly hold forms in place by stakes set at satisfactory intervals. Provide sufficient clamps, spreaders and braces to insure the rigidity of the forms.

D. Provide forms for back and face of curbs, lip of gutters and edge of walks, valley gutters or other surface slabs that are equal to the full depth of the concrete as shown, noted or called for on the Plans. On curves and curb returns provide composite forms made from benders or thin planks of sufficient ply to ensure rigidity of the form.

3.5 PLACING STEEL REINFORCEMENT

A. Bars shall be free of mortar, oil, dirt, excessive mill scale and scabby rust and other coatings of any character that would destroy or reduce the bond. All bending shall be done cold, to the shapes shown on the plans. The length of lapped splices shall be as follows:
   1. Reinforcing bars No. 8, or smaller, shall be lapped at least 45 bar diameters of the smaller bar joined, and reinforced bars Nos. 9, 10, and 11 shall be lapped at least 60 bar diameters of the smaller bars joined, except when otherwise shown on the plans.
   2. Splice locations shall be made as indicated on the plans.

B. Accurately place reinforcement as shown on the plans and hold firmly and securely in position by wiring at intersections and splices, and by providing precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, and other approved

devices of sufficient strength to resist crushing under applied loads. Provide supports and ties of such strength and density to permit walking on reinforcing without undue displacement.

C. Place reinforcing to provide the following minimum concrete cover:
   1. Surfaces exposed to water: 4-inches.
   2. Surfaces poured against earth: 3-inches.
   3. Formed surfaces exposed to earth or weather: 2-inches.
   4. Slabs, walls, not exposed to weather or earth: 1-inch.

D. Minimum spacing, center of parallel bars shall be two and one half (2-1/2) times the diameter of the larger sized bar. Accurately tie reinforcing securely in place prior to pouring concrete. Placing of dowels or other reinforcing in the wet concrete is not permitted.

3.6 MIXING AND TRANSPORTING PORTLAND CEMENT CONCRETE

A. Transit mix concrete in accordance with the requirements of ASTM Designation C 94. Transit mix for not less than ten (10) minutes total, not less than three (3) minutes of which shall be on the site just prior to pouring. Mix continuous with no interruptions from the time the truck is filled until the time it is emptied. Place concrete within one hour of the time water is first added unless authorized otherwise by the County's Representative.

B. Do not hand mix concrete for use in concrete structures

3.7 PLACING PORTLAND CEMENT CONCRETE

A. Thoroughly wet subgrade when concrete is placed directly on soil. Remove all standing water prior to placing concrete.

B. Do not place concrete until the subgrade and the forms have been approved.

C. Convey concrete from mixer to final location as rapidly as possible by methods that prevent separation of the ingredients. Deposit concrete as nearly as possible in final position to avoid re-handling.

D. Place and solidify concrete in forms without segregation by means of mechanical vibration or by other means as approved by the County's Representative. Continue vibration until the material is sufficiently consolidated and absent of all voids without causing segregation of material. The use of vibrators for extensive shifting of fresh concrete will not be permitted.

E. Concrete in certain locations may be pumped into place upon prior approval by the County's Representative. When this procedure requires redesign of the mix, such redesign shall be submitted for approval in the same manner as herein specified for approval of design mixes.

3.8 PLACING ACCESSORY MATERIALS

A. Place water stops and other items required to be embedded in of Portland cement concrete structures at locations shown or required in accordance with Section 51 of the Caltrans Standard Specifications unless otherwise specifically noted or called for on the Plans.

B. Curing Compounds:
   1. Regular Portland Cement Concrete: Apply "Non-Pigmented Curing Compound - chlorinated Rubber Base-Clear" in accordance with Section 90-7.01B, 7.01D and 7.03 of the Caltrans Standard Specifications.
   2. Color Conditioned Decorative Portland Cement Concrete: Apply LITHOCHROME colorwax, or approved equal, in accordance with the manufacturer's instructions.

3.9 EXPANSION JOINTS

A. Construct expansion joints incorporating pre-molded joint fillers at twenty (20) foot intervals in all concrete curbs, gutters, sidewalks, median/island paving, valley gutters, driveway approaches and at the ends of all returns. At each expansion joint install one-half inch by twelve inch (1/2" x 12") smooth slip dowels in the positions shown or noted on the detail drawings.

B. Orient slip dowels at right angles to the expansion joint and hold firmly in place during the construction process by means of appropriate chairs.

3.10 WEAKENED PLANE JOINTS

A. Construct weakened plane joints in concrete curbs, gutters, sidewalks, median/island paving and valley gutters between expansion joints at ten (10) foot intervals throughout, or as otherwise indicated. Depth of joint score depth to be one-fourth (25%) the thickness of the concrete.
   1. Grooved Joints: Form weakened plane joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8-inch. Repeat grooving of weakened plane joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
   2. Sawed Joints: Form weakened plane joints with power saws equipped with shatterproof abrasive or diamond-rimed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade or otherwise damage surface and before concrete develops random contraction cracks.

3.11 FORM REMOVAL

A. Remove forms without damage to the concrete. Remove all shores and braces below the ground surface, before backfilling.

B. Do not backfill against concrete until the concrete has developed sufficient strength to prevent damage.

C. Leave forms for cast-in-place walls in place at least 72 hours after pouring.

D. Leave edge forms in place at least 24 hours after pouring.

3.12 CONSTRUCTION

A. Form, place and finish concrete curbs, walkways, valley gutters in conformance with the applicable requirements of Section 73-1.04, 73-1.05, 72-1.05A and 73-1.06 of the Caltrans Standard Specifications as modified herein.

B. Finish:
   1. Provide the following finishes to all horizontal surfaces as shown on the Architectural Plans:
      a. Medium broom.
      b. Medium exposed aggregate.

C. Construct new concrete curb, curb and gutter and valley gutters against existing asphalt concrete by removing a minimum of 12-inches of the asphalt concrete to allow placement of curb or gutter forms. Patch pavement with a 6-inch deep lift of asphalt concrete after gutter form is removed.

D. Where monolithic curb, gutter and sidewalk is specified, separate concrete pours will not be allowed.

3.13 CONNECTING TO EXISTING CONCRETE IMPROVEMENTS

A. New curb, gutter, or sidewalk is to connect to existing improvements to remain by saw cutting to existing sound concrete at the nearest score line, expansion joint or control joint. Drill and insert ½-inch diameter by 12-inch long dowels at 24-inches on center into existing improvements. Install pre-molded expansion joint filler at the matching joint.

B. A cold joint to the existing curb is not acceptable.

3.14 DECORATIVE AND NON-DECORATIVE SURFACING CONSTRUCTION

A. Decorative (colored) surfacing concrete walks or other installations shall be formed and placed as a concrete slab conforming to the details shown or noted on the Architectural Plans.

B. Color and finish shall match the existing concrete at the adjacent concrete paving.

3.15 FIELD QUALITY CONTROL

A. Finish subgrade for concrete improvements shall be subject to approval prior to placement of forms.

B. No concrete shall be placed prior to approval of forms.

C. Concrete improvements constructed shall not contain areas that pond water and shall be smooth and ridge free.

D. Conform the finish grade at top of curb, flow line of gutter, and the finish cross section of concrete improvements to the design grades and cross sections.

E. Variation of concrete improvements from design grade and cross section as shown or called for on the plans shall not exceed the tolerances established in Sections 73-1.05 and/or 73-1.06 of the Caltrans Standard Specifications or the maximum limits noted on the plans.

F. Method of measuring slope shall be determined with a 2’ (24”) digital smart level.

3.16 RESTORATION OF EXISTING IMPROVEMENTS

A. Replace in kind all pavement or other improvements removed or damaged due to the installation of concrete improvements.

B. Remove, landscaping or plantings damaged or disturbed due to the installation of concrete improvements. Replace in kind.

END OF SECTION 32 05 23

SECTION 32 11 32

AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Aggregate base.

B. Lime stabilization.

1.2 RELATED SECTIONS

A. Section 32 12 16, Asphalt Paving.

B. Section 32 05 23, Portland Cement Concrete

1.3 RELATED DOCUMENTS

A. Caltrans Standard Specifications:
   1. Section 24, Lime Stabilization.
   2. Section 26, Aggregate Bases.

B. ASTM:
   1. D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.

1.4 DEFINITIONS

A. ASTM: American Society for Testing Materials.

1.5 SUBMITTALS

A. Submittal procedure shall be as outlined in Division 01.

B. Submit material certificates signed by the material producer and the Contractor, certifying that that each material item complies with, or exceeds the specified requirements.

1.6 QUALITY ASSURANCE

A. Conform to these Specifications and Section 19 of Caltrans Standard Specifications.

B. Finish surface of the prepared subgrade to receive aggregate base, shall be as specified in Section 31 23 00.

C. Finish surface of material to be stabilized prior to lime treatment shall be as specified in Section 24-1.04 of Caltrans Standard Specifications.

D. Finish surface of the stabilized material after lime treatment shall be as specified in Section 24-1.08 of Caltrans Standard Specifications.

E. Do not project the finish surface of aggregate base above the design subgrade.

F. Finish surface of aggregate base shall be 0 to - 0.05-feet.

G. Finish surface of cement treated base shall be as specified in Section 27 of Caltrans Standard Specifications.

H. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM Designation D1557.

PART 2 - PRODUCTS

2.1 FILL MATERIAL

A. If fill material is required to restore the previously constructed subgrade to its proper elevation, provide structural fill material specified in Section 31 23 00.

2.2 AGGREGATE BASE

A. Material: Caltrans Standard Specification Section 26.
   1. Class 2, 3/4-inch Maximum: Section 26-1.02A.

2.3 LIME STABILIZATION

A. Lime Treatment Material per Geotechnical recommendation and field investigation if required.

PART 3 - EXECUTION

3.1 SOIL STERILANT

A. Furnish and apply to areas indicated in accordance with Section 31 23 00.

3.2 AGGREGATE BASE

A. Watering, Spreading and Compacting: Section 26-1.035, 26-1.04 and 26-1.05 of Caltrans Standard Specifications.

3.3 LIME STABILIZATION

A. Performing the stabilization shall conform with Geotechnical recommendation

END OF SECTION 32 11 32

SECTION 33 41 00

STORM DRAINAGE SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Provide and install all appurtenances as necessary to complete the storm drainage system, as shown on the plans, including trench drains and flexible joints.

1.2 RELATED SECTIONS

A. Section 32 05 23 -Portland Cement Concrete

1.3 RELATED DOCUMENTS

A. ASTM:
1. A615/A615M: Deformed and Billet-Steel Bars for Concrete Reinforcement.
2. C 1173: Flexible Transition Couplings for Underground Piping Systems.
3. D 1785: Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
4. D 2564: Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
5. D 3034: Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
6. F 477: Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
7. F 656: Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC)Plastic Pipe and Fittings.
8. F-1336: Poly(Vinyl Chloride) (PVC) Gasket Sewer Fittings.

1.4 DEFINITIONS

A. AASHTO: American Association of State Highway and Transportation Officials.

B. ASTM: American Society for Testing Materials.

C. NPS: Nominal pipe size.

D. PVC: Polyvinyl chloride.

1.5 SUBMITTALS

A. Submittal procedure shall be as outlined in Division 01.

B. Product Data Shop Drawings, etc. for the following:
1. Piping materials and fittings.
2. Joint sealants.

3. Stainless steel grates.

C. Design Mix Reports and Calculations: For each class of cast in place concrete.

D. Field Test Reports: Indicate and interpret test results for compliance with performance.

1.6 DELIVERY, STORAGE AND HANDLING

A. Do not store plastic structures, pipe and fittings in direct sunlight.

B. Protect pipe, fittings, and seals from dirt and damage.

C. Handle precast concrete pipe, manholes and other precast structures according to manufacturer's written instructions.

D. Protect imported bedding and backfill material from contamination by other materials.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS FOR GRAVITY FLOW

A. PVC Pipe and Fittings: Pipes 12" and smaller in diameter shall be SDR 35 PVC conforming to ASTM D3034 using elastomeric gasket joint in a bell and spigot assembly system or as shown on plans. Minimum 1 foot cover, maximum 15 feet cover.
   1. Fittings: Shall conform to ASTM F 1336.
   2. Joint Gasket: Shall conform to elastomeric seal, ASTM F 477.
   3. Trench Drains
   4. Modular system of concrete channel sections, grates, and appurtenances; designed so grates fit into channel recesses without rocking or rattling. Include number of units required to form total length required.
   5. Include the following components:
      a. Channel Sections: Interlocking-joint, precast modular units with end caps. Inside width as indicated with deep, rounded bottom, with built in slope or flat invert as indicated and outlets in number, sizes, and locations indicated. Include extension sections necessary for required depth.
      b. Frame and Grate: Stainless Steel
   6. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.
   7. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
      a. "Dura Slope" by NDS
      b. "Polydrain" by ABT Inc. (Troutman, NC) (Tel 704-528-9806).

c. "ACO Drain" by ACO Polymer Products Inc. (Chardon, OH) (Tel. 800-543-4764).

B. Frames, Grates and Covers for Inlets: Caltrans Standard Specification Section 75-1.02, 75-1.03 and 75-1.05.
1. Stainless steel frames, grates and covers.
2. Grates and covers shall be non-rocking.
3. Grates shall conform to Accessibility requirements and be heel proof.
4. Rate for AASHTO H20.

2.2 SPECIAL PIPE COUPLINGS

A. Gravity Piping: ASTM C 1173. Rubber or elastomeric sleeve and band assembly fabricated to match outside diameters of pipes to be joined.

PART 3 - EXECUTION

3.1 GRAVITY PIPE INSTALLATION

A. Construct all storm drainage utilities to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations.

B. Install pipe, fittings, and appurtenances utilizing best practices, manufacturer's instructions, and in accordance with Section 6 and 7 of ASTM D 2321 for plastic pipe, Caltrans Standard Specification Section 65-1.07 for reinforced concrete pipe, and chapter 11.3.3 of AWWA M41 for cast iron and ductile iron pipe.

C. Pipe Depth and Trench Configuration: Conform to typical trench section(s) indicated.

D. Handling: Carefully handle during loading, hauling, unloading and placing operations to avoid breakage or damage. Use strap type slings for lifting and placing; no chains or hooks will be permitted. Comply with manufacturer's recommendations.

E. Laying: Before lowering pipe into the trench, remove all stakes, debris, loose rock and other hard materials from the bottom of the trench. Lay accurately in conformance with lines and grades indicated. Start laying the pipeline at the low end and proceed upstream. Lay bell and spigot pipe with the bell end facing upstream. Lay pipe on a bed prepared by handwork, dug true to grade. Furnish firm bearing for pipe throughout it's entire length with bell holes provided at the ends of each pipe length of sufficient size to permit making up the particular type of joint being used. Adjust pipe to line and grade by scraping away or filling and tamping material under the body of the pipe for the entire pipe length and not by blocking or wedging. After final positioning, hold pipe in place in trench with

backfill material placed equally on both sides of the pipe at as many locations as required to hold the pipe section in place.

F. Curved Alignment: When necessary to conform to the alignment specifically indicated, lay pipe on a curved alignment by means of asymmetrical closure of joints or bending of the pipe barrel. Use shorter lengths of pipe than the standard length if necessary to achieve curvature specified. Do not exceed the recommendations of the pipe manufacture for deflections at the joints or pipe bending.

G. Closure: Close open ends of pipes and appurtenance openings at the end of each days work or when work is not in progress.

3.2 SPECIAL PIPE COUPLINGS

A. General: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.

B. Installation: Manufacturer's instructions.

3.3 INSTALLATION OF MODIFIED DRAIN INLET

A. Poured in Place Structures: Install as indicated and Caltrans Standard Specification Section 51.
   1. Pour new top section as shown on the plans.
   2. Shape bottoms to convey flows as indicated.

3.4 TRENCH DRAIN INSTALLATION

A. Install: As indicated and in accordance with the manufacturer's instructions.

3.5 TRENCHING AND EXCAVATION

A. Excavation Depth for Bedding: Minimum of 4-inches below bottom of pipe or as otherwise allowed or required by the District's Representative, except that bedding is not required for nominal pipe diameters of 2-inches or less.

B. Comply with the District limitations on the amount of trench that is opened or partially opened at any one time. Do not leave trenches open overnight without the approval of the District.

C. Where forming is required, excavate only as much material as necessary to permit placing and removal of forms.

D. Bottoms of trenches will be subject to testing by District. Correct deficiencies as directed by the District.

E. Grade bottom of trench to provide uniform thickness of bedding material and to provide uniform bearing and support for pipe along entire length. Remove stones to avoid point bearing.

3.6 CLEANUP

A. Upon completion of utility earthwork all lines, inlets, and other structures shall be thoroughly cleaned of dirt, rubbish, debris and obstructions of any kind to the satisfaction of the County.

3.7 TESTING

A. General: Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours advance notice.
   4. Submit separate reports for each test.
   5. Where authorities having jurisdiction do not have published procedures, perform tests in accordance with latest edition of the Uniform Plumbing Code (UPC) Section 1109.0, Testing.
   6. Leaks and loss in test pressure constitute defects that must be repaired.
   7. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

B. Storm Drain Pipe and Trench Drain:
   1. Storm drain pipe and trench drain, shall be hydrostatically joint tested, (air test is not to be used), in the field for water-tightness in accordance with ASTM Standard C 1103.
   2. Perform test after pipe is bedded but prior to any backfill.
   3. Testing may be done by manufacturing pipe with double gasket joints, or by utilizing a joint tester. Contractor shall obtain the County's Representative's approval of details of the Contractor's selected method prior to performing the testing.
   4. Inspect all joints for leakage.

3.8 DISPOSAL

A. Lawfully dispose of all unsuitable and excess or surplus material off-site at no cost to the County.

3.9 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

A. Construction Waste shall be managed in accordance with provisions of Standard Construction Waste Management and Disposal Practices. Documentation shall be submitted to satisfy the requirements of that section.

END OF SECTION 33 41 00