SECTION 14- SPECIAL PROVISIONS, SUBSECTIONS 14-30 THROUGH 14-49 AND VARIOUS PLAN SHEETS

14-1 through 14-29 Not Included

14-30 Trash Collector, Connector Pipe Screen

14-31 City of Fremont Tree Well

14-32 Filterra Tree Well

14-33 Silva Cell System Tree Well

14-34 WetlandMod System with Curb Inlet

14-35 Rainwater Harvesting System

14-36 Pavers

14-37 Permeable Articulating Concrete Blocks

14-38 Anti-Graffiti Coating

14-39 Geotextile

14-40 Geomembrane Liner

14-41 Pavement Structural Section

14-42 Class 2 Permeable Material

14-43 Decomposed Granite

14-44 Modify Downspout

14-45 Porous Asphalt Pavement

14-46 Pervious Concrete Pavement

14-47 Asphalt Concrete

14-48 Aggregate Base

14-49 Bioretention Soil

14-50 and following – Not included

PLAN SHEETS INCLUDED

L-01 through L-04	Site Plan
X-01	Typical Section
G-01 through G-03	Grading Plan
D-01	Storm Drainage Plans
C-01 through C-13	Construction Details
LS-01 through LS-05	Planting

Payment for BOLLARD shall be paid at the contract unit price bid for BOLLARD, as set forth on the BIDDING SHEET.

The price bid per BOLLARD shall include full compensation for furnishing all labor, materials (including bollard, reinforcement, Portland cement concrete, etc.), tools, equipment, and incidentals, and for doing all the work involved in installing the bollard, complete in place, (including excavation, backfill, placing concrete and reinforcement, furnishing and installing the bollards, as shown on the Plans, and as specified in these Special Provisions, and as directed by the Engineer.

14.30 TRASH COLLECTOR CONNECTOR PIPE SCREEN

GENERAL

Summary

Trash collector connector pipe screen shall conform to these specifications, as shown on the plans, and as directed by the Engineer.

Submittals

The Contractor shall submit the manufacturer's warranty to the Engineer prior to installation of the connector pipe screen.

MATERIALS

The trash collector connector pipe screen shall be the Stormtek Model ST3-G or an approved equivalent with the dimensions shown on the plans. The following components are included in the unit:

1. Mounting Frame – The mounting frame can be made of coated or stainless steel. Frame members are made from two (2)-inch flat bars with a minimum thickness of three-sixteenth (3/16) inch. Mounting frame members are welded.

2. Insert Screen – The insert screen is made of heavy-gage sheet metal with five (5)-millimeter openings. Total openings constitute fifty (50) percent of the screen surface. The top four (4) inches of the screen is grated with bars spaced at two (2) inches on center. Insert screens are welded onto structural support frames.

3. Insert Top Cover – The insert top cover is made of heavy-gage sheet metal screen with five (5)-millimeter openings and one (1)-inch. support frames.

4. Support Members – The structural support members for the screen and top cover are made of coated or stainless steel. Members are made from one (1)-inch flat bars with a minimum thickness of one-eighth (1/8) inch. Structural support frame members are welded.

The approved manufacturer for the trash collector connector pipe screen is:

1. **StormTek**
   4190 Mission Blvd.
   Montclair, CA 91763
   (424) 443-3119
   www.stormtekcps.com
   Contact: Octavio Lugo
   octavio@stormtekcps.com

Anchor bolts

Anchor bolts shall be HILTI expansion anchors.

DESCRIPTION OF WORK

The Contractor shall install the trash collector connector pipe screen at the outlet pipe of the Alameda County SD-411, Type I inlet as shown on the plans, as specified herein, and as directed by the Engineer.

Delivery

The typical lead time for the connector pipe screen is one (1) week.

Installation

The Contractor shall ensure that the inlet where the connector pipe screen is to be installed is clear of debris and foreign materials.

The Contractor shall ensure that installation will comply with all applicable OSHA requirements.

The Contractor shall install the mounting frame as follows:

1. Anchor the mounting frame with the anchor bolts onto the catch basin wall at all four corners around the outlet pipe opening.

The Contractor shall install the inserts as follows:

1. Install the insert screen and insert top cover vertically onto the mounting frame directly in front of the outlet pipe opening.

2. The insert is completely removable by lifting it off the mounting frame.

MEASUREMENT

Trash collector connector pipe screen will be measured for payment by each unit based on the actual number of units shown on the plans.

PAYMENT

Payment for trash collector connector pipe screen shall be deemed included in the price paid per each unit for **Trash Collector Connector Pipe Screen**, as set forth on the BIDDING SHEET.

The contract price bid per each unit for **Trash Collector Connector Pipe Screen** shall include full compensation for furnishing all labor, materials (including anchor bolts, stainless steel mounting frames, screen cover and mounting hinges), tools, equipment, and incidentals, and for doing all the work involved installing the connector pipe screen (including furnishing and installing connector pipe screen, installing anchor bolts, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

14.31 CITY OF FREMONT TREE WELL

GENERAL

Furnishing and installing the City of Fremont tree well shall conform to these specifications, as shown on the plans, and as directed by the Engineer.

MATERIALS

Tree Grate

The tree grate shall be Neenah R-8707, sixty inches by sixty inches (60 inches by 60 inches) with thirty-inch by sixty-inch (30-inch by 60-inch) extensions, as shown on the plans.

Trash Capture Inlet

Trash capture inlet shall be City of Fremont standard trash capture device (LSD-31) for a subsurface stormwater facility (Option #1 in LSD-31).

Plastic Pipe

Four (4) inch perforated plastic pipe shall conform to the requirements in Section 14.25 "PERFORATED PLASTIC PIPE," of these special provisions.

Four (4) inch plastic pipe shall conform to the requirements in Section 14.23, "PLASTIC PIPE," of these special provisions.

Plastic Pipe Cleanout

Four (4)-inch plastic pipe cleanout shall conform to the requirements in Section 14.24, "PLASTIC PIPE CLEANOUT," of these special provisions.

Permeable Material

Permeable material shall conform to the requirements in Section 14.42, "CLASS 2 PERMEABLE MATERIAL," of these special provisions.

Pea Gravel

Pea gravel (naturally rounded) must be clean, washed, dry density of not less than ninety-five (95) pounds per cubic foot, free from clay or organic material, and must comply with the following grading as determined by California Test 202:

Sieve or Screen Size	Percent Passing
¾ inch	100
½ inch	90 - 100
3/8 inch	40 - 70
No. 4	0 - 15
No. 8	0 - 3

Pea gravel must comply with the following requirements:

Test	California Test No.	Test Requirements
Durability Index	229	35 minutes

Bioretention Soil

Bioretention soil shall conform to the requirements in Section 14.49, "BIORETENTION SOIL," of these special provisions.

Concrete

Concrete for PCC-thickened edge of tree well shall conform to the requirements in Section 14.50, "MINOR CONCRETE," of these special provisions.

DESCRIPTION OF WORK

Subgrade Preparation

The Contractor shall prepare the subgrade in accordance with Section 14.20, "EARTHWORK," of these special provisions. The Contractor shall follow the excavation limits as shown on the plans and shall not excavate the three-foot by three-and-one-half-foot (3-foot x 3½-foot) subgrade section within the limits of the tree planting.

Installation

The Contractor shall install the permeable material, perforated plastic pipe underdrain, and plastic pipe cleanouts as follows:

1. Install and lightly compact the first two (2) inches of permeable material.
2. Place the four (4)-inch perforated plastic pipe underdrain.
3. Install the four (4)-inch plastic pipe cleanouts. Install caps on top of each riser flush with grade.
4. Install and lightly compact the remaining four (4) inches of the first six (6)-inch lift of permeable material.
5. Install and lightly compact the second six (6)-inch lift of permeable material.

The Contractor shall install the trash capture inlet in accordance with the City of Fremont LSD-31.

The Contractor shall install the bioretention soil as follows:

1. Install and lightly compact the bioretention soil in lifts greater than ten (10) inches but that do not exceed sixteen (16) inches. Do not compact bioretention soil to greater than eighty-five (85) percent.

The Contractor shall install the permeable material and distribution system as follows:

1. Install and lightly compact a four (4)-inch lift of permeable material.
2. Install the four (4)-inch perforated plastic pipe distribution system with the perforations down and four (4)-inch plastic pipe cleanouts.
3. Install and lightly compact the remaining eight (8) inches of the twelve (12)-inch lift of permeable material.

The Contractor shall install the irrigation system:

1. Install the irrigation system as shown on the plans and as described in Section 14.57, "IRRIGATION."

The Contractor shall install the tree:

1. Install the tree as shown on the planting plans and as described in Section 14.56, "LANDSCAPE."

The Contractor shall install the pea gravel, frame, and tree grate as follows:

1. Fill the remaining volume with pea gravel.
2. Add the tree grate with anchor rod into the frame.

MEASUREMENT

Tree Well (City of Fremont Mod) and trash capture inlet (City of Fremont LSD-31) will be measured for payment per each unit installed as shown on the plans.

Pea gravel will be measured for payment by the cubic yard based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for City of Fremont Tree Well and Trash Capture Inlet shall be deemed included in the price bid per each unit for **Tree Well (City of Fremont Mod)** and **Trash Capture Inlet (City of Fremont LSD-31)** as set forth on the BIDDING SHEET.

The contract price paid per each unit for **Tree Well (City of Fremont Mod)** shall include full compensation for furnishing all labor, materials (including tree frames and grates with anchor rods, 4" perforated plastic pipe underdrain, 4" perforated plastic pipe distribution pipe, fabric bag, cleanouts, and connection of pipes and fittings, silicone sealant and grout, etc.; excluding tree, pea gravel, Class 2 permeable material, bioretention soil mix, mulch, geomembrane liner)), tools, equipment, and incidentals, and for doing all the work involved in constructing the tree well (including structure excavation, compaction, conforming to the adjacent sidewalk and curb, installing the tree frames and grates (including embedment), disposal of all resulting materials, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit price paid per each unit for **Trash Capture Inlet (City of Fremont LSD-31)** shall include full compensation for furnishing all labor, materials (including matching frame and grate, bar reinforcing steel, miscellaneous iron and steel, form work, bolts, joint seals, waterstops, grout, and mortar, etc.), tools, equipment, and incidentals, and for doing all the work involved in furnishing and constructing the storm drain inlet (including structure excavation, subgrade preparation, structure backfill, compaction, , connecting to new or existing facilities,

disposal of all resulting materials, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payment for furnishing and installing pea gravel, shall be deemed included in the price bid per cubic yard for Pea Gravel, as set forth on the BIDDING SHEET.

The contract unit price paid per cubic yard for **Pea Gravel** shall include full compensation for furnishing all labor, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing pea gravel, including disposal of all resulting materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

14.32 FILTERRA TREE WELL

GENERAL

Furnishing and installing the Filterra tree well shall conform to these specifications, as shown on the plans, and as directed by the Engineer.

MATERIALS

Filterra Tree Well

The precast concrete tree well shall be a four-foot by four-foot (4-foot x 4-foot) Filterra concrete vault by Contech, or an approved equal, with the following components:

1. Biofiltration Media – Engineered biofiltration media shall consist of a proprietary blend of a specified gradation of washed aggregate and organic material homogeneously blended under strict quality-controlled conditions. The biofiltration media shall be delivered installed in the vault (see #6 below), unless otherwise agreed upon with the Manufacturer.

2. Underdrain – PVC underdrain piping shall be SDR35 with perforation pattern. Underdrain stone shall be of size and shape to provide adequate bridging between the media and stone for the prevention of migration of fine particles.

3. Mulch – Mulch shall be double-shredded wood or bark mulch approved for use with the Filterra Unit.

4. Tree – The tree shall comply with the type and size required by the approved plans and shall be alive and free of obvious signs of disease.

5. Tree Grate – Tree grates shall be three-foot by three-foot (3-foot x 3-foot) cast iron and the tree grate frame shall be galvanized steel.

6. Precast Concrete Vault – Precast concrete vault shall conform to the requirements in ASTM C857 and C858.

The approved manufacturer for the Filterra tree well is:

1. Contech Engineered Solutions, LLC
   9025 Centre Pointe Drive
   West Chester, OH 45069
   (800) 338-1122
   Contact: John Lewis, (925) 292-0666, JLewis@conteches.com

Aggregate Subbase

Aggregate subbase material will meet the requirements specified for ASTM No. 57 in Section 14.41, "PAVEMENT STRUCTURAL SECTION," in these special provisions. The base material shall be a six (6)-inch-minimum layer.

Concrete

Concrete shall have an unconfined compressive strength at twenty-eight (28 days) of at least three-thousand (3,000) pounds per square inch, with three-fourths (¾)-inch round rock, and a four (4)-inch slump maximum. The concrete shall be placed within ninety (90) minutes of initial mixing.

Silicone Sealant

Silicone sealant shall be pure RTV silicone conforming to Federal Specification Number TT S001543A or TT S00230C or approved equal.

Grout

Grout shall be non-shrink grout meeting the requirements of U.S. Army Corps of Engineers CRD-C588. Specimens shall be molded, cured, and tested in accordance with ASTM C-109 and shall have minimum compressive strength of 6,200 pounds per square inch. Grout shall not exhibit visible bleeding.

DESCRIPTION OF WORK

Preconstruction

The typical lead time for the Filterra tree well is four (4) to six (6) weeks.

Prior to the start of the installation of the Filterra tree well, the Contractor shall arrange a pre-construction meeting at the site the manufacturer's representative and the Engineer to review the layout, procedures, means, and methods.

Subbase

The Contractor shall install the ASTM No. 57 permeable material in a single lift and compact it to achieve a six (6)-inch layer of material, compacted to at least ninety-five (95) percent of the

maximum dry density as determined by the standard Proctor compaction test, ASTM D698, at moisture content of +/- two (2) percent of optimum water content.

Installation

The Contractor shall install the unit as follows:

1. Set the precast vault on the layer of aggregate material.
2. Attach inlet and outlet pipes to couplers or grout in and connect to precast concrete vault as shown on plans. Ensure that all connections are water tight.
3. Keep all throat and grate protection covers in place until the system is activated.
4. Cast-in-place throat inlet to convey stormwater into bioretention system as shown on plans.

Biofiltration Media

The Contractor shall take appropriate action to protect the biofiltration media from sediment and other debris during construction. The method ultimately selected shall be at Contractor's discretion and Contractor's risk. If the media is shipped separately from the vault, the Manufacturer or a Manufacturer's certified representative shall install the media into the vault or be present to supervise installation in order to ensure proper installation.

Activation

The bioretention system shall not be placed in operation (activated) until the project site is clean and stabilized (construction erosion control measures no longer required). The project site includes any surface that contributes storm drainage to the system. All impermeable surfaces shall be clean and free of dirt and debris. All catch basins, manholes, and pipes shall be free of dirt and sediment.

The Contractor shall complete and return the Activation Checklist paperwork to the Manufacturer. The Manufacturer's representative shall then place the Filterra tree well into activation, authorizing installation of the mulch, tree, and any other vegetation as specified on the plans, by the Manufacturer or authorized supplier.

MEASUREMENT

Filterra Tree Well will be measured for payment by each unit based on the number of Filterra Tree Wells shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for the Filterra Tree Well shall be deemed included in the price bid per each unit for Tree Well (Filterra), as set forth on the BIDDING SHEET.

The contract price paid per each unit for **Tree Well (Filterra)** shall include full compensation for furnishing all labor, materials (including tree well frames and grates, silicone sealant and grout, galvanized angle nose, dowels, biofiltration media, energy dissipation rocks etc.; excluding tree, stone subbase, ASTM No. 57 permeable material, mulch, geomembrane liner), tools, equipment, and incidentals, and for doing all the work involved in installing the tree well (including structure excavation, subgrade preparation, structure backfill, compaction, disposal of all resulting material), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

14.33 SILVA CELL SYSTEM TREE WELL

GENERAL

Summary

Furnishing and installing the Silva Cell system shall conform to these specifications, as shown on the plans, and as directed by the Engineer.

Submittals

The Contractor shall submit documentation to the Engineer demonstrating the qualifications of the Silva Cell installer sufficient to demonstrate that the installer meets the following requirements:

1. The installer must provide a list of completed projects of similar scope and scale or related products (i.e. underground piping, chamber and vault structures, planting soils and planter drainage systems, etc.) demonstrating capabilities and experience.

2. The installer is required to maintain an experienced, full-time supervisor on-site when work is in progress. This person shall be identified during the pre-installation meeting, with appropriate contact information provided, as necessary. The same supervisor shall be utilized throughout the project, unless a substitution is submitted to and approved by the Engineer.

3. The installer and the field supervisor shall have a minimum of five (5) years successful experience with construction of similar scope or related products and materials in dense urban areas.

The Contractor shall also submit the manufacturer's product warranty.

MATERIALS

Silva Cell System

Each Silva Cell frame shall include the base, deck, and posts as shown on the plans. The Silva Cell system shall include all contiguous Silva Cell frame components listed below used to

construct the full Silva Cell system (14 Silva Cell frames) for the tree well as shown on the plans and as directed by the Engineer.

The manufacturer for the Silva Cells is the following or an approved equivalent:

1. DeepRoot Partners, L.P. (Deep Root)
   530 Washington Street,
   San Francisco, CA 94111
   (415) 781-9700
   www.deeproot.com
   Rachel Roberts, Project Manager, (415) 746-1553

The approved manufacturer shall have the following qualifications:

1. A manufacturer whose product is manufactured in an ISO/TS 16949 compliant and ISO 9001 – 2008 registered factory.
2. A manufacturer with not less than 100 Silva Cell systems or equivalent in-place, each system in use for no less than 3 years, confirming durability and longevity of the system.
3. A manufacturer with documented written approval of their product for use as a stormwater treatment device by a minimum of 3 governmental jurisdictions.
4. A manufacturer with an established and demonstrated utility service and repair process, including written procedure and photographs demonstrating work.

Silva Cells are manufactured, fiberglass-reinforced, polypropylene structures, including frames and deck, designed to support sidewalk loads. They are designed to be filled with soil for the purpose of growing trees and providing rainwater filtering, detention, and retention. The Silva Cell system shall consist of the components in the following table:

Silva Cell System Components	Height (inches)	Width (inches)	Length (inches)
Frames	30.9	24	48
Deck (including manufactured installed galvanized steel tubes)	2	24	48
Strongbacks*	6	24	48
Deck Screws (manufacturer-supplied stainless steel screws to attach decks to frames)	--	--	--

*Silva Cell strongbacks are modified Silva Cell frame units designed to stiffen and align the frames as bioretention soil and backfill materials are placed. Strongbacks are removed prior to placing decks and are to be reused as the work progresses.

Anchoring Spikes

Spiral, galvanized timber spikes shall be used as anchoring spikes; spikes shall be ten (10) inches in length with a nineteen/sixty-fourths (19/64)-inch-diameter.

Geomembrane Liner

The geomembrane liner shall conform to the requirements specified in Section 14.40, "GEOMEMBRANE LINER," in these special provisions.

Plastic Pipe

Four (4)-inch plastic pipe shall conform to the requirements in Section 14.23, "PLASTIC PIPE," of these special provisions.

Four (4)-inch perforated plastic pipe shall conform to the requirements in Section 14.25, "PERFORATED PLASTIC PIPE," of these special provisions.

Plastic Pipe Cleanout

Four (4)-inch plastic pipe cleanout shall conform to the requirements in Section 14.24, "PLASTIC PIPE CLEANOUT," of these special provisions.

Geogrid

Geogrid shall be uniaxial or biaxial; made of woven, polyester fabric with PVC coating; inert to biological degradation; and resistant to naturally occurring chemicals, alkalis, and acids.

The geogrid shall have the characteristics in the following table:

Characteristic	Measurement	Test Method
Tensile strength at ultimate	1850 pounds/foot minimum	ASTM D6637
Creep reduced strength	1000 pounds/foot minimum	ASTM D5262
Long term allowable design load	950 pounds/foot minimum	GRI GG-4
Grid aperture size (MD)	0.8 inch minimum	n/a
Grid aperture size (CD)	1.28 inch maximum	n/a
Roll size	6-foot width preferred, up to 18 feet	n/a

The approved manufacturers for the Geogrid are:

1. For geogrid model Stratagrid SG 150:

Strata
Cumming, GA
www.geogrid.com

2. For geogrid model Miragrid 2XT (Distributed by Geosynthetic Systems in Ontario)
   TenCate Nicolon
   Norcross, GA
   www.tencate.com

3. For geogrid model Fortrac 35 Geogrid
   Huesker
   Charlotte, NC
   www.huesker.com

Geotextile

Geotextile shall conform to the requirements in Section 14.39, "GEOTEXTILE," of these special provisions.

Eco-Flex Rubber Flooring Tiles

The Eco-Flex rubber Flooring Tiles shall be compliant with the Americans with Disabilities Act (ADA) and meet the following requirements for the 4'X5' Sidewalk Block:

Characteristic	Measurement
Dimensions	48 inch width, 60 inch length, and 2 inch depth
Materials	100% recycled tires, urethane resin binder, and colorant
Color	Grey

The manufacturer for the Eco-Flex 4'X5' Sidewalk Block shall be as follows or an approved equivalent:

Eco-Flex Recycled Rubber Solutions
Champagne Edition Inc.
57425 RGE RD 253
Sturgeon County, AB TOG 1L1
866-326-3539 or 780-961-3229
www.Eco-flex.com

Contact: Kelsey Bolle, kelsey@eco-flex.com

Edge Restraints

The Edge Restraints shall meet the following requirements:

Characteristic	Measurement	Test Method
Dimensions	1.8 inch wall height, 2.75 inch tab depth, and 6 foot length	n/a
Materials	Vinyl	n/a
Color	Black	n/a

The anchor spikes for the edge restraints shall have a one-half (1/2)-inch diameter and be eight (8)-inches long.

The manufacturer for the edge restraint and anchoring spike shall be as follows or an approved equivalent:

ProFlex, Dimex LLC
28305 State Route 7
Marietta, OH 45750
1 (800) 334-3776
www.proflex.edgepro.com

Aggregate Subbase

Aggregate subbase shall conform to the requirements for ASTM No. 57 in Section 14.41, "PAVEMENT STRUCTURAL SECTION," of these special provisions.

Aggregate Bedding Course

The aggregate bedding course shall conform to the requirements for ASTM No. 8 in Section 14.41, "PAVEMENT STRUCTURAL SECTION," of these special provisions.

Permeable Material

Permeable material shall conform to the requirements in Section 14.42, "CLASS 2 PERMEABLE MATERIAL," of these special provisions.

Bioretention Soil

Bioretention Soil shall conform to the requirements in Section 14.49, "BIORETENTION SOIL," of these specifications.

Backfill Material

Backfill material shall be native soil, clear of debris and foreign materials, and of suitable material to achieve the ninety-five (95) percent Standard Proctor compaction.

Concrete

Concrete for 6" PCC Curb shall meet the requirements in Section 14.50, "MINOR CONCRETE," of these special provisions.

DESCRIPTION OF WORK

Preconstruction

The Contractor shall order all materials in advance for installation of the Silva Cell system. Note that lead times for the Silva Cells manufactured by Deep Root or approved equivalent can be as long as four (4) to six (6) weeks.

Prior to the start of Silva Cell installation, the Contractor shall arrange a preconstruction meeting at the site with the Contractor, Engineer, and installer to review the layout, procedures, means, and methods. The preconstruction meeting will also consist of the following:

1. Provide at least 72 hours advance notice to participants prior to convening pre-installation meeting.
2. Introduce and provide a roster of individuals in attendance with contact information.
3. The pre-installation meeting agenda will include, but is not limited to the review of:
    a. Required submittals both completed and yet to be completed.
    b. The sequence of installation and the construction schedule.
    c. Coordination with other trades.
    d. Details, materials, and methods of installation.
        i. Review requirements for substrate conditions, special details, if any, installation procedures.
        ii. Installation layout, procedures, means, and methods.
    e. Sequencing and Scheduling

Prior to the start of work, the limits of excavation and horizontal and vertical control points will be laid out and staked by the District sufficiently to install the Silva Cells and required drainage features in the correct locations.

Excavation

Excavation shall conform to Section 14.16, "ASPHALT CONCRETE REMOVAL," and 14.20, "EARTHWORK," of these special provisions.

The width and length of the excavation shall be a minimum of six (6) inches in all directions beyond the edges of the Silva Cells.

Subgrade Preparation

The Contractor shall compact the soil subgrade to a minimum of ninety-five (95) percent of maximum dry density at optimum moisture content in accordance with ASTM D 698 Standard Proctor Method.

The Contractor shall proof compact the subgrade with a minimum of three passes of a suitable vibrating compacting machine, or apply other compaction forces as needed to achieve the required subgrade compaction rate. Additional compaction forces shall be applied at optimum water levels.

Installation

The Contractor shall install the geotextile over the compacted subgrade as follows:

1. Where indicated on the plans, install geotextile over compacted subgrade in accordance with Section 14.39, "GEOTEXTILE," herein.

2. Ensure the geotextile is installed with a minimum joint overlap of eighteen (18) inches between sections of material and that the geotextile is laid flat with no folds or creases.

The Contractor shall install the geomembrane liner as follows:

1. Install the geomembrane liner at the locations shown on the plans in accordance with the manufacturer's instructions.

The Contractor shall install the aggregate subbase as follows:

1. Install the 4" aggregate subbase as shown on the plans; the subbase will be under the first layer of Silva Cell frames and shall extend a minimum of six (6) inches beyond the edge of the Silva Cell frames.

2. Compact aggregate subbase layer to a minimum of ninety-five (95) percent of maximum dry density at optimum moisture content in accordance with ASTM D 698 Standard Proctor Method. Compact the subgrade with a minimum of three (3) passes of a suitable vibrating compacting machine or apply other compaction forces as needed to achieve the required subgrade compaction rate.

3. Ensure that the maximum slope on the surface of the subbase shall does not exceed five (5) percent.

4. Obtain approval from the Engineer on the grade and elevations of the subbase prior to proceeding with the installation of the Silva Cells.

The Contractor shall install the Silva Cell frames as follows:

1. Identify the outline layout of the structure and the edges of paving around tree planting areas on the floor of the excavation, using spray paint or chalk line.

2. Lay out the first layer of Silva Cell frames on the subbase. Verify that the layout is consistent with the required locations and dimensions of paving edges to be constructed over the Silva Cells.

3. Check each Silva Cell frame unit for damage prior to placing in the excavation. Any cracked or chipped unit shall be rejected.

4. Place frames no less than one (1) inch and no more than four (4) inches apart at base as shown on the plans.

5. Assure that each frame sits solidly on the surface of the subbase. Frames shall not rock or bend over any stone or other obstruction protruding above the surface of the subbase material. Frames shall not bend into dips in the subbase material. The maximum tolerance for deviations in the plane of the subbase material under the bottom of the horizontal beams of each Silva Cell frame shall be one-quarter (1/4) inch per four (4) feet.

6. Adjust subbase material, including larger pieces of aggregate, under each frame to provide a solid base of support.

7. Anchor each Silva Cell into the subbase with four anchoring spikes, driven through the molded holes in the Cell frame base. The purpose of the anchoring system is to maintain cell spacing and layout during the installation of planting soil and backfill.

8. Install the second layer of Silva Cell frames on top of the first layer. Register each frame on top of the lower frame post. Rotate each frame registration arrow in the opposite direction from the frame below to assure that connector tabs firmly connect. Each frame shall be solidly seated on the one below. Comply with manufacturer's requirements to correctly register and connect the Silva Cell frames together.

9. Build layers as stacks of frames set one directly over the other. Do not set any frame half on one Silva Cell frame and half on an adjacent frame.

The Contractor shall install the Silva Cell strongbacks as follows:

1. Install strongbacks on top of the Silva Cell frames prior to installing bioretention soil and backfill. Strongbacks are required only during the installation and compaction of the planting soil and backfill.

2. Move strongbacks as the work progresses across the installation.

3. Remove strongbacks prior to the installation of Silva Cell decks.

The Contractor shall install the geogrid as follows:

1. Where shown on the plans, place the geogrid curtain along the outside of the limit of the Silva Cell frames. Geogrid curtains are required between the edge of the Silva Cells and any soils to be compacted to support paving beyond the area of Silva Cells. Do not place

geogrid curtains between the edge of the Silva Cells and the planting area adjacent to the Silva Cells.

2. Pre-cut the geogrid to allow for a minimum of six (6) inches underlapping below the backfill material and a minimum of twelve (12) inches overlapping the top of the Silva Cells.

3. Where the Silva Cell layout causes a change in direction in the plane of the geogrid, slice the top and bottom flaps of the material so that it lies flat on the top of the cell deck and aggregate base coarse along both planes.

4. Provide a minimum twelve (12) inches of overlap between different sheets of geogrid.

5. Place the geogrid in the space between the Silva Cell frames and the sides of the excavation. Attach the geogrid to the Silva Cell frames using three-sixteenth by fourteen (3/16-inch x 14-inch) zip ties. Attach with zip ties at every cell and at the cell deck.

The Contractor shall install the plastic pipe cleanouts as follows:

1. Install the plastic pipe cleanout as shown on the plans. The Cleanout should be rigid at level of pavement section.

2. Brace the cleanout for the remainder of installation to secure its location and elevation.

3. Install caps on top of each cleanout flush with grade as shown on the plans.

The Contractor shall install permeable material, bioretention soil, and backfill material as shown on the plans. The process of installation requires that these materials be installed and compacted together in several alternating operations to achieve correct compaction relationships within the system, as follows:

1. Install backfill material in alternating lifts with the permeable material or bioretention soil inside the Silva Cells.

2. Install and lightly compact the permeable material within the Silva Cell frames to the elevations shown on the plans.

3. Install and lightly compact the bioretention soil within the Silva Cell frames in alternating lifts that are at least ten (10) inches and that do not exceed sixteen (16) inches to the elevations shown on the plans. Do not compact greater than eighty (80) percent of maximum dry density. Check the soil compaction with a penetrometer or densitometer to achieve similar compaction levels throughout the Silva Cell system. If the bioretention soil becomes overly compacted, remove the soil and reinstall. Use hand tools or other equipment that does not damage the Silva Cell frames.

4. Install and compact backfill material at the locations shown on the plans in alternating lifts that do not exceed eight (8) inches. Compact backfill material to ninety-five (95) percent of maximum dry density using a powered mechanical compactor if backfill is

installed under the concrete sidewalk. Compact backfill material to ninety (90) percent of maximum dry density as shown on the plans and as directed by the Engineer using a powered mechanical compactor if backfill is installed under the Eco-Flex 4'X5' Sidewalk Block. Use a pneumatic compacting tool or narrow-foot, jumping jack compactor for spaces less than twelve (12) inches wide and a twelve (12)-inch wide jumping jack compactor or larger equipment in wider spaces.

5. Maintain the geogrid curtain between the Silva Cell frames and the backfill material.

6. Do not walk directly on horizontal beams of the frames.

7. Work soil under the horizontal frame beams of the second level of Silva Cell frames and between columns, eliminating air pockets and voids.

8. Ensure that the bioretention soil level is not more than one (1) inch below the bottom of the Silva Cell deck when installed.

9. Remove the strongbacks.

The Contractor shall install the irrigation system as follows:

1. Install the irrigation system as shown on the plans in accordance with Section 14.57, "IRRIGATION," of these specifications and as directed by the Engineer.

The Contractor shall install the Silva Cell deck as follows:

1. Clean dirt from the tops of the Silva Cell frame columns.

2. Install the Silva Cell decks over the top of each frame stack.

3. Register the deck and make connections as recommended by the manufacturer to secure the deck to the top of the Silva Cell frame. Secure each deck at the four corners with screw fasteners as recommended by the manufacturer. Assure that each deck is seated firmly on the frame top with all connectors attached.

4. Install and compact remaining backfill material such that the soil outside the limits of the Silva Cells is flush with the top of the installed deck.

5. Overlap geogrid from the sides of the Silva Cells over the top of the Silva Cell decks, with a minimum twelve (12) inches of overlap.

The Contractor shall install the geotextile as follows:

1. Place geotextile over the top of the deck and where indicated on the plans, extending beyond the outside edge of the excavation by at least eighteen (18) inches. Any joints must be overlapped by a minimum of eighteen (18) inches.

2. In the event that any geotextile that is over subgrades or the Silva Cell decks must be cut during or after installation, repair the seam with a second piece of geotextile that overlaps the edges of the cut by a minimum of twelve (12) inches in all directions prior to adding aggregate material.

The Contractor shall install the six (6)-inch concrete curb as follows:

1. Provide a concrete cut-off wall as shown on the plans at the edge of the Silva Cell deck to retain the aggregate base coarse material.

The Contractor shall install the pavement structural section and Eco-Flex rubber flooring tiles as follows:

1. Install the ASTM No. 57 aggregate subbase over the geotextile immediately after completing the installation of the geotextile. Work the aggregate from one side of the deck to the other to assure that the fabric and aggregate conform to the cell deck contours. Do not apply aggregate in several positions at the same time.

2. Install the ASTM No. 8 bedding layer to the grade and elevations shown on the plans.

3. Load the aggregate from equipment that is outside the limits of the excavated area. Work over material already in place.

4. Compact aggregate in lifts that do not exceed six (6) inches, to ninety-five (95) percent of maximum dry density. Utilize a roller or plate compactor with a maximum weight of one-thousand (1,000) pounds. Make sufficient passes with the compacting equipment to attain the required compaction.

5. Trim the rubber flooring tiles as needed to fit the sidewalk extents. Place and interlock the rubber flooring tiles as shown on the plans and secure the tiles with the edge restraints and anchoring spikes as shown on the plans.

The Contractor shall install the planted area as follows:

1. Prior to planting, install additional bioretention soil, as shown on the plans, within the opening adjacent to paving supported by Silva Cells.

2. Remove all rubble, debris, dust, and silt from the top of the bioretention soil that may have accumulated after the initial installation of the bioretention soil within the Silva Cells.

3. Assure that the bioretention soil under the planting location is compacted for the entire soil depth to eighty-five to ninety (85 to 90) percent to prevent settlement of the tree root ball.

4. Refer to Section 14.556, "LANDSCAPE," herein, and the planting plans for planting instructions.

5. Cover the bioretention soil finished grade with mulch in accordance with Section 14.56 "LANDSCAPE," herein.

Protection

The Contractor shall ensure that all construction equipment is kept away from the limits of the Silva Cells until the final surface materials are in place. No vehicles or equipment shall drive directly on the Silva Cell deck or aggregate base course. The Contractor shall provide fencing and other barriers to keep construction equipment and vehicles from entering into the area with Silva Cell-supported sidewalk.

The Contractor shall maintain a minimum of four (4) inches of aggregate base coarse over the geotextile material during construction.

When vehicles must cross Silva Cells that do not have final paving surfaces installed, construction mats shall be used that are designed to distribute vehicle loads to levels that would be expected at the deck surface once final paving has been installed. Only low-impact track vehicles with a maximum surface pressure under the vehicle of four (4) pounds per square inch shall be used on top of the mats over Silva Cells prior to the installation of final surface.

Clean Up

The Contractor shall perform cleanup during the installation of work and upon completion of the work. The site shall be kept free of debris and foreign materials. The Contractor shall remove all excess soil materials, debris, and equipment from the site, and repair any damage to adjacent materials and surfaces resulting from installation of this work.

MEASUREMENT

The Silva Cell system and four (4)-inch plastic pipe cleanouts will be measured for payment by each unit based on the amount shown on the plans, adjusted by the amount of any change ordered by the Engineer.

Four (4)-inch perforated plastic pipe and six (6)-inch PCC curb will be measured for payment by the linear foot based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

Geogrid, geotextile, geomembrane liner, and Eco-Flex rubber flooring tiles will be measured for payment by the square foot based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

Aggregate subbase, permeable material, bioretention soil, and bedding layer will be measured for payment by the cubic yard based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for the Silva Cell System shall be deemed included in the price bid per each unit for Silva Cell System, as set forth on the BIDDING SHEET.

The contract price paid per each unit for **Silva Cell System**, shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing the Silva Cell system including the anchoring spikes, excavation, subgrade preparation, backfill, delivery, storage, disposal of all resulting materials, and protecting the final product from damage during construction, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, and no additional payment will be made therefor.

Payment for perforated plastic pipe shall be deemed included in the price bid per linear foot for 4" Perforated Plastic Pipe, as set forth on the BIDDING SHEET.

The contract unit price paid per linear foot for **4" Perforated Plastic Pipe** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing perforated plastic pipe, including disposal of all resulting materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, and no additional payment will be made therefor.

Payment for six (6)-inch PCC curb shall be deemed included in the price bid per linear foot for Minor Concrete (6" PCC Curb), as set forth on the BIDDING SHEET.

The contract price paid per linear foot for **Minor Concrete (6" PCC Curb)** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing concrete curb, complete in place including weakened plane joints, expansion joints, bar reinforcing steel, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, and no additional compensation will be made therefor.

Payment for plastic pipe cleanouts shall be deemed included in the price bid per each unit for 4" Plastic Pipe Cleanout, as set forth on the BIDDING SHEET.

The contract unit price paid per each unit for **4" Plastic Pipe Cleanout** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing plastic pipe cleanout, including disposal of all resulting materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, and no additional payment will be made therefor.

Payment for geomembrane liner, geogrid, and geotextile shall be deemed included in the price bid per square foot for Geomembrane Liner, Geogrid, and Geotextile, as set forth on the BIDDING SHEET.

The contract unit price paid per square foot for **Geomembrane Liner**, **Geogrid**, and **Geotextile** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing geomembrane liner, geogrid, and geotextile, including disposal of all resulting materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, and no additional payment will be made therefor.

Payment for Eco-Flex rubber flooring tiles shall be deemed included in the price bid per square foot for Eco-Flex Rubber Flooring Tiles, as set forth on the BIDDING SHEET.

The contract unit price paid per square foot for **Eco-Flex Rubber Flooring Tiles** shall include full compensation for furnishing all labor, materials (including edge restraints and anchoring spikes), tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the rubber flooring tiles, including trimming, installing edge restraints and anchoring spikes, and disposal of all resulting materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, and no additional payment will be made therefor.

Payment for aggregate subbase, permeable material, bioretention soil, and bedding layer shall be deemed included in the price bid per cubic yard for Permeable Material (ASTM No. 57), Class 2 Permeable Material, Bioretention Soil, and Bedding Layer (ASTM No. 8) as set forth on the BIDDING SHEET.

The contract unit price paid per cubic yard for **Permeable Material (ASTM No. 57)**, **Class 2 Permeable Material**, **Bioretention Soil**, and **Bedding Layer (ASTM No. 8)** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing permeable material (ASTM No. 57), class 2 permeable material, and bioretention soil, including disposal of all resulting materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, and no additional payment will be made therefor.

14.34 WETLANDMOD SYSTEM WITH CURB INLET

GENERAL

Summary

Furnishing and installing the WetlandMOD system with curb inlet shall conform to these specifications, as shown on the plans, and as directed by the Engineer.

Submittals

The Contractor will submit the manufacturer's certification that precast concrete WetlandMOD system has met applicable ASTM standards and the manufacturer's warranty to the Engineer prior to installation.

MATERIALS

WetlandMOD System

The WetlandMOD system shall consist of the following materials:

1. WetlandMOD System Model #MWS-4-29 Standard Height Curb Type
2. Thirty (30)-inch-diameter Parkway Rated Manhole Frame and Cover
3. Pre-filter Screen in the Pretreatment Chamber
4. Precast Concrete Structure
5. Bioretention soil media, which shall conform to the requirements in Section 14.49, "BIORETENTION SOIL," herein.
6. Irrigation shall be installed as shown on the irrigation plans and as described in Section 14.57, "IRRIGATION." The planting layer shall be installed as shown on the planting plans and as described in Section 14.56, "LANDSCAPE." A minimum 3" grow enhancement media shall be installed per the manufacturer.

Activation

The bioretention system shall not be placed in operation (activated) until the project site is fully stabilized (full landscaping, final paving, and street sweeping completed). Activation shall be performed by Bio Clean personnel.

The approved manufacturer for the WetlandMOD System is BioClean Environmental or an approved equal:

1. BioClean Environmental
   398 Via El Centro
   Oceanside, CA 92058
   (760) 433-7640
   www.biocleanenvironmental.com
   Contact: William Harris
   (760) 433-7640
   william.harris@forterrabp.com

Aggregate Subbase

Aggregate subbase shall conform to the requirements for ASTM No. 57 in Section 14.41, "PAVEMENT STRUCTURAL SECTION," herein.

Minor Concrete

Portland cement concrete required to create the gutter for the curb inlet shall conform to Section 14.50, "MINOR CONCRETE," herein.

DESCRIPTION OF WORK

Delivery

The lead time for the WetlandMOD system can be as long as nine (9) to eleven (11) weeks.

Modular Wetland Systems, Inc., shall deliver the unit to the site in coordination with the Contractor. The Contractor shall use spreader bars and chains/cables to safely and securely lift the main structure, risers, a set of suitable lifting hooks, knuckles, shackles, and eye bolts. The main structure and lid can be lifted together or separately.

Inspection

The County may inspect the WetlandMOD system prior to shipment at the Sacramento manufacturing facility.

The Contractor shall inspect the WetlandMOD system and all parts contained in or shipped outside of the unit at the time of delivery by the Contractor. Any non-conformance to approved drawings or damage to any part of the system shall be documented on the Modular Wetland Systems, Inc. shipping ticket. Damage to the unit during and after unloading shall be corrected at the expense of the Contractor. Any necessary repairs to the Modular Wetland unit shall be made to the acceptance of the Engineer.

Site Preparation

The Contractor shall adhere to all jurisdictional and/or OSHA safety rules in providing temporary shoring of the excavation. See Section 14.21, "TRENCH AND EXCAVATION PROTECTION," herein.

Installation

The Contractor shall install the Wetland MOD system as follows:

1. Install the system at the location and elevation shown on the plans and as directed by the Engineer.

2. Place the system on the sub-grade compacted to ninety-five (95) percent with a minimum six (6)-inch aggregate subbase matching the final grade of the curb line in the area of the unit. The unit is to be placed such that the unit and top slab match the grade of the curb in the area of the unit. Compact undisturbed sub-grade materials to ninety-five (95) percent of maximum density at plus one-to-two (+1 to 2) percent of the optimum moisture.

3. Once the unit is set, the internal wooden forms and protective silt fabric cover must be left intact (if bioretention media is pre-installed). The top lid(s) should be sealed onto the box section before backfilling, using a non-shrink grout, butyl rubber, or similar waterproof seal. The boards on the top of the lid and boards sealed in the unit's throat must NOT be removed. The Manufacturer/Supplier will remove these sections at the time of activation.

4. Align and seal the outlet connections to meet the approved plans with modifications necessary to meet site conditions and local regulations. The correct outlet will be marked on the WetlandMOD system by the manufacturer.

5. The Contractor shall take care when backfilling. The appropriate fill material shall be brought up in six (6)-inch lifts on all sides. Precast sections shall be set in a manner that will result in a watertight joint. In all instances, installation of the WetlandMOD system shall conform to ASTM Specification C891, "Standard Practice for Installation of Underground Precast Utility Structures," unless specified otherwise in contract documents.

Protection

The Contractor shall provide adequate and complete site/inlet protection when the Modular Wetland unit is installed prior to final site stabilization (full landscaping, grass cover, final paving, and street sweeping completed). The Contractor shall appropriately barricade the Modular Wetland unit from foot traffic after installation prior to final site stabilization.

MEASUREMENT

The WetlandMOD system will be measured for payment by each unit based on the actual number of WetlandMOD systems shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for the WetlandMOD system shall be deemed included in the price bid per each WetlandMOD System (with Curb Inlet), as set forth on the BIDDING SHEET.

The contract price bid per each for **WetlandMOD System (with Curb Inlet)** shall include full compensation for furnishing all labor, materials (including precast unit, bar reinforcement, 30" diameter manhole frame and cover, pre-filter screen, throat protection device, threaded rebar inserts, 2" perforated plastic pipe underdrain, cleanouts, vertical underdrain manifolds, etc.; excluding ASTM No. 57 subbase, bioretention soil mix), tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the WetlandMOD system (including delivery, storage and installation, structure excavation, subgrade preparation, structure backfill, compaction, installation of irrigation holes and pipe connections, installation of the curb inlet, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, and no additional payment will be made therefor.

14.35 RAINWATER HARVESTING SYSTEM

GENERAL

Summary

The rainwater harvesting system shall conform to these specifications, as shown on the plans and as directed by the Engineer.

Submittals

The Contractor shall submit manufacturer's drawing and warranty for the rainwater harvesting system to the Engineer for review and approval prior to ordering of the product.

MATERIALS

Stainless Steel Tank

The stainless steel tank for the rainwater harvesting system shall be constructed of 20 gauge, Grade 304 stainless steel with mechanical joints, and shall be constructed for above-ground water storage at atmospheric pressure, 8.33 pounds per gallon. The tank shall not serve as structural support. The piping to and from the tank shall have proper support. The tank shall be corrosion resistant. The joints are sealed with NSF-61 potable water rated elastomer. The tank shall meet the California Plumbing Code Chapter 17 requirements for Non-potable Rainwater Catchment Systems.

The tank shall be furnished with a removable, child-proof lid for clean out and inspection. The lid shall not be rated for structural support and shall not bear weight. The lid shall be secured with stainless steel roofing screws.

The tank shall be furnished with an outlet fitting and an overflow fitting at the locations shown on the plans and as directed by the Engineer.

Tank Components	Component Description
Tank	The stainless steel tank shall have the following dimensions: Diameter: 6 feet Tank Height: 5'-8" Roof Height: 1'-7"
Overflow Connection	The tank shall be equipped with a bulkhead fitting for a four (4)-inch pipe connection to the tank overflow system.
Outlet	The tank shall be equipped with a 1¼" outlet and drain bulkhead fitting for connection to a hose.
Inlet	The tank inlet shall be equipped with a filtration system for a four (4)-inch inflow pipe connection.

The approved manufacturers for the stainless steel tank are as follows or an approved equivalent:

Metal Rain Tanks, LLC
PO Box 21534
Houston TX 77226
(832) 630-9556
metalraintanks@gmail.com

Anchor Brackets and Bolts

Anchor bolts shall be three-fourths (3/4)-inch diameter by eight (8)-inch Grade 304 stainless steel threaded rod in six (6)-inch deep hole (4 total).

Anchor brackets shall be 1/8" thick (12 gauge minimum) Grade 304 stainless steel and shall be installed by the manufacturer prior to shipping to the project site.

Anchor Straps

Anchor straps to brace the overflow pipe to the tank shall be four (4)-inch Grade 304 stainless steel two hole conduit straps. Anchor bolts for conduit straps to be stainless steel.

Three (3)-way Valve

Three (3)-way Valve shall be schedule 40 PVC and fit four (4)-inch diameter plastic pipe at the three connections.

Plastic Pipe

The plastic pipe shall meet the requirements in Section 14.23, "PLASTIC PIPE," of these special provisions.

Streambed Cobbles

The concrete foundation for the tank shall meet the requirements in Section 14.51, "STREAMBED COBBLES," of these special provisions.

Concrete Foundation

The concrete foundation for the tank shall meet the requirements in Section 14.50, "MINOR CONCRETE," of these special provisions.

DESCRIPTION OF WORK

Delivery

The lead time for the corrugate steel tank can be as long as six (6) to eight (8) weeks.

All tanks over 500 gallons must be transported in the upright position.

Installation

Install as shown on the plans and as directed by the manufacturer and Engineer.

Construct the concrete footing:

1. Construct the concrete footing and reinforcement to the dimensions and elevations shown on the plans in accordance with Section 14.50, "MINOR CONCRETE."

Install the tank:

1. Lift the tank on the concrete footing as shown on the plans.
2. Anchor the tank to threaded dowels in the concrete footing using the anchor brackets and bolts.

Modify the downspout:

1. Modify the downspout in accordance with Section 14.44, "MODIFY DOWNSPOUT," and as shown on the plans.

Connect the piping to the tank:

1. Connect the 4" plastic piping for overflow to the tank flange connection as shown on the plans.
2. Connect the 4" plastic piping from the three-way valve into the pipe flashing inflow connection on the tank roof as shown on the plans.

Install the downspout overflow system:

1. Connect the 4" plastic pipe for the downspout overflow system to the three-way valve as shown on the plans.

Install the streambed cobbles at the locations shown on the plans.

MEASUREMENT

The rainwater harvesting system will be measured for payment by each unit based on the actual number of rainwater harvesting system shown on the plans adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for the rainwater harvesting system shall be deemed included in the price bid per each unit for **Rainwater Harvesting System (with connections)**, as set forth on the BIDDING SHEET.

The contract price bid per each unit for **Rainwater Harvesting System (with connections)** shall include full compensation for furnishing all labor, materials (including stainless steel tank, anchor brackets and bolts, anchor straps, filter screen, spigot, overflow pipe; pipe adaptors, three (3)-way ball valve, etc.; excluding concrete, bar reinforcement, streambed cobbles)), tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the rainwater harvesting system (including freight and delivery fees, temporary storage and installation, excavation for concrete foundation, subgrade preparation, installation of pipe connections, and connection of the downspout to the tank, and disposal of all resulting materials, etc.), as specified in the Standard Specifications and these special provisions, as shown on the plans and as directed by the Engineer.

14.36 PAVERS

GENERAL

Summary

Concrete pervious pavers, concrete permeable pavers, and aggregate pervious pavers shall conform to the specifications in the American Society of Civil Engineers' Standards for Permeable Pavements, these special provisions, as shown on the plans, and as directed by the Engineer.

Submittals

The Contractor shall submit the manufacturer's certification that pavers have met the applicable ASTM standards and the manufacturer's warranty to the Engineer prior to installation.

The Contractor will submit to the Engineer the installers' certifications, including:

1. Current Interlocking Concrete Pavement Institute (ICPI) certificate requirements.

2. Record of completion for at least one person for a current ICPI Permeable Interlocking Concrete Pavement (PICP) Installer Specialist Course. This person must be on-site to function as project foreman for the installation crew during installation.

MATERIALS

Pavers

All pavers shall be pre-manufactured as an assembly of pavers with the following characteristics:

1. Meet the requirements of ASTM C936, including:
    a. Exposed face area of ≤ 101 square inches
    b. Average compressive strength not less than 8,000 pounds per square inch with no individual unit less than 7,200 pounds per square inch.

2. Have the following physical characteristics:
    a. Concrete Pervious Paver dimensions:
        i. Length: 8 inches
        ii. Width: 4 inches
        iii. Height: 3-1/8 inches
    b. Concrete Permeable Pavers dimensions:
        i. Length: 8 inches
        ii. Width: 4 inches
        iii. Height: 3-1/8 inches
    c. Aggregate Pervious Pavers dimensions:
        i. Length: 9 inches

ii. Width: 4½ inches
iii. Height: 2-3/8 inches

3. Meet the following dimensional tolerance:
   a. Measured length or width shall not differ by more than ±0.063 inches from specified dimensions.
   b. Measured height shall not differ by more than ±0.125 inches from the specified dimensions.

The following are approved paver products and manufacturers:

1. The approved product for the Concrete Pervious Pavers is "HYDRO-FLO," Holland 80 millimeter, or an approved equal.

   Pacific Interlock Pavingstone
   1495 S Winchester Blvd
   San Jose, CA 95128
   Phone: (408) 379-1436

2. The approved product for Concrete Permeable Pavers is "Basalite," Permeable Mission 80 millimeter in the Positano color, or an approved equal.

   Stoneyard Masonry – Bay Point
   805 Port Chicago Hwy
   Bay Point, CA 94565
   Phone: (925) 458-8100

3. The approved product for Aggregate Pervious Pavers is "Xeripave," XeriBrix 60 millimeter in the Dupont color, or an approved equal.

   Diamond K Supply
   3671 Mt. Diablo Blvd
   Lafayette, CA 94549
   Phone: (925) 284-4477
   Contact: Gary Luiz, (844) 799-3777, gary@xeripave.com

The Engineer reserves the right to change the specified color of the respective pavers during the submittal review process, provided that the colors are available from the respective paver manufacturers. Any additional material costs resulting from changing the color selection will be paid by force account.

Filler Material

The material for the filler material shall conform to the requirements for ASTM No. 9 specified in Section 14.41, "PAVEMENT STRUCTURAL SECTION," herein.

Aggregate Bedding Coarse

The material for the bedding coarse shall conform to the requirements for ASTM No. 8 specified in Section 14.41, "PAVEMENT STRUCTURAL SECTION," herein.

Base

The material for the base shall conform to the requirements for ASTM No. 57 specified in Section 14.41, "PAVEMENT STRUCTURAL SECTION," herein.

Subbase

The material for the subbase shall conform to the requirements for ASTM No. 2 specified in Section 14.41, "PAVEMENT STRUCTURAL SECTION," herein.

Perforated Plastic Pipe

Four (4)-inch perforated plastic pipe shall conform to the requirements in Section 14.25, "PERFORATED PLASTIC PIPE," herein.

Plastic Pipe Cleanout

Four (4)-inch plastic pipe cleanout shall conform to the requirements in Section 14.24 "PLASTIC PIPE CLEANOUT," herein.

Geomembrane Liner

The material for the geomembrane liner shall conform to the requirements specified in Section 14.40, "GEOMEMBRANE LINER," herein.

DESCRIPTION OF WORK

The Contractor shall install the pavers as specified by the Manufacturer or Supplier, as shown on the plans, as specified herein, and as directed by the Engineer.

Delivery

The typical lead times for the pavers are:

1. Two and one-half (2½) weeks for the HYDR-FLO concrete pervious pavers.
2. Less than two (2) weeks for the Basalite concrete permeable pavers.
3. Four (4) weeks for the XeriBrix aggregate pervious pavers.

The Contractor shall coordinate delivery and installation schedule to minimize interference with normal use of buildings adjacent to paving. The pavers shall be delivered in manufacturer's original, unopened, undamaged container packaging with identification tags intact on each paver bundle. The pavers shall be delivered to the site in steel-banded, plastic-banded, or plastic-wrapped cubes capable of transfer by forklift or clamp lift. The Contractor shall ensure that the pavers are unloaded at job site in such a manner that no damage occurs to the product or existing construction.

The Contractor shall stockpile filler, bedding, base, and subbase materials such that they are free from standing water, uniformly graded, free of any organic material or sediment, debris, and ready for placement. Materials shall be stored in a protected area such that they are kept free from mud, dirt, and other foreign materials.

The Contractor shall keep areas where pavement is to be constructed free from sediment during entire job. Filler, bedding, base, and subbase materials contaminated with sediment shall be removed and replaced with clean materials.

Excavation and Subgrade

1. The existing subgrade shall NOT be compacted or subject to construction equipment traffic prior to geotextile and pavement structural section installation. Excavators shall be used from adjacent locations to excavate the subgrade. Only low ground pressure equipment, with less than four (< 4) pounds per square inch, is acceptable in the bed areas when excavation is within one (1) vertical foot of the final subgrade elevation. Where operation of equipment on subgrade is unavoidable and compaction occurs, the subgrade area shall be scarified or tilled to no less than eight (8) inches with a York rake, light tractor, or other means.

2. If additional backfill material is required to meet subgrade grading and elevation requirements, compact the backfilled soil to a minimum ninety-two (92) percent standard Proctor density. Do not over compact.

3. Verify that subgrade is dry, uniform, even, free of any debris or foreign materials, and ready to support imposed loads.

4. Verify that gradients and elevations of the subgrade are correct. Fill and re-grade any areas damaged by erosion, ponding, or traffic compaction before placing the geomembrane liner and subbase.

5. Obtain approval of the subgrade from the Engineer before proceeding.

Installation

The Contractor shall prepare for installation as follows:

1. Prior to applications of the subbase material, remove any excess thickness of soil applied over the excavated soil subgrade used to trap sediment from adjacent construction activities.

2. Verify location, type, installation, and elevations of drainage pipes around the perimeter of the area to be paved.

3. Ensure that the channel invert and side slopes are free of tree roots, projecting stones, or any other obstructions.

4. Ensure that pavers are free from foreign materials before installation.

5. Do not install in rain.

6. Do not install frozen bedding materials.

7. Do not proceed with installation of geomembrane liner, subbase, base, bedding, filler, and pavers until subgrade soil conditions are approved by the Engineer.

The Contractor shall install the geomembrane liner at the locations shown on the plans and as specified in Section14.40, "GEOMEMBRANE LINER," herein.

The Contractor shall install subbase, underdrain, and cleanouts as follows:

1. Moisten, spread, and compact the first two (2)-inch layer of the ASTM No. 2 subbase.

2. Place the perforated plastic pipe underdrain with the perforations down. Install the cleanouts.

3. Moisten, spread, and compact the remaining five (5) inches of the first eight (8)-inch ASTM No. 2 subbase lift.

4. For each ASTM No. 2 subbase lift, make at least two (2) passes in the vibratory mode then at least two (2) in the static mode with a minimum ten (10)-ton vibratory roller until there is no visible movement of the ASTM No. 2 subbase. Do not crush aggregate with the roller.

5. Moisten, spread, and compact the remaining ASTM No. 2 subbase layer in one (1) lift.

6. The surface tolerance of the compacted No. 2 subbase shall be plus or minus two and one-half (±2½ inches over a ten (10)-foot straightedge.

The Contractor shall install the base as follows:

1. Moisten, spread, and compact the ASTM No. 57 base layer in one (1), four (4)-inch thick lift.

2. On this layer, make at least two (2) passes in the vibratory mode then at least two (2) in the static mode with a minimum ten (10)-ton vibratory roller until there is no visible movement of the ASTM No. 57. Do not crush aggregate with the roller.

3. The surface tolerance the compacted ASTM No. 57 base should not deviate more than plus or minus one (±1) inch over a ten (10)-foot straightedge.

The Contractor shall install the bedding coarse as follows:

1. Moisten, spread, and screed the ASTM No. 8 bedding material to a two (2)-inch- thick layer.

2. Fill voids left by removed screed rails with ASTM No. 8 bedding material.

3. The surface tolerance of the screeded bedding layer shall be plus or minus three-eighths (±3/8) inches over a ten (10)-foot straightedge.

4. Do not subject screeded bedding material to any pedestrian or vehicular traffic before paver unit installation begins.

The Contractor shall install the pavers and filler material as follows:

1. Lay the paving units in a herringbone pattern. Maintain straight pattern lines. Spacing between the pavers shall be:

Paver Type	Paver Spacing
Concrete Permeable Paver	1/4 inches
Concrete Pervious Paver	1/16 – 1/8 inches
Aggregate Pervious Paver	0 inches*

* Pavers shall have no spacing and shall be installed flush with adjacent pavers.

2. Fill gaps at the edges of the paved area with cut units. Cut pavers subject to tire traffic shall be no smaller than one-third (1/3) of a whole unit.

3. Cut pavers and place along the edges with a double-bladed splitter or masonry saw.

4. For the concrete permeable pavers and concrete pervious pavers, fill the openings and joints with ASTM No. 9 filler material. Remove excess aggregate on the surface by sweeping pavers clean.

5. Compact and seat the pavers into the bedding material using a low-amplitude, 75-90 Hz plate compactor capable of at least five-thousand (5,000)-pound force. This will require at least two (2) passes with the plate compactor. A rubber or neoprene pad between the compactor and grids is necessary to prevent cracking or chipping on textured surfaces.

6. Do not compact within three (3) feet of the unrestrained edges of the paving units.

7. Vibrate and compact the pavers again, sweeping a small fraction of the ASTM No. 9 aggregate into the joints and openings until it is within one-half (½) inch from the top surface. This will require at least two (2) or three (3) passes with the compactor.

8. All pavers within six (6) feet of the laying face shall be left fully compacted at the completion of each day.

9. The final surface tolerance of compacted pavers shall not deviate more than plus or minus three-eighths (±3/8) inches over a ten (10)-foot straightedge.

10. After sweeping the surface clean, check final elevations for conformance to the drawings. Lippage must be no greater than one-eighth (1/8)-inch difference in height between

adjacent pavers. Bond lines for pavers shall be plus or minus one-half (½) inch over a fifty (50)-foot string line.

After work in this section is complete, the Contractor shall protect work from debris and foreign materials and damage due to subsequent construction activity on the site.

MEASUREMENT

Furnishing and installing concrete permeable pavers, concrete pervious pavers, and aggregate pervious pavers will be measured for payment by the square foot based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for furnishing concrete permeable pavers, concrete pervious pavers, and aggregate pervious pavers shall be deemed included in the price paid per square foot for Furnish Concrete Permeable Pavers, Furnish Concrete Pervious Pavers, and Furnish Aggregate Pervious Pavers, respectively, as set forth on the BIDDING SHEET.

The contract unit price per square foot for **Furnish Concrete Permeable Pavers, Furnish Concrete Pervious Pavers**, and **Furnish Aggregate Pervious Pavers** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing the pavers (including delivery, temporary storage, and protecting materials and constructed pavers during construction, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payment for installing concrete permeable pavers, concrete pervious pavers, and aggregate pervious pavers shall be deemed included in the price paid per square foot for Install Concrete Permeable Pavers, Install Concrete Pervious Pavers, and Install Aggregate Pervious Pavers, respectively, as set forth on the BIDDING SHEET.

The contract unit price per square foot for **Install Concrete Permeable Pavers, Install Concrete Pervious Pavers**, and **Install Aggregate Pervious Pavers** shall include full compensation for furnishing all labor (including saw cutting pavers), materials (excluding ASTM No. 9 filler material), tools, equipment, and incidentals, and for doing all the work involved in installing the pavers (including handling, temporary storage, subgrade preparation, compacting, site cleanup, disposal of all resulting material, and protecting materials during construction, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Excavation for installation of concrete permeable pavers, concrete pervious pavers, aggregate pervious pavers, and subgrade structural sections, and disposal of resulting materials are deemed included in the bid item for **Earthwork** and **Disposal of Excess Site Grading Soils**.

14.37 PERMEABLE ARTICULATING CONCRETE BLOCKS

GENERAL

Summary

Furnishing and installing the permeable articulating concrete blocks shall conform to these special provisions, as shown on the plans, and as directed by the Engineer.

Submittals

The Contractor will submit the manufacturer's certification that concrete blocks have met applicable ASTM standards and the manufacturer's warranty to the Engineer prior to installation.

The Contractor will submit to the Engineer the installers' certifications, including:

1. Current Interlocking Concrete Pavement Institute (ICPI) certificate requirements.
2. At least one person holding a current ICPI Permeable Interlocking Concrete Pavement (PICP) Installer Specialist Course record of completion. This person must be on-site to function as project foreman for the installation crew during installation.

MATERIALS

Permeable Articulating Concrete Blocks

The concrete blocks shall be PaveDrain in the grey color or an approved equal and meet the following specifications:

1. Meet the requirements of ASTM D6684, including:
    a. Average compressive strength not less than 4,000 pounds per square inch with no individual unit less than 3,500 pounds per square inch.
2. Have the following physical characteristics:
    a. Dimensions:
        i. Length: 12 inches
        ii. Width: 12 inches
        iii. Height: 5.65 inches
    b. Weight: 45-49 pounds per square foot.
3. Meet the following dimensional tolerance:
    a. Measured length, width, or height shall not differ by more than ±1/8 inch from specified dimensions.
4. The infiltration rate shall be no less than 1,500 inches per hour as tested using ASTM C1701/C1701M or C1781.
5. Be capable of supporting AASHTO H-25 and HS-25 truck loading.

PaveDrain end caps shall be used rather than grout for a smooth transition with concrete curb and cut-off wall edges.

The approved manufacturer for the concrete blocks is PaveDrain or an approved equal:

1. PaveDrain, LLC
   info@pavedrain.com
   www.pavedrain.com
   Phone: (888) 575-5339
   Contact: Ryan Melow, (858) 673-0966, rmelow@whitsoncm.com

Revetment Cable and Fittings

Cable and fittings are only used with matted installations. If blocks are not cabled into mats and placed by hand/machine, this section does not apply. If used, the revetment cable shall have the following physical characteristics:

Nominal Cable Diameter	Circumference	Approximate Average Strength	Weight per 100 feet
¼ inch	20 millimeters	3,700 pounds	2.47 - 2.74 pounds
5/16 inch	27 millimeters	7,000 pounds	3.99 - 4.42 pounds

Base

The material for the base shall conform to the requirements for ASTM No. 57 specified in Section 14.41, "PAVEMENT STRUCTURAL SECTION," herein.

Subbase

The material for the subbase shall conform to the requirements for ASTM No. 2 specified in Section 9, "PAVEMENT STRUCTURAL SECTION," herein.

Perforated Plastic Pipe

Four (4)-inch perforated plastic pipe shall conform to the requirements in Section 14.25, "PERFORATED PLASTIC PIPE," herein.

Plastic Pipe Cleanout

Four (4)-inch plastic pipe cleanout shall conform to the requirements in Section 14.24, "PLASTIC PIPE CLEANOUT," herein.

Geomembrane Liner

The material for the geomembrane liner shall conform to the requirements specified in Section 14.40, "GEOMEMBRANE LINER," herein.

Geogrid

The geogrid shall be Tensar Biaxial Geogrid BX1200 or an approved equivalent and shall meet the following strength requirements:

Parameters	ASTM Test Method	Mean Value (pounds per foot)
Tensile Strength @ 2% Strain	ASTM D6637-10 Method A	410
Tensile Strength @ 5% Strain	ASTM D6637-10 Method A	810
Ultimate Tensile Strength	ASTM D6637-10 Method A	1,310

DESCRIPTION OF WORK

The concrete blocks shall be installed as specified by the Manufacturer or Supplier, as shown on the plans, as specified herein, and as directed by the Engineer.

Delivery

The typical lead time for PaveDrain is four (4) to six (6) weeks.

The Contractor shall coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving. The materials shall be delivered in the manufacturer's original, unopened, undamaged container packaging with identification tags intact. The concrete blocks shall be delivered to the site in steel-banded, plastic-banded, or plastic-wrapped cubes capable of transfer by forklift or clamp lift. The Contractor shall ensure that the blocks are unloaded at the job site in such a manner that no damage occurs to the product or existing construction.

The Contractor shall stockpile base materials such that they are free from standing water, uniformly graded, free of any organic material or debris and foreign materials, and ready for placement. Materials shall be stored in a protected area such that they are kept free from mud, dirt, and other foreign materials. Materials shall be covered during forecasted rain events.

The Contractor shall keep areas where pavement is to be constructed free from debris and foreign materials during entire job. Base materials contaminated with debris and foreign materials shall be removed and replaced with clean materials.

Excavation and Subgrade

1. The existing subgrade shall NOT be compacted or subject to construction equipment traffic prior to geotextile and pavement structural section installation. Excavators shall be used from adjacent locations to excavate the subgrade. Only low ground pressure

equipment, with less than four (< 4) pounds per square inch, is acceptable in the bed areas when excavation is within one (1) vertical foot of the final subgrade elevation. Where operation of equipment on subgrade is unavoidable and compaction occurs, the subgrade area shall be scarified or tilled to no less than eight (8) inches with a York rake, light tractor, or other means.

2. If additional backfill material is required to meet subgrade grading and elevation requirements, compact the backfilled soil to a minimum ninety-two (92) percent standard Proctor density. Do not over compact.

3. Verify that subgrade is dry, uniform, even, free of any debris or foreign materials, and ready to support imposed loads.

4. Verify that gradients and elevations of the subgrade are correct. Fill and re-grade any areas damaged by erosion, ponding, or traffic compaction before placing the geomembrane liner and base.

5. Obtain approval of the subgrade from the Engineer before proceeding.

Installation

The Contractor shall observe the following:

1. Do not install in rain.

2. Do not install frozen bedding materials.

3. Do not proceed with installation of geomembrane liner, subbase, base, geogrid, and concrete blocks until subgrade soil conditions are approved by the Engineer.

The Contractor shall install the geomembrane liner at the locations shown on the plans and as specified in Section 14.40, "GEOMEMBRANE LINER," herein.

The Contractor shall install the pavement structural section, underdrain, and cleanouts as follows:

1. Moisten, spread, and compact the first two (2)-inch layer of the ASTM No. 2 subbase.

2. Place the perforated plastic pipe underdrain with the perforations down. Install the cleanouts.

3. Moisten, spread, and compact the remaining three (3) inches of the ASTM No. 2 subbase. Compact with a roller compactor.

4. Moisten, spread, and compact the second five (5)-inch lift of the ASTM No. 2 subbase. Compact the final grade level with a vibratory plate compactor.

5. Moisten, spread, and compact the four (4)-inch lift of the ASTM No. 57 base. Compact the final grade level with a vibratory plate compactor.

6. Ensure that the finished grade is a smooth-plane surface and conforms to the lines, grades, and cross-sections shown on the plans.

The Contractor shall place the Geogrid over the compacted pavement structural section.

The Contractor shall install the PaveDrain concrete blocks:

1. Concrete blocks/mats shall be constructed within the specified lines and grades shown on the plans. Maintain straight pattern lines.

2. Place the concrete blocks on the geogrid so as to produce a smooth-plane surface. Place the blocks tight together in a running bond pattern such that one unit is directly in contact with one-half of the two adjacent units. Place the blocks in such a manner as to ensure that the pattern remains square to curbs, transitions, or adjacent pavements.

3. Note: If installed in mats, the concrete blocks shall be attached to a spreader bar or other conventional device to aid in the lifting and placing of the mats into their proper position by the use of a large, tracked excavator or other appropriate equipment. The equipment used shall be of adequate capacity to place the mats without bumping, dragging, or otherwise damaging the aggregate bedding layer. The mats shall be "zippered" together forming a seamless mat-to-mat connection.

4. Verify that each block makes contact with the geogrid and is tightly engaged with adjacent units.

5. When necessary, make partial units by sawcutting solid, archless PaveDrain concrete blocks. Transitions against curbs and other rigid pavements shall be made with maximum one-half (½)-inch gaps utilizing solid and half PaveDrain units and/or PaveDrain end caps.

6. The joints between the concrete blocks do not require backfilling with smaller aggregates or sand in order to function properly. The joints are meant to be left open.

7. Make minor adjustments to properly engage PaveDrain concrete blocks with a dead blow hammer or rubber mallet.

8. Once all PaveDrain blocks have been installed, minor differential heights between units can be corrected with a small non-vibratory single- or double-barrel roller compactor or vibratory plate compactor. When using a plate compactor, protect blocks with nonwoven geotextile to eliminate scuffing.

9. Inspect completed installation and replace any cracked or damaged blocks.

10. Ensure that no individual PaveDrain block protrudes more than one-fourth (¼) inch within the plane of final placed blocks/mats.

11. Ensure that no gap between the individual PaveDrain blocks exceeds one-half (½) inch.

12. After sweeping the surface clean, check final elevations for conformance to the plans.

After work in this section is complete, the Contractor shall protect work from debris, foreign materials, and damage due to subsequent construction activity on the site.

MEASUREMENT

Furnishing and installing permeable articulating concrete blocks will be measured for payment by the square foot based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for furnishing PaveDrain concrete blocks shall be deemed included in the price bid per square foot for Furnish Permeable Articulating Concrete Blocks, as set forth on the BIDDING SHEET.

The contract unit price paid per square foot for **Furnish Permeable Articulating Concrete Blocks** shall include full compensation for furnishing all labor, materials (including blocks, end caps, revetment cables and fittings if applicable), tools, equipment, and incidentals, and for doing all the work involved in furnishing the concrete blocks (including delivery, temporary storage and protecting the materials from debris and damage, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payment for installing PaveDrain concrete blocks shall be deemed included in the price bid per square foot for Install Permeable Articulating Concrete Blocks, as set forth on the BIDDING SHEET.

The contract unit price paid per square foot for **Install Permeable Articulating Concrete Blocks** shall include full compensation for furnishing all labor (including saw cutting blocks), materials (including blocks, end caps, revetment cables and fittings if applicable; excluding ASTM No. 2, ASTM No. 57, geogrid, geomembrane liner, 4" perforated plastic pipe), tools, equipment, and incidentals, and for doing all the work (including handling, storage, cutting, subgrade preparation, site cleanup, disposal of all resulting material, and protecting materials from debris and damage during construction, etc.) involved in installing the concrete blocks, , as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Excavation for installation of permeable articulating concrete blocks and subgrade structural sections, and disposal of resulting materials are deemed included in the bid item for **Earthwork** and **Disposal of Excess Site Grading Soils**.

14.38 ANTI-GRAFFIT COATING

GENERAL

The following concrete structures shall be treated with anti-graffiti coating.

1. Minor Concrete (Planter Box)
2. CIDH Piles

MATERIALS

Anti-graffiti coating shall be PRMAKOTE or RAIN GUARD Vandlguard or approved equal.

The anti-graffiti coating shall be clear and the cured finish shall be non-glossy matte or satin finish. Anti-graffiti coating shall be non-sacrificial, graffiti-resistant coating. Coating must be LOW VOC. Cured anti-graffiti coating shall not discolor or adversely affect the appearance of the treated surface. The coating shall be water cleanable with water at ambient temperature of 50°F or higher. Pressure wash requirements must not exceed 500 psi. Anti-graffiti coating must allow for a minimum of ten cycles of graffiti removal. Anti-graffiti coating must be self-recoatable for the life of the coating.

Coatings requiring special cleaning solvents for graffiti removal will not be accepted.

DESCRIPTION OF WORK

The Contractor shall prepare all surfaces to be coated as specified by the coating manufacturer and concrete surfaces shall be cured for the minimum time specified. Anti-graffiti coating shall be applied to the thickness and in the manner specified in writing by the manufacturer.

MEASUREMENT

Anti-graffiti coating will not be measured for payment.

PAYMENT

Full compensation for furnishing all labor, tools, equipment, and incidentals, and for doing all the work involved in furnishing and applying the anti-graffiti coating per manufacturer's instructions (including preparing surfaces, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, shall be considered as included in the price paid for various contract items of work and no additional compensation will be made therefor.

14.39 GEOTEXTILE

GENERAL

Geotextile shall conform to Section 88, "Engineering Fabrics," of the Standard Specifications and these specifications, as shown on the plans, and as directed by the Engineer.

MATERIALS

Geotextile shall be nonwoven polypropylene fibers, inert to biological degradation, and resistant to naturally occurring chemicals, alkalis, and acids.

The geotextile shall meet the following requirements:

1. Grab tensile strength: two-hundred (200) pounds minimum (ASTM D 4632 test method),
2. Elongation: fifty (50) percent minimum (ASTM D 4632 test method),
3. Trapezoid tear strength: eighty (80) pounds minimum (ASTM D 4533 test method),
4. Mullen burst strength: three-hundred-fifty (350) pounds per square inch (psi) minimum (ASTM D 3786 test method),
5. Puncture strength: one-hundred-ten (110) pounds minimum (ASTM D 4833 test method),
6. CBR puncture strength: five-hundred (500) pounds minimum (ASTM D 6241 test method),
7. Apparent opening size: eighty (80) sieve maximum (ASTM D 4751 test method),
8. Flow rate: ninety (90) gallons/minute/square foot minimum (ASTM D 4491 test method), and
9. UV Resistance (at five-hundred [500] hours): seventy (70) percent strength retained.

The following are approved manufacturers for the Geotextile:

1. Geotextile model ADS Geosynthetics 0801T
   ADS Geosynthetics
   Hillard, OH
   www.ads-pipe.com

2. Geotextile model Mirafi 180 N
   TenCate Nicolon
   Norcross, GA
   www.tencate.com

3. Geotextile model Geotex 801
   Propex Geosynthetics
   Chattanooga, TN
   www.geotextile.com

DESCRIPTION OF WORK

The Contractor shall install the geotextile as specified by the Manufacturer or Supplier, as shown on the plans, as specified herein, and as directed by the Engineer. The geotextile shall be placed in the manner and at the locations shown on the plans.

The Contractor shall prepare the surface that will receive the geotextile to a smooth condition, free of obstructions, depressions, and debris. The Engineer shall inspect and approve of the subgrade surfaces before the geotextile is placed. The geotextile shall not be laid in a stretched condition, but shall be laid loosely as directed by the Engineer.

The panels shall be overlapped a minimum of eighteen (18) inches for vertical laps and eighteen (18) inches for horizontal laps. The geotextile shall be placed parallel to the direction of the flow. It shall be placed so that the upstream or higher panel will overlap the downstream or lower panel.

Geotextile damaged or displaced before or during installation or during placement of overlying layers shall be replaced or repaired to the satisfaction of the Engineer at the Contractor's expense.

MEASUREMENT

Geotextile will be measured for payment by the square foot based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer. Overlaps will not be measured for payment.

PAYMENT

Payment for geotextile shall be deemed included in the price bid per square foot for Geotextile, as set forth in the BIDDING SHEET.

The contract unit price paid per square foot for **Geotextile** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and placing geotextile material (including subgrade preparation, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

14.40 GEOMEMBRANE LINER

GENERAL

Geomembrane liner shall conform to these specifications, as shown on the plans, and as directed by the Engineer.

MATERIALS

Geomembrane Liner

Geomembrane liner shall be recyclable, black, high density polyethylene (HDPE) sheet material, with a thirty (30)-millimeter wall thickness, and meet the specifications in the following table:

Specifications High Density Polyethylene (HDPE) Geomembrane Properties:		
Parameters	**ASTM Test Method**	**Mean Value**
MD Break Strength	D 638	2,533 psi
TD Break Strength	D 638	3,594 psi
MD Break Elongation	D 638	211 %
TD Break Elongation	D 638	328 %
Puncture Strength	D 4833	93 lbs
MD Tear Strength	D 1004	29 lbs
TD Tear Strength	D 1004	36 lbs
Hydrostatic Resistance	D 751, Procedure A	328 psi
Multi-Axial Tensile Properties		
Maximum Stress	D 5617. Test Method A: Centerpoint Deflection Versus Pressure	2,361 psi
Elongation @ Rupture	D 5617. Test Method A: Centerpoint Deflection Versus Pressure	20.8 %

MD = Machine Direction
TD = Transverse Direction
psi = pounds per square inch
lbs = pounds

Sealant

The Contractor shall use the manufacturer's standard sealing tape or a silicone sealant.

The Contractor shall use geomembrane liner and accessories manufactured by the following, or an approved equal:

1. DeepRoot Partners, L.P. (Deep Root)
   530 Washington Street,
   San Francisco, CA 94111
   (415) 781-9700
   www.deeproot.com

DESCRIPTION OF WORK

Liner Installation

The Contractor shall install the geomembrane liner as specified by the manufacturer or supplier, as shown on the plans, as specified in these specifications, and as directed by the Engineer. The liner shall be placed in the manner and at the locations shown on the plans.

The Contractor shall prepare the surface that will receive the liner to a smooth condition, free of obstructions, depressions, and debris. The Engineer shall inspect and approve of the subgrade surfaces before the liner is placed. The liner shall not be laid in a stretched condition, but shall be laid loosely as directed by the Engineer.

The panels shall be overlapped a minimum of eighteen (18) inches for vertical laps and eighteen (18) inches for horizontal laps. The liner shall be placed parallel to the direction of the flow. It shall be placed so that the upstream or higher panel will overlap the downstream or lower panel.

Where the installation occurs at the surface of planters, the top of the geomembrane liner shall be installed one-half (½) inch above the grade of the soil.

Seaming

Where material requires seaming, the Contractor shall overlap the geomembrane liner at minimum of two (2) widths of sealing tape, approximately six (6) inches, using manufacturer's standard sealing tape. A consistent seal across the entire seam must be ensured.

If the standard sealing tape is unavailable, the seaming may be made by overlapping a minimum of six (6) inches and welded using a Leister welder with welded seams not less than one-and-one-half (1½) inches wide in order to create a watertight seal.

Liner damaged or displaced before or during installation or during placement of overlying layers shall be replaced or repaired to the satisfaction of the Engineer at the Contractor's expense.

MEASUREMENT

Geomembrane liner will be measured for payment by the square foot based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer. Overlaps will not be measured for payment.

PAYMENT

Payment for geomembrane liner shall be deemed included in the price bid per square foot for Geomembrane Liner, as set forth in the BIDDING SHEET.

The contract unit price paid per square foot for **Geomembrane Liner** shall include full compensation for furnishing all labor (including seaming), materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and placing the geomembrane liner (including subgrade preparation, anchoring liner, installing sealants and flat bar, etc.), as shown

on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

14.41 PAVEMENT STRUCTURAL SECTION

GENERAL

Furnishing and installing pavement structural sections will conform to the American Society of Civil Engineers' Standards for Permeable Pavements; Section 26, "Aggregate Bases," of the Standard Specifications; and these special provisions, as shown on the plans, and as directed by the Engineer.

MATERIALS

The following materials shall be used:

1. Filler material (ASTM No. 9);
2. Aggregate bedding coarse (ASTM No. 8);
3. Permeable material (ASTM No. 57); and
4. Stone subbase (ASTM No. 2).

The material for the ASTM No. 9, ASTM No. 8, ASTM No. 57, and ASTM No. 2 shall have the following properties:

1. Crushed stone with ninety (90) percent fractured faces;
2. LA Abrasion less than (< 40) per ASTM C 131;
3. Minimum CBR of eighty (80) percent per ASTM D 1883;
4. Washed with less than one (1) percent passing the No. 200 sieve; and
5. Conforming to ASTM D 448 gradation as shown in the table below.

Rounded river gravel shall not be used.

Sieve Size	Percent Passing			
	ASTM No. 8 Aggregate Bedding Coarse	ASTM No. 57 Permeable Material	ASTM No. 2 Stone Subbase	ASTM No. 9 Filler Material
3 inch	--	--	100	--
2½ inch	--	--	90 - 100	--
2 inch	--	--	35 - 70	--
1½ inch	--	100	0 - 15	--
1 inch	--	95 - 100	--	--
¾ inch	--	--	0 - 5	--
½ inch	100	25 - 60	--	--
3/8 inch	85 - 100	--	--	100
No. 4	10 - 30	0 - 10	--	85 - 100
No. 8	0 - 10	0 - 5	--	10 - 40
No. 16	0 - 5	--	--	0 - 10
No. 50	--	--	--	0 - 5

DESCRIPTION OF WORK

The Contractor shall install the aggregate as specified by the manufacturer or supplier of the porous or non-porous pavement material, as specified herein, as shown on the plans, and as directed by the Engineer.

Storage

The Contractor shall store materials in a protected area such that they are kept free from mud, dirt, and other foreign materials. The area where pavement is to be constructed free shall be kept free from sediment during the entire job. Base and bedding materials contaminated with sediment shall be removed and replaced with clean materials.

Installation

The Contractor shall not proceed with installation of aggregate until subgrade soil conditions are approved by the Engineer.

The Contractor shall not perform installation in rain or with frozen bedding materials.

The subgrade surfaces on which the porous or non-porous surfaces are to be installed shall be cut or filled and compacted to the lines and grades shown on the plans and specified herein.

The Contractor shall take care to not damage drainpipes, overflow pipes, observation wells, or any inlets and other drainage appurtenances during installation. Any damage shall be reported immediately to the Engineer.

MEASUREMENT

ASTM No. 9, ASTM No. 8, ASTM No. 57, and ASTM No. 2 will be measured for payment by the cubic yard based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for furnishing and installation of ASTM No. 9, ASTM No. 8, ASTM No. 57, and ASTM No. 2 shall be deemed included in the price bid per cubic yard for Filler Material (ASTM No. 9), Aggregate Bedding Course (ASTM No. 8), Permeable Material (ASTM No. 57), and Stone Subbase (ASTM No. 2), as set forth on the BIDDING SHEET.

The contract unit price paid per cubic yard for **Filler Material (ASTM No. 9), Aggregate Bedding Course (ASTM No. 8), Permeable Material (ASTM No. 57)**, and **Stone Subbase (ASTM No. 2)** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and placing the materials (including delivery, compacting, protecting material from debris, sediment and silt during storage and construction, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Excavation for constructing pavement structural section and disposal of resulting materials are deemed included in the bid item for **Earthwork** and **Disposal of Excess Site Grading Soils**.

14.42 CLASS 2 PERMEABLE MATERIAL

GENERAL

Class 2 permeable material shall conform to Section 68-1.025, "Permeable Material," of the Standard Specifications, these specifications, as shown on the plans, and as directed by the Engineer.

MATERIALS

Class 2 permeable material shall:

1. Consist of hard, durable, clean sand, gravel, or crushed stone, and shall be free from organic material, clay balls, or other deleterious substances;
2. Have a Durability Index of not less than forty (40); and
3. Have a Sand Equivalent value of not less than seventy-five (75).

The percentage composition by weight of Class 2 permeable material in place shall conform to the following gradation:

Sieve Size	Percent Passing
1 inch	100
3/4 inch	90 - 100
3/8 inch	40 - 100
No. 4	25 - 40
No. 8	18 - 33
No. 30	5 - 15
No. 50	0 - 7
No. 200	0 - 3

DESCRIPTION OF WORK

The Contractor shall keep Class 2 permeable material free of debris and foreign materials that could reduce the permeability of the material. The Contractor shall wash Class 2 permeable material to remove debris and foreign materials prior to installation.

The Contractor shall install Class 2 permeable material to the depths specified on the plans. The Contractor shall compact the material as specified in these special provisions and as shown on the plans.

MEASUREMENT

Class 2 permeable material will be measured for payment by the cubic yard based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for Class 2 permeable material shall be deemed included in the price bid per cubic yard for Class 2 Permeable Material, as set forth on the BIDDING SHEET.

The contract unit price paid per cubic yard for **Class 2 Permeable Material** shall include full compensation for furnishing all labor, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing Class 2 permeable material (including delivery, storage, as-needed washing prior to installation, placing and compacting, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Excavation for installation of Class 2 permeable material, and disposal of resulting materials are deemed included in the bid item for **Earthwork** and **Disposal of Excess Site Grading Soils**.

14.43 DECOMPOSED GRANITE

GENERAL

Furnishing, installing, and stabilizing decomposed granite for pathway areas shall conform to these specifications, as shown on the plans, and as directed by the Engineer.

MATERIALS

Decomposed Granite

Decomposed granite shall be blue fines material composed of crushed granite rock screenings graded from 3/8-inch particles to dust. The material must comply with the following grading requirements:

Sieve Size	Percent Passing
3/8 inch	100
No. 4	95 - 100
No. 8	75 - 80
No. 16	55 - 65
No. 30	40 - 50
No. 50	25 - 35
No. 100	20 - 25
No. 200	5 - 15

Note: Gradation based upon AASHTO T11-82 and T27-82

Edge Restraints with Metal Stakes

The 14 gauge steel Edge Restraints shall meet the following requirements:

Characteristic	Measurement
Dimensions	6-inch wall height, 6-inch tab depth, and 1- foot length
Materials	Steel
Color	Black Powder Coating

The metal stakes for the edge restraints shall be sixteen (16)-inches long.

The manufacturer for the edge restraint and anchoring spike shall be as follows or an approved equivalent:

COL-MET
3333 Miller Park South
Garland, TX 75042
1 (972) 494-3900
www.colmet.com

Polymer Stabilizer

The liquid polymer stabilizer for application to the decomposed granite shall be TechniSoil G3 Commercial Surface (G3-CS).

Aggregate Base

Aggregate Base shall conform to the requirements for Section 14.48, "AGGREGATE BASE," of these special provisions.

DESCRIPTION OF WORK

Decomposed Granite Installation

The Contractor shall install decomposed granite as follows:

1. Do not install decomposed granite work during rainy conditions.

2. Mix solidifying emulsion thoroughly and uniformly throughout the decomposed granite per the manufacturer's recommendations. Mix the material in the field using portable mixing equipment, or delivered in mixer trucks from a local ready-mixed plant.

3. Place decomposed granite uniformly in layers no more than one-and-one-half (1½) inches thick. Compact each layer of decomposed granite to a relative compaction of not less than ninety (90) percent. Compaction must not begin less than six (6) hours after placement, nor more than forty-eight (48) hours.

4. Apply a final application of solidifying emulsion as recommended by the manufacturer. Prevent runoff or overspray of solidifying emulsion onto adjacent paved or planting areas.

The Contractor shall ensure that the completed surface is smooth, compacted to ninety (90) percent, and uniform. Surface shall maintain original flow lines, slope gradient, and contours of the project site.

After satisfactory completion of decomposed granite work, annually thereafter until the plant establishment period is completed, the decomposed granite areas shall receive a topcoat of solidifying emulsion at the rate recommended by the manufacturer.

MEASUREMENT

Decomposed granite will be measured for payment by the square yard based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for decomposed granite shall be deemed included in the price bid per square yard for Decomposed Granite Path, as set forth in the BIDDING SHEET.

The contract unit price paid per square yard for **Decomposed Granite Path** shall include full compensation for furnishing all labor, materials (including aggregate, polymer stabilizer, edge restraints with anchoring spikes, etc.), tools, equipment, and incidentals, and for doing all the work involved in constructing decomposed granite pathway (including site preparation, excavation for placement and compaction of stabilized decomposed granite material, installing edge restraints with anchoring spikes, disposal of all resulting materials, annual reapplication of polymer stabilizer, etc.), complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

14.44 MODIFY DOWNSPOUT

GENERAL

Modification of the roof downspouts shall conform to these specifications, as shown on the plans, and as directed by the Engineer.

DESCRIPTION OF WORK

The Contractor shall use the following procedures to modify downspouts:

1. Cut the existing portion of downspout with a hacksaw approximately 9 inches above the location where it enters the new structure.

2. Plug or cap the standpipe using an in-pipe test plug or an over-the-pipe cap, and secure it with a hose clamp. Do not use concrete to seal the standpipe.

3. Attach the elbow over the downspout. If the elbow does not fit over the downspout, use crimpers or needle-nose pliers to crimp the end of the cut downspout so that it fits inside the elbow.

4. Measure and cut the downspout extension to the length specified on the plans. Attach the extension over the end of the elbow.

5. Secure the pieces with sheet metal screws at each joint where the downspout, elbow, and extension connect.

MEASUREMENT

Downspout modification will be measured for payment per each unit, as shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for modifying the downspout shall be deemed included in the price bid per each unit for Modify Downspout, as set forth in the BIDDING SHEET.

The contract unit price paid per each unit for **Modify Downspout** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in modifying the downspout (including sawcutting, pipe connections, bracing, and disposal of all resulting materials), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

14.45 POROUS ASPHALT PAVEMENT

GENERAL

Furnishing and installing porous asphalt pavement shall conform to these specifications, as shown on the plans, and as directed by the Engineer.

MATERIALS

Porous Asphalt Mix

Porous asphalt mix shall have the following gradation:

Sieve Size	Percent Passing
3 inch	--
2½ inch	--
2 inch	--
1½ inch	--
1 inch	--
3/4 inch	100
½ inch	85 - 100
3/8 inch	55 - 75
No. 4	10 - 25
No. 8	5 - 10
No. 200	2 - 4

Porous asphalt mix shall have the following binder and mix additives:

1. Binder Content = 6-6.5 (AASHTO T164)
2. Fiber Content By Total Mixture Mass = 0.3 cellulose or 0.4 mineral
3. Rubber Solids (SBR) Content By Weight of the Bitumen = 1.5 to 3

Porous asphalt mix shall have the following characteristics:

1. Air void content = 18.0 to 22.0 (ASTM D6752/AASHTO T275)
2. Draindown ≤ 0.3 (ASTM D6390)
3. Retained Tensile Strength ≥ 80 (AASTO 283)
4. Cantabro Abrasion Test on Unaged Samples ≤ 20 (ASTM D7064-04)
5. Cantabro Abrasion Test on 7-Day Aged Samples ≥ 30 (ASTM D7064-04)

The PG polymer modified asphalt binder shall be PG 76-22 PM.

The manufacturer for porous asphalt shall be the following or an approved equivalent:
Graniterock
365 Blomquist St
Redwood City, CA 94063
(650) 482-3805
Contact: Justin Burke, jburke@graniterock.com

Geomembrane Liner

Geomembrane liner shall conform to the requirements specified in Section 14.40, "GEOMEMBRANE LINER," herein.

Base

The material for the base shall conform to the requirements for ASTM No. 57 specified in Section 14.41, "PAVEMENT STRUCTURAL SECTION," herein.

Subbase

The material for the subbase shall conform to the requirements for ASTM No. 2 specified in Section 14.41, "PAVEMENT STRUCTURAL SECTION," herein.

Perforated Plastic Pipe

Four (4)-inch perforated plastic pipe shall conform to the requirements in Section 14.25, "PERFORATED PLASTIC PIPE," herein.

Plastic Pipe Cleanout

Four (4)-inch plastic pipe cleanout shall conform to the requirements in Section 14.24, "PLASTIC PIPE CLEANOUT," herein.

DESCRIPTION OF WORK

The Contractor shall install porous asphalt pavement as specified by the Manufacturer or Supplier, as shown on the plans, as specified herein, and as directed by the Engineer.

Delivery and Storage

The Contractor shall stockpile base materials such that they are free from standing water, uniformly graded, free of any organic material or debris and foreign materials, and ready for placement. Materials shall be stored in a protected area such that they are kept free from mud, dirt, and other foreign materials. Materials shall be covered during forecasted rain events.

The Contractor shall keep areas where pavement is to be constructed free from debris and foreign materials during entire job. Base materials contaminated with debris and foreign materials shall be removed and replaced with clean materials.

Excavation and Subgrade

The Contractor shall prepare the subgrade as follows:

1. The existing subgrade shall NOT be compacted or subject to construction equipment traffic prior to geotextile, subbase, and base installation. Excavators shall be used from adjacent locations to excavate the subgrade. Only low-ground-pressure equipment, less than four (< 4) pounds per square inch) is acceptable in the bed areas when excavation is within one (1) vertical foot of the final subgrade elevation. Where operation of equipment on subgrade is unavoidable and compaction occurs, scarify or till the subgrade area to no less than eight (8) inches with a York rake, light tractor, or other means.

2. If additional backfill material is required to meet subgrade grading and elevation requirements, compact the backfilled soil to a minimum ninety-two (92) percent standard Proctor density. Do not over compact.

3. Verify that subgrade is dry, uniform, even, free of any debris or foreign materials, and ready to support imposed loads.

4. Verify that gradients and elevations of the subgrade are correct. Fill and re-grade any areas damaged by erosion, ponding, or traffic compaction before placing the geomembrane liner and base.

5. Obtain approval of the subgrade from the Engineer before proceeding.

Installation

The Contractor shall install the geomembrane liner at the locations shown on the plans.

1. Place the geomembrane liner immediately after receiving subgrade approval from the Engineer.

2. Install the geomembrane liner as described in Section 14.40, "GEOMEMBRANE LINER," herein.

The Contractor shall install the subbase layer, underdrain, and cleanouts as follows:

1. Place the first two (2) inches of the clean and washed ASTM No. 2 subbase layer.

2. Place the pervious plastic pipe underdrain with the perforations down and install the plastic pipe cleanouts as shown on the plans.

3. Place the clean and washed ASTM No. 2 subbase layer in eight-inch to twelve inch- (8-inch to 12-inch) lifts and compact to a maximum of ninety-five (95) percent and minimum ninety (90) percent standard Proctor density to the grades and elevations specified on the plans.

4. On each lift, make at least two (2) passes in the vibratory mode then at least two (2) in the static mode with a minimum of ten (10)-ton vibratory roller until there is no visible movement of the ASTM No. 2. Do not crush aggregate with the roller.

5. Protect the subbase layer from debris and foreign materials that may diminish the permeability of the material.

The Contractor shall install the subbase layer, underdrain, and cleanouts, as follows:

1. Place the clean and washed ASTM No. 57 base layer in one lift and compact to a maximum of ninety-five (95) percent and minimum ninety (90) percent standard Proctor density to the grades and elevations specified on the plans.

2. Make at least two (2) passes in the vibratory mode then at least two (2) in the static mode with a minimum (ten)-10 ton vibratory roller until there is no visible movement of the ASTM No. 57. Do not crush aggregate with the roller.

3. Protect the base layer from debris and foreign materials that may diminish the permeability of the material.

The Contractor shall install the porous asphalt mix layer, as follows:

1. Do not install the porous asphalt in the rain, on a wet stone base, or in temperatures below 55° F.

2. The production temperature of the bituminous mix shall be determined by the results of draindown testing (ASTM D6390) and recommendations of the asphalt supplier, but typically ranges between 275° F and 302° F.

3. Place the porous asphalt in one (1), three (3)-inch lift. Compact with two (2) to three (3) passes with an eight to ten (8 to 10)-ton static steel wheel roller (for air voids of eighteen [18] percent to twenty-two [22] percent. Additional rolling may reduce surface porosity and/or cause aggregate breakdown.

4. Use a small roller to smooth seams and remove marks. Rollers shall move slowly and uniformly to prevent displacement of the mix.

After work in this section is complete, the Contractor is responsible for protecting work from debris, foreign materials, and damage due to subsequent construction activity on the site.

MEASUREMENT

Porous asphalt pavement will be measured for payment by the ton, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for porous asphalt pavement shall be deemed included in the price bid per ton for Porous Asphalt Pavement, as set forth on the BIDDING SHEET.

The contract unit price paid per ton for **Porous Asphalt Pavement** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing, placing, and compacting porous asphalt pavement (including subgrade preparation, disposal of all resulting materials, protecting the constructed pavement from debris and damage), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Excavation for installation of porous asphalt concrete pavement and subgrade structural sections, and disposal of resulting materials are deemed included in the bid item for **Earthwork** and **Disposal of Excess Site Grading Soils**.

14.46 PERVIOUS CONCRETE PAVEMENT

GENERAL

Furnishing and installing pervious concrete pavement shall conform to these specifications, as shown in the plans, and as directed by the Engineer.

MATERIALS

Pervious Concrete Pavement

Pervious concrete pavement shall be manufactured and delivered in accordance with ASTM C94.

The manufacturer for pervious concrete pavement shall be as follows or an approved equivalent:

Bay Area Pervious Concrete (BAPC Classic Pervious Concrete without color)
San Carlos, CA
650-273-6073

Formwork

Form materials shall be wood, steel, or other and shall be the full depth of the pavement. Forms shall be of sufficient strength and stability to support mechanical equipment without deformation during installation and shall conform to plan profiles following spreading, strike-off, and compaction operations.

Geomembrane Liner

The geomembrane liner shall conform to the requirements specified in Section 14.40, "GEOMEMBRANE LINER," herein.

Base

The material for the base shall conform to the requirements for ASTM No. 57 specified in Section 14.41, "PAVEMENT STRUCTURAL SECTION," herein.

Perforated Plastic Pipe

Four-inch (4") perforated plastic pipe shall conform to the requirements in Section 14.25, "PERFORATED PLASTIC PIPE," herein.

Plastic Pipe Cleanout

Four-inch (4") plastic pipe cleanout shall conform to the requirements in Section 14.24, "PLASTIC PIPE CLEANOUT," herein.

DESCRIPTION OF WORK

The Contractor shall install the pervious concrete pavement as specified by the Manufacturer or Supplier, as shown on the plans, as specified herein, and as directed by the Engineer.

Delivery and Storage

The Contractor shall comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays. The typical lead time is 4-6 weeks.

The Contractor shall stockpile base materials such that they are free from standing water, uniformly graded, free of any organic material or debris and foreign materials, and ready for placement.

The Contractor shall store materials in a protected area such that they are kept free from mud, dirt, and other foreign materials. Materials shall be covered during forecasted rain events.

The Contractor shall keep areas where pavement is to be constructed free from debris and foreign materials during the entire job. Base materials contaminated with debris and foreign materials shall be removed and replaced with clean materials.

Excavation and Subgrade

The Contractor shall prepare the subgrade as follows:

1. The existing subgrade shall NOT be compacted or subject to construction equipment traffic prior to geotextile and stone aggregate installation. Excavators shall be used from adjacent locations to excavate the subgrade. Only low-ground-pressure equipment, less

than four (< 4) pounds per square inch) is acceptable in the bed areas when excavation is within one (1) vertical foot of the final subgrade elevation. Where operation of equipment on subgrade is unavoidable and compaction occurs, scarify or till the subgrade area to no less than eight (8) inches with a York rake, light tractor, or other means.

2. If additional backfill material is required to meet subgrade grading and elevation requirements, compact the backfilled soil to a minimum ninety-two (92) percent standard Proctor density. Do not over compact.

3. Verify that subgrade is dry, uniform, even, free of any debris or foreign materials, and ready to support imposed loads.

4. Verify that gradients and elevations of the subgrade are correct. Fill and re-grade any areas damaged by erosion, ponding, or traffic compaction before placing the geomembrane liner and base.

5. Obtain approval of the subgrade from the Engineer before proceeding.

Installation

The Contractor shall install the geomembrane liner at the locations shown on the plans.

1. Place the geomembrane liner immediately after receiving subgrade approval from the Engineer.

2. Install the geomembrane liner as described in Section 14.40, "GEOMEMBRANE LINER," herein.

The Contractor shall install the base layer, underdrain, and cleanouts as follows:

1. Moisten and spread the first two (2) inches of the clean and washed ASTM No. 57 base layer.

2. Place the pervious plastic pipe underdrain with the perforations down and install the plastic pipe cleanouts as shown on the plans.

3. Moisten, spread, and compact the ASTM No. 57 base over the remaining four (4) inches of the six (6)-inch lift. Then place the second six (6)-inch thick lift of the base layer to the grades specified on the plans.

4. On each lift, make at least two (2) passes in the vibratory mode then at least two (2) in the static mode with a minimum ten (10)-ton vibratory roller until there is no visible movement of the ASTM No. 57. Do not crush aggregate with the roller.

5. The surface tolerance of the compacted ASTM No. 57 base shall not deviate more than plus or minus one (±1) inch over a ten (10)-foot straightedge.

6. Protect the base layer from debris and foreign materials that may diminish the permeability of the material.

7. Ensure that the base layer is in a moist condition at the time of pervious concrete placement. Spray the base layer with water immediately prior to placing pervious concrete.

The Contractor shall install the pervious concrete layer as follows:

1. Mixing: Mixtures shall be produced in central mixers or in transit (truck) mixers. Mix concrete for the minimum time specified in ASTM C94.

2. Transporting: The pervious concrete mixture transport and the discharge of individual loads at the site shall be completed within one (1) hour of the introduction of mix water to the cement. Delivery times may be extended to ninety (90) minutes when dosages of hydration stabilizer are increased to maintain the concrete.

3. Visually inspect each truckload for consistency of concrete mixture. Permit water additions to adjust the consistency at the point of discharge. Subsequent water additions for workability shall be adjusted accordingly at the batching facility.

4. Deposit the six (6)-inch layer of pervious concrete into the forms by mixer truck chute, conveyor, or buggy. Pervious concrete is not pumpable. Deposit concrete as close to its final position as practical, and such that discharge concrete is incorporated into previously placed plastic concrete.

5. Hand place and screed properly with a roller weighted with water or sand inside the roller. Failure to weigh down the roller screed will result in poor compaction, poor durability, raveling, and a poor riding surface.

The Contractor shall use the following jointing procedures:

1. Joints shall be constructed utilizing a rolled joint former. Mark joints where they will be placed before paving starts. Perform jointing immediately after roller compaction.

2. Use isolation joints when abutting fixed vertical structures such as manholes, light poles, sign poles, etc. Joints may also be raw cut. Sawing may be performed as soon as the pavement is strong enough to resist raveling and before random cracking occurs.

The Contractor shall use the following curing procedures:

1. Begin curing procedures three to five (3 to 5) minutes behind the roller screed.

2. Cover the pavement surface with heavy duty polyethylene sheeting to retain moisture necessary for rapid curing inherent in high void surface areas.

3. Roll the polyethylene sheeting on tubes prior to the start of paving to allow the sheeting to roll out over the fresh pavement across the width of the forms. Maintain a minimum of

twelve (12) inches of overhang on each side of the form and use the excess sheeting to secure the sheeting in place.

4. Prior to covering, spray an evaporation retarder, such as soybean oil, onto the pavement from both sides of the paving operation. Follow the manufacturer's recommendations for application rate.

5. Tape or otherwise repair any holes, tears, or cuts in the plastic sheeting to prevent moisture loss and air infiltration.

6. Use anchors, such as boards and sand bags, to properly secure the edges of the sheeting along the pavement edge. Use anchors so plastic sheeting will remain securely in place for the entire curing period and not be removed by wind. Mud clumps, construction trash, rocks, subgrade material, etc. shall not be used as anchors. Prevent plastic sheeting from billowing in the wind during the entire seven (7)-day cure. If using wood forms, staple the plastic sheeting outside of the forms. Place wooden boards on the upper outer edge for added continuous anchoring, and place sand bags every three to six (3 to 6) feet to hold them in place.

7. Secure the curing cover in place and do not move for a minimum of seven (7) days.

8. Do not permit vehicular traffic on the pavement until curing is complete and do not permit truck traffic for at least fourteen (14) days.

After work in this section is complete, the Contractor shall protect the work from debris, foreign materials, and damage due to subsequent construction activity on the site.

MEASUREMENT

Pervious concrete pavement will be measured for payment by the cubic yard based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for pervious concrete pavement shall be deemed included in the price bid per cubic yard for Pervious Concrete Pavement, as set forth on the BIDDING SHEET.

The contract unit price paid per cubic yard for **Pervious Concrete Pavement** shall include full compensation for furnishing all labor, materials (including formwork), tools, equipment, and incidentals, and for doing all the work involved in installing the pervious concrete (including subgrade preparation, formwork, jointing, curing, disposal of all resulting materials, and protecting the constructed pavement from debris and damage), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Excavation for installation of pervious concrete pavement and subgrade structural sections, and disposal of resulting materials are deemed included in the bid item for **Earthwork** and **Disposal of Excess Site Grading Soils**.

14.47 ASPHALT CONCRETE

GENERAL

Furnishing and installing asphalt concrete shall conform to Section 39, "Asphalt Concrete," of the Standard Specifications and these specifications. Amendments to Section 39 do not apply. Reclaimed Asphalt Pavement will not be allowed.

MATERIALS

Asphalt Concrete

Asphalt concrete for surfacing shall be Type A. The aggregate for asphalt concrete shall conform to the grading specified for three-fourths (¾)-inch maximum size aggregate, coarse grading, or one-half (½)-inch maximum size aggregate, coarse grading, as determined by the Engineer.

Asphalt Binder

Asphalt binder shall comply with Section 92, "Asphalts," of the Standard Specifications. Asphalt binder shall be PG 64-10 unless otherwise noted.

Prime Coat and Paint Binder

Prime coat and paint binder shall conform to Section 39-4.02, "Prime Coat and Paint Binder," of the Standard Specifications and these specifications.

Liquid asphalt for use as a prime coat shall be Grade SC-70 unless otherwise directed by the Engineer. When directed in writing by the Engineer to use asphaltic paint binder of mixing-type emulsion, water shall be added to the material and mixed therewith in such proportion that the resulting mixture will contain no more than fifty (50) percent added water. The exact amount of added water shall be determined as directed by the Engineer.

Seal Coat

Seal coat shall conform to Section 39-7.02, "Seal Coat," of the Standard Specifications.

DESCRIPTION OF WORK

Asphalt Concrete

The Contractor shall not use of any equipment for placing asphalt concrete that leaves ridges, indentations, or other objectionable marks in the surface, or fails to provide a finished workmanlike uniform job; other acceptable equipment shall be furnished by the Contractor.

Prime Coat and Paint Binder

The Contractor shall apply a prime coat of liquid asphalt to granular bases. In exceptional cases during wet weather construction, asphaltic paint binder of mixing-type emulsion may be used in

lieu of prime coat on granular bases, but only if approved and directed by the Engineer. The application of the asphaltic paint binder shall be at the specified rate for the original emulsion.

Seal Coat

The Contractor shall apply a seal coat to all newly paved surfaces.

MEASUREMENT

Furnishing and installing Asphalt Concrete will be measured for payment by the ton in accordance with Section 9-1.01, "Measurement of Quantities," of the Standard Specifications. This tonnage shall be the combined weight of the aggregate and asphalt binder.

PAYMENT

Payment for asphalt concrete shall be deemed included in the price bid per ton for Asphalt Concrete, Type A, as set forth on the BIDDING SHEET.

The contract unit price paid per ton for **Asphalt Concrete, Type A** shall include full compensation for furnishing all labor, materials (including asphalt binder, prime coat and binder, and seal coat), tools, equipment, and incidentals, and for doing all the work involved in furnishing, placing and compacting asphalt concrete (including installing prime coat, paint binder, and fog seal coat; and water furnished and applied to tacky asphaltic emulsion for mixing-type asphaltic emulsion), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Excavation for installation of asphalt concrete pavement and subgrade structural section, and disposal of resulting materials are deemed included in the bid item for **Earthwork** and **Disposal of Excess Site Grading Soils**.

14.48 AGGREGATE BASE

GENERAL

Furnishing and installing aggregate base shall conform to Section 26, "Aggregate Bases," of the Standard Specifications and these specifications, as shown on the plans, and as directed by the Engineer.

MATERIALS

Aggregate base shall conform to the grading specified for the one-and-one-half (1½)-inch or the three-quarter (3/4)-inch maximum aggregate size and shall be Class 2. Aggregate base shall contain a minimum of 25% recycled material.

DESCRIPTION OF WORK

Install the aggregate base to the grades and elevations shown on the plans and specified in these special provisions. Compact to a minimum of ninety-five (95) percent relative compaction unless specified otherwise on the plans or in these special provisions.

MEASUREMENT

Furnishing, placing, and compacting the aggregate base will be measured for payment by the ton.

PAYMENT

Payment for furnishing, placing, and compacting the aggregate base shall be deemed included in the price bid per ton for Class 2 Aggregate Base, as set forth on the BIDDING SHEET.

The contract unit price paid per ton for **Class 2 Aggregate Base** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing, placing and compacting the aggregate base (including delivery, storage, etc.), as specified in the Standard Specifications and these special provisions, as shown on the plans, and as directed by the Engineer.

Excavation for installation of Class 2 aggregate base, and disposal of resulting materials are deemed included in the bid item for **Earthwork** and **Disposal of Excess Site Grading Soils**.

14.49 BIORETENTION SOIL

GENERAL

Summary

The bioretention soil shall conform to these specifications, as shown on the plans, and as directed by the Engineer.

Submittals

The Contractor shall submit the following to the Engineer:

1. A minimum one (1)-gallon size sample of mixed bioretention soil.

2. Certification from the soil supplier or an accredited laboratory that the bioretention soil meets the requirements of this guideline specification.

3. Grain size analysis results of the fine sand component performed in accordance with ASTM D 422, "Standard Test Method for Particle Size Analysis of Soils," or Caltrans Test Method (CTM) C202.

4. Quality analysis results for compost performed in accordance with Seal of Testing Assurance (STA) standards, as specified for Composted Material in the Materials section.

5. Organic content test results of mixed bioretention soil. Organic content test shall be performed in accordance with by Testing Methods for the Examination of Compost and Composting 05.07A, "Loss-On-Ignition Organic Matter Method."

6. Grain size analysis results of compost component performed in accordance with ASTM D 422, "Standard Test Method for Particle Size Analysis of Soils."

7. A description of the equipment and methods used to mix the sand and compost to produce the bioretention soil.

The Contractor shall provide the Engineer with the name of all testing laboratories, including the following information for each laboratory:

1. Contact person
2. Address
3. Phone
4. Email
5. Qualifications of laboratory and personnel including the date of current certification by USCC, ASTM, Caltrans, or approved equal.

MATERIALS

Bioretention Soil

The bioretention soil shall meet the following requirements:

1. Achieve a long-term, in-place infiltration rate of at least five (5) inches per hour.
2. Support vigorous plant growth.
3. Consist of the following mixture of fine sand and compost, measured on a volume basis:
    a. Sixty to seventy (60 to 70) percent sand, and
    b. Thirty to forty (3 to 40) percent compost

Sand

Sand shall meet the following requirements:

1. Be free of wood, waste, coating such as clay, stone dust, carbonate, etc., or any other deleterious material. All aggregate passing the No. 200 sieve size shall be non-plastic.

2. Sand shall be analyzed by an accredited lab using the following sieve sizes inch (ASTM D 422, CTM 202, or as approved by municipality):
    a. No. 200,
    b. No. 100,

c. No. 40 or No. 50,
d. No. 30,
e. No. 16,
f. No. 8,
g. No. 4, and
h. 3/8-inch).

3. Sand shall meet the following gradation:

Sieve Size	Percent Passing	
	Min	Max
3/8 inch	100	100
No. 4	90	100
No. 8	70	100
No. 16	40	95
No. 30	15	70
No. 40 or 50	5	55
No. 100	0	15
No. 200	0	5

Note: all sands complying with ASTM C33 for fine aggregate comply with the above gradation requirements.

Compost

Compost shall be a well decomposed, stable, weed-free organic matter source derived from waste materials including yard debris, wood wastes, or other organic materials not including manure or biosolids meeting the standards developed by the U.S. Composting Council (USCC). The product shall be certified through the USCC STA Program (a compost testing and information disclosure program).

Compost Quality Analysis by Laboratory

Before delivery of the soil, the supplier shall submit a copy of laboratory analysis performed by a laboratory that is enrolled in the USCC's Compost Analysis Proficiency program and using approved Test Methods for the Examination of Composting and Compost.

The lab report shall verify:

1. Organic Matter Content – Thirty-five to seventy-five (35 to 75) percent by dry weight.

2. Carbon and Nitrogen Ratio – C:N < 25:1 and C:N >15:1.

3. Maturity/Stability – Any one of the following is required to indicate stability:
   a. Oxygen Test < 1.3 O_2 /unit TS /hr

b. Specific oxy. Test < 1.5 O_2 / unit BVS /hr
c. Respiration test < 8 mg CO_2-C /g OM / day
d. Dewar test < 20 Temp. rise (°C) e.
e. Solvita® > 5 Index value
f. Toxicity – Any one of the following measures is sufficient to indicate non-toxicity.
g. NH_4^+ – NO_3--N < 3
h. Ammonium < 500 ppm, dry basis
i. Seed Germination > 80 percent of control
j. Plant Trials > 80 percent of control
k. Solvita® = 5 Index value.

4. Nutrient Content – Provide analysis detailing nutrient content including N-P-K, Ca, Na, Mg, S, and B.
    a. Total Nitrogen – Content = 0.9 percent or above preferred
    b. Boron – Total shall be <80 ppm.

5. Salinity must be reported; < 6.0 mmhos/cm.

6. pH – Shall be between 6.2 and 8.2; may vary with plant species.

Compost Quality Analysis by Compost Supplier

Before delivery of the compost to the soil supplier, the Compost Supplier shall verify the following:

1. Feedstock Materials – Shall be specified and include one or more of the following: landscaping/yard trimmings, grass clippings, food scraps, and agricultural crop residues.

2. Maturity/Stability – Shall have a dark brown color and a soil-like odor. Compost exhibiting a sour or putrid smell or containing recognizable grass or leaves, or is hot one-hundred-twenty (120) °Fahreheit upon delivery or rewetting is not acceptable.

3. Weed Seed/Pathogen Destruction – Provide proof of process to further reduce pathogens). For example, turned windrows must reach a minimum of fifty-five (55) °Celcius for fifteen (15) days with at least five (5) turnings during that period.

Compost Texture

Compost for bioretention soils shall be analyzed by an accredited lab using No. 200, one-quarter (¼)-inch, one-half (½)-inch, and one (1)-inch sieves (ASTM D 422 or as approved by municipality), and meet the following gradation:

Sieve Size	Percent Passing (by weight)	
	Min	Max
1 inch	99	100
½ inch	90	100
¼ inch	40	90
No. 200	1	10

Additional Requirements

Compost shall also meet the following requirements:

1. Bulk Density – Shall be between 500 and 1,100 dry pounds per cubic yard.
2. Moisture Content – Shall be between 30 percent and 55 percent of dry solids.
3. Inert Ingredients – Compost shall be relatively free of inert ingredients, including glass, plastic and paper, < 1 percent by weight or volume.
4. Select Pathogens – Salmonella <3 MPN/4 grams of TS, or Coliform bacteria <10000 MPN/gram
5. Trace Contaminant Metals (e.g., Lead, Mercury) – Product must meet U.S. EPA, 40 CFR 503 regulations.
6. Compost Testing – Compost supplier will test all compost products within one-hundred-twenty (120) calendar days prior to application. Samples will be taken using the STA sample collection protocol. (The sample collection protocol can be obtained from the U.S. Composting Council, 4250 Veterans Memorial Highway, Suite 275, Holbrook, NY 11741 Phone: 631-737-4931, www.compostingcouncil.org). The sample shall be sent to an independent STA Program-approved lab. The compost supplier will pay for the test.

DESCRIPTION OF WORK

The Contractor shall furnish and install bioretention soil to the depths specified on the plans. The Contractor shall compact the soil as specified in these special provisions and as shown on the plans.

MEASUREMENT

Bioretention soil will be measured for payment by the cubic yard based on the dimensions shown on the plans, adjusted by the amount of any change ordered by the Engineer.

PAYMENT

Payment for bioretention soil shall be deemed included in the price bid per cubic yard for Bioretention Soil, as set forth on the BIDDING SHEET.

The contract price paid per cubic yard for **Bioretention Soil** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing and installing the bioretention soil (including delivery, mixing, storage and placement, etc.), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

14.50 MINOR CONCRETE

GENERAL

Sidewalk, driveways, curbs, cutoff walls, gutters, pedestrian ramps, parking stall bumpers, tank footing, and planter box shall conform to the provisions in Section 73, "Concrete Curbs and Sidewalks," and Section 90-10, "Minor Concrete," of the Standard Specifications and these specifications, as shown on the plans, and as directed by the Engineer.

NOTE:

A 200 square foot section of sidewalk (4' wide by approximately 50' long) shall be constructed adjacent to at the south end of the 951A Building. This section of sidewalk is **not shown on the Plans.** The Engineer shall determine the limits of sidewalk in the field and provide stakes for the Contractor as required. The sidewalk will be paid for under the bid item **Minor Concrete (Sidewalk and Driveway).** No additional compensation will be allowed for any adjustments to the landscaping and irrigation plans resulting from the construction of this additional sidewalk.

MATERIALS

Sidewalk, Driveways, Curbs, Cutoff Walls, Gutters, and Pedestrian Ramps

Sidewalks, driveways, curbs, cutoff walls, gutters, and pedestrian ramps constructed of materials other than Portland cement concrete shall be replaced in kind using materials conforming to these specifications and/or approved in writing by the Engineer.

Truncated domes for pedestrian ramps shall be Armor Tile, as manufactured by Engineered Plastics, Inc., Sound Amplifying, Color Yellow, or approved equivalent. The minimum truncated dome size for Case A and Case G curb ramps is thirty-six by forty-eight (36 x 48) inches. The minimum truncated dome size for Case C is curb ramps thirty-six by sixty (36 x 60) inches.

Parking Stall Bumpers

Parking bumpers must be steel-reinforced PC units. The concrete must be air-entrained and have a minimum compressive strength of four-thousand (4,000) psi.

Each unit must be from four (4) to six (6) inches high, from six (6) to nine (9) inches wide, and from six (6) to eight (8) feet long. All units must be the same size.

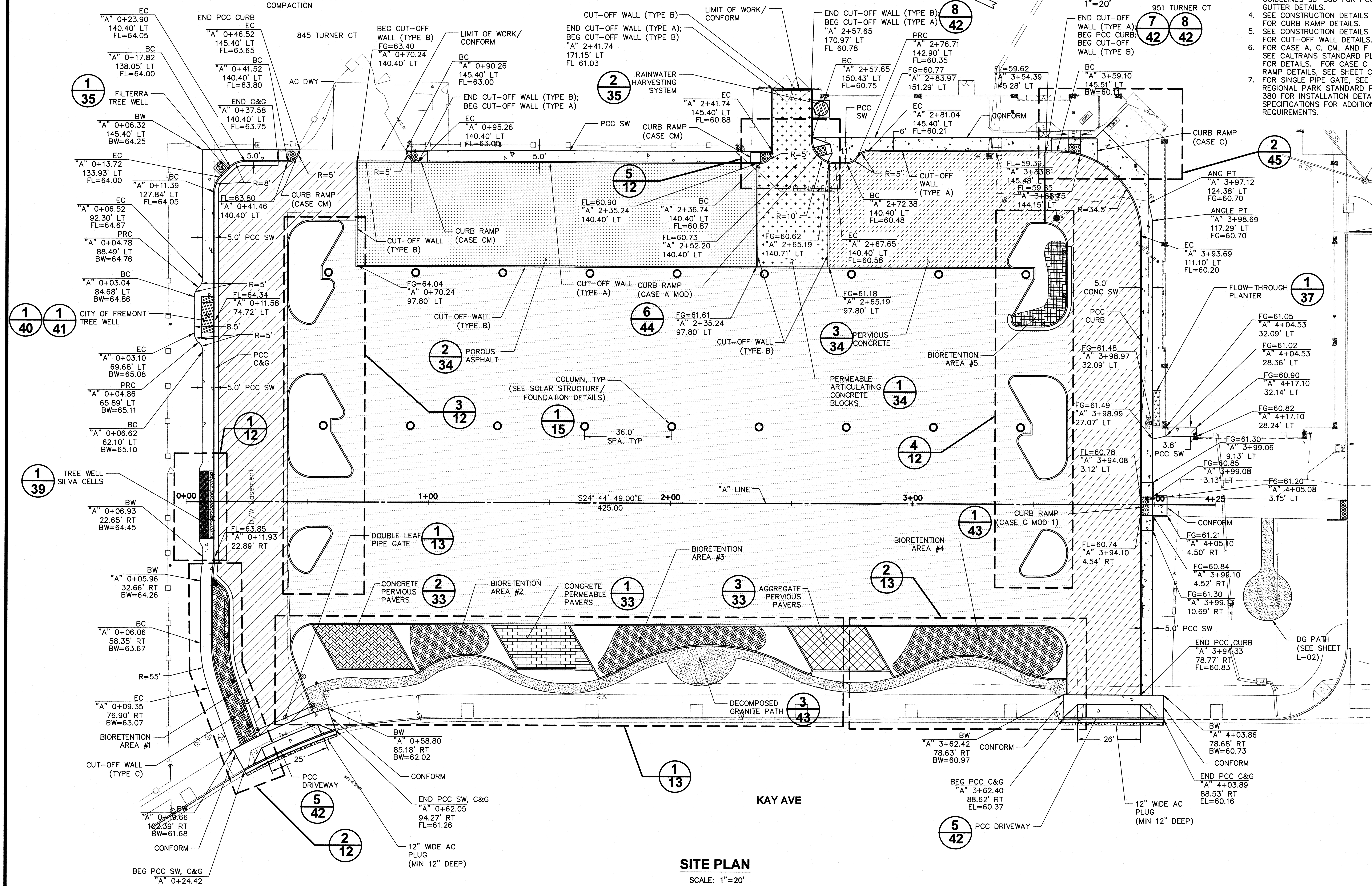
LEGEND:

- BIORETENTION AREA
- CONCRETE SIDEWALK
- TRUCK PAVEMENT
  - 8" AC (TYPE A)
  - 12" CL 2 AB @ 95% COMPACTION
- CONC PERVIOUS PAVER
- POROUS ASPHALT
- DETECTABLE WARNING SURFACE
- DG SIDEWALK
- PERVIOUS CONCRETE
- CONCRETE PERMEABLE PAVERS
- AGGREGATE PERVIOUS PAVERS
- FLOW-THROUGH PLANTER
- PERMEABLE ARTICULATING CONCRETE BLOCKS
- 4" HOT MIXED ASPHAULT (TYPE A) 6" AB (CL 2)

NOTES:

1. SEE SITE PLAN SHEETS L-03 AND L-04 FOR ADDITIONAL IMPROVEMENT DETAILS.
2. SEE CITY OF HAYWARD STANDARD DETAILS 2014 FOR PCC DRIVEWAY AND SIDEWALK DETAILS.
3. SEE COUNTY OF ALAMEDA DESIGN GUIDELINES SD-300 FOR PCC CURB & GUTTER DETAILS.
4. SEE CONSTRUCTION DETAILS SHEET C-11 FOR CURB RAMP DETAILS.
5. SEE CONSTRUCTION DETAILS SHEET C-02 FOR CUT-OFF WALL DETAILS.
6. FOR CASE A, C, CM, AND F CURB RAMPS, SEE CALTRANS STANDARD PLANS 2015 FOR DETAILS. FOR CASE C MOD 1 CURB RAMP DETAILS, SEE SHEET C-11.
7. FOR SINGLE PIPE GATE, SEE EAST BAY REGIONAL PARK STANDARD PLANS 301 & 380 FOR INSTALLATION DETAILS, SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

20 0 10 20 40 80 (IN FEET) 1"=20'



SITE PLAN

SCALE: 1"=20'

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

SITE PLAN

WRECO, 1243 Alpine Road, Suite 108, Walnut Creek, California 94596, (925) 941-0017, Fax (925) 941-0018

DATE	NOV 2017
SCALE	AS SHOWN
WORK ORDER NO.	F86020/R86020
SPECIFICATION NO.	FC 3A-138
SHEET NO.	10 OF 57
FILE NO.	CB-955

L-01

REVISIONS — NO. | DESCRIPTION | BY | DATE | APPV'D

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	REVIEWED BY:	DATE:
CONSTRUCTION		
MAINTENANCE		
REAL ESTATE		

	REVIEWED BY:	DATE:
SURVEY		
TRAFFIC		
ENVIRONMENTAL		

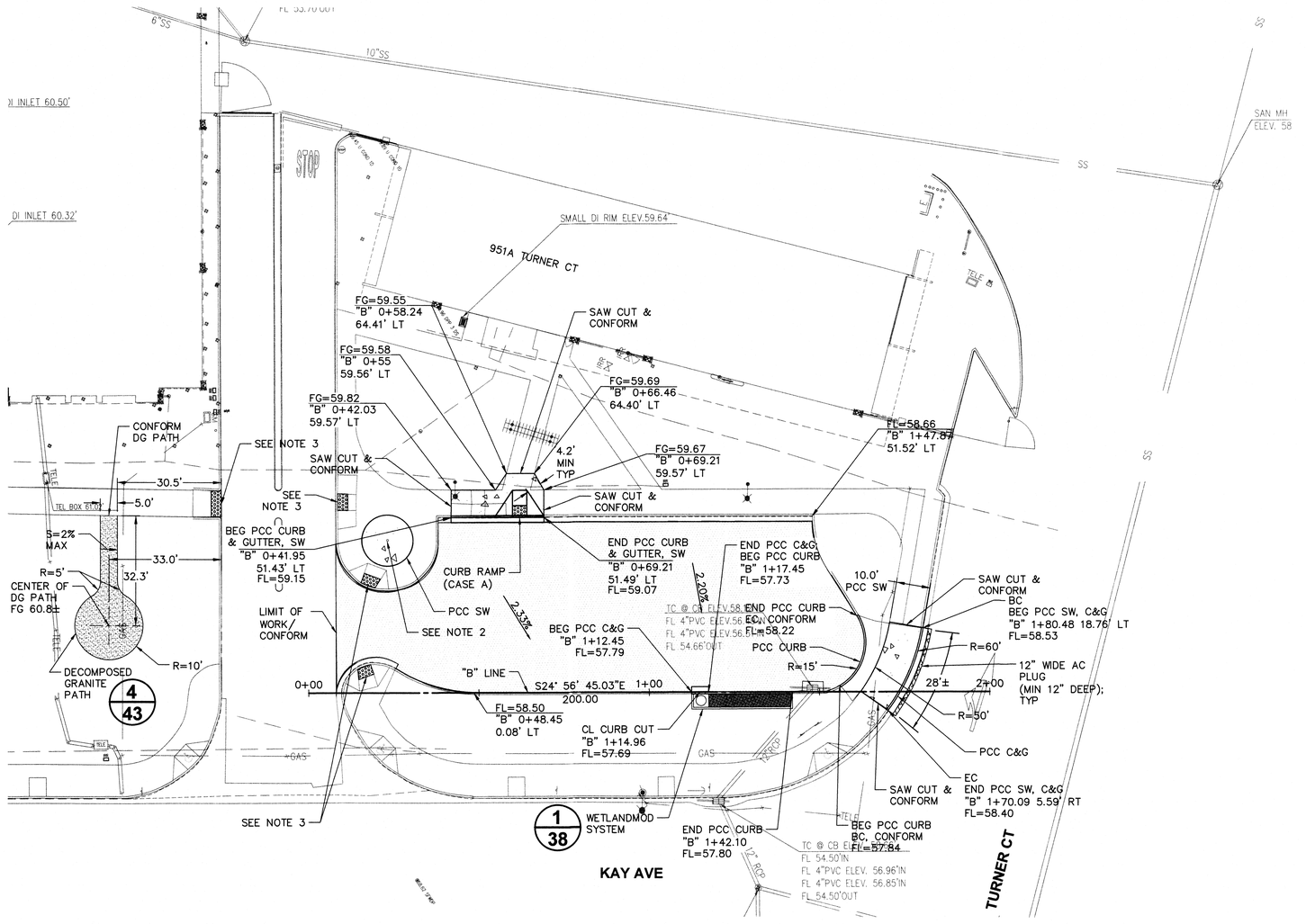
LEGEND:

- BIORETENTION AREA
- CONCRETE SIDEWALK
- TRUCK PAVEMENT
  - 8" AC (TYPE A)
  - 12" CL 2 AB @ 95% COMPACTION
- CONC PERVIOUS PAVER
- POROUS ASPHALT
- DETECTABLE WARNING SURFACE
- DG SIDEWALK
- PERVIOUS CONCRETE
- CONCRETE PERMEABLE PAVERS
- AGGREGATE PERVIOUS PAVERS
- FLOW-THROUGH PLANTER
- PERMEABLE ARTICULATING CONCRETE BLOCKS
- 4" HOT MIXED ASPHAULT (TYPE A) 6" AB (CL 2)

20 0 10 20 40 80

(IN FEET)

1"=20'



SITE PLAN

SCALE: 1"=20'

NOTES:

1. SEE SITE PLAN SHEET L-01 FOR NOTES AND LEGEND.
2. REPLACE EXISTING FLAG POLE, SEE SPECIFICATIONS FOR DETAILS.
3. RETROFIT EXISTING CURB RAMPS WITH DETECTABLE WARNING SURFACES. SEE CALTRANS STANDARD PLAN A88A FOR DETAILS.

NO.	DESCRIPTION	BY	DATE	APP'D

REVISIONS

PROFESSIONAL ENGINEER ANDREW SOKOKA No. 61122 Exp. 12/31/19 CIVIL STATE OF CALIFORNIA

wreeo
1243 Alpine Road, Suite 108
Walnut Creek, California 94596
(925) 941-0017
Fax (925) 941-0018

DESIGNED: ANDREW SOKOKA
DRAWN: ANDREW SOKOKA
CHECKED: GARRETT LOW
APPROVED: ANALETTE SOKOKA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

APPROVAL RECOMMENDED: MOSES TSANG
REVIEWED: LINE MANAGER
APPROVED: HANSON HOM, DIRECTOR

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

SITE PLAN

DATE: NOV 2017
SCALE: AS SHOWN
WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 11 OF 57
FILE NO. CB-955

L-02

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

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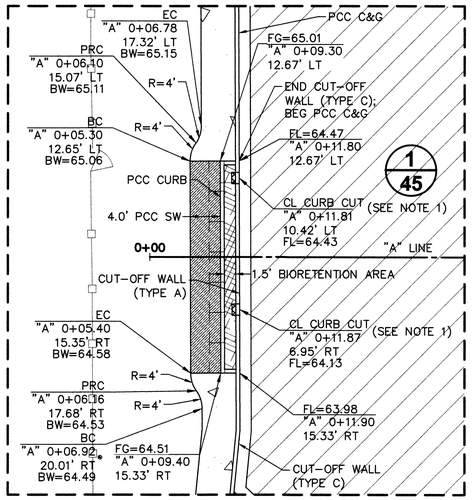
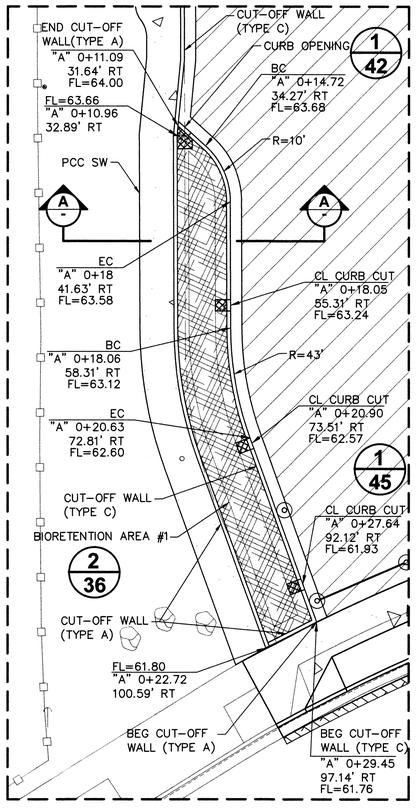


BIORETENTION AREA #6 DETAIL

SCALE: 1"=10'

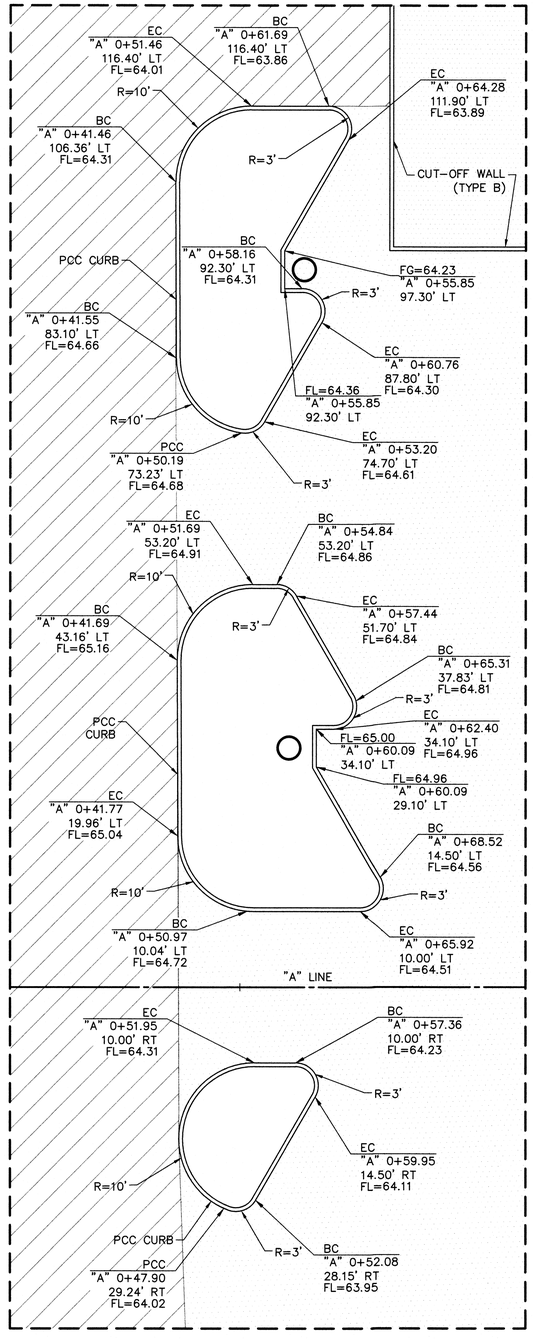
1/10



BIORETENTION AREA #1 DETAIL

SCALE: 1"=10'

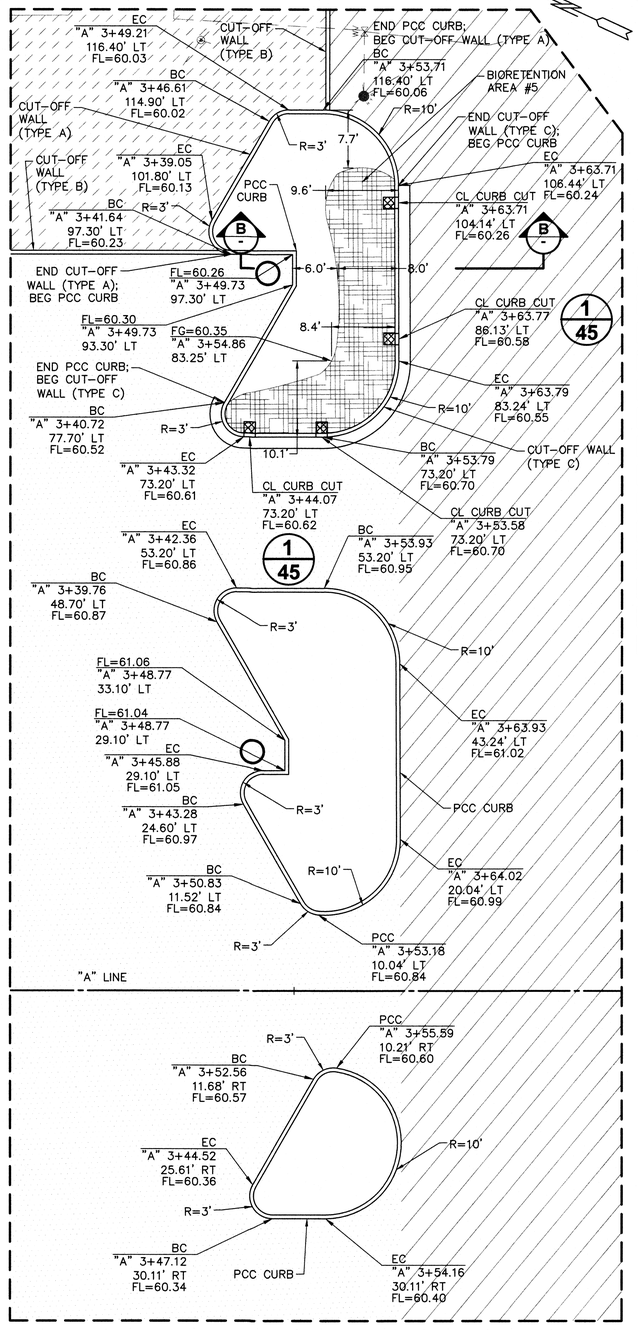
2/10



MEDIAN ISLANDS ENLARGEMENT DETAILS

SCALE: 1"=10'

3/10



BIORETENTION AREA #5 & MEDIAN ISLANDS ENLARGEMENT DETAILS

SCALE: 1"=10'

4/10

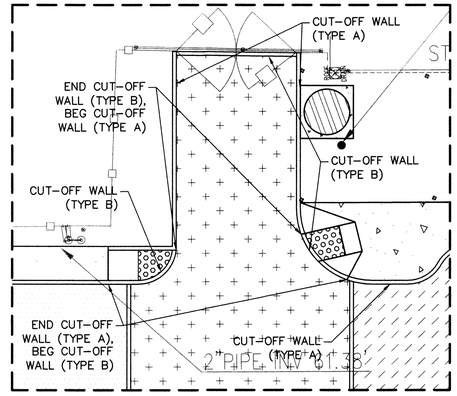
10 0 5 10 20 40

(IN FEET)

1"=10'

NOTES:

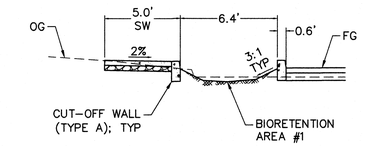
1. USE 2.0'x0.5'x0.3' STREAMBED COBBLES AT EACH CURB CUT LOCATIONS FOR BIORETENTION AREA #6.
2. SEE SHEETS C-01 & C-10 FOR CUT-OFF WALL DETAILS.



CUT-OFF WALL AT CURB RAMP DETAIL

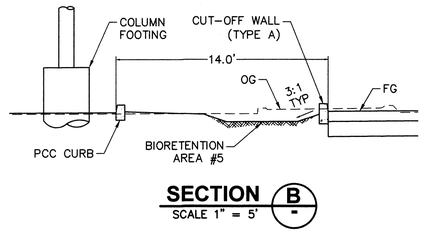
SCALE: 1"=10'

5/10



SECTION A

SCALE 1" = 5'



SECTION B

SCALE 1" = 5'

REVISIONS				
NO.	DESCRIPTION	BY	DATE	APPVD
1				
2				
3				
4				
5				

PROFESSIONAL ENGINEER — ANDREW SEKOKA — No. 81122 — Exp. 12.31.19 — CIVIL — STATE OF CALIFORNIA

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DRAWN: ANDREW SEKOKA
DESIGNED: ANDREW SEKOKA
CHECKED: GARRETT LOW
APPROVED: ANALETTE DORIA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED: LESLIE GUTIERREZ
REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED: HANSEL CHAN

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

SITE PLAN DETAILS

DATE	NOV 2017
SCALE	AS SHOWN
WORK ORDER NO.	F86020/R86020
SPECIFICATION NO.	FC 3A-138
SHEET NO.	12 OF 57
FILE NO.	CB-955

L-03

	REVIEWED BY:	DATE:
CONSTRUCTION		
MAINTENANCE	SURVEY	
REAL ESTATE	TRAFFIC	
	ENVIRONMENTAL	

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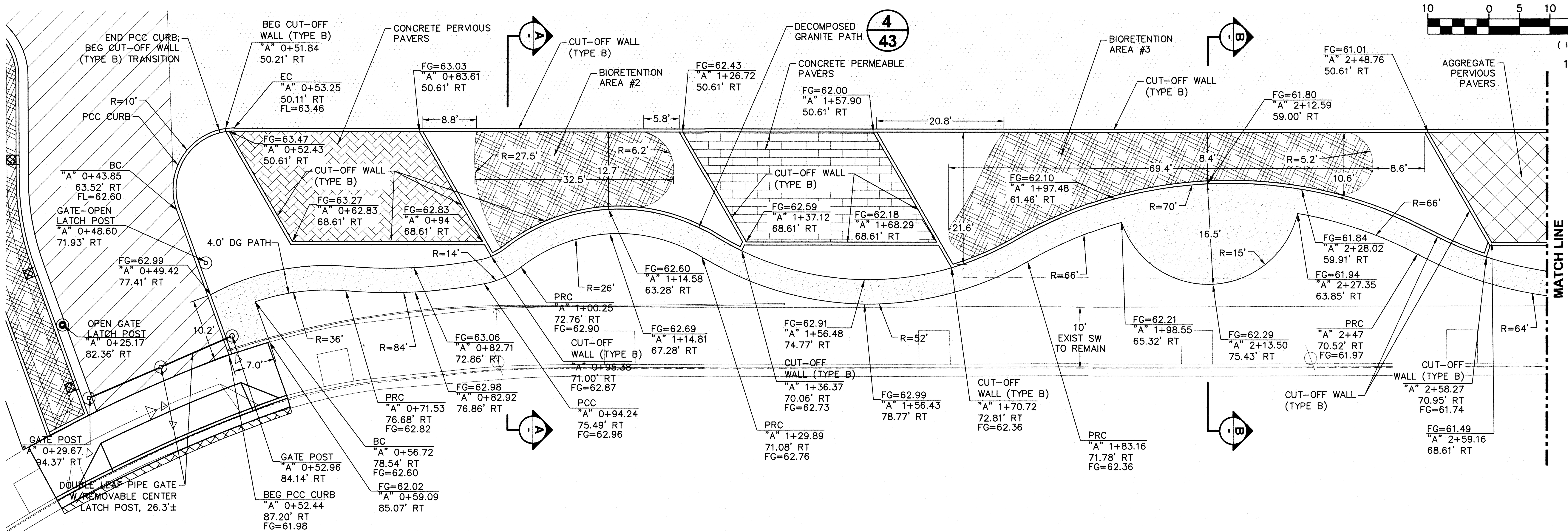
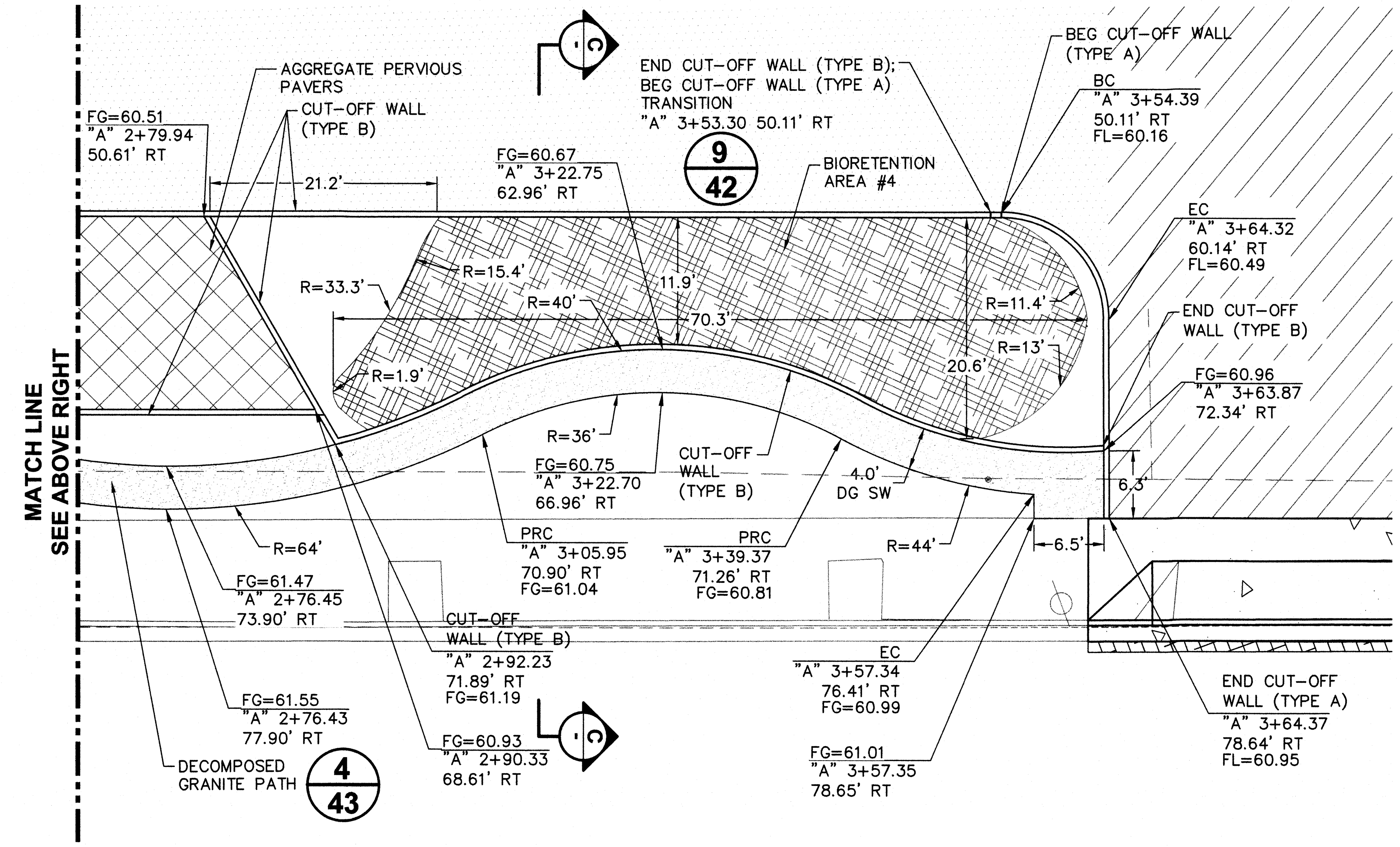


NOTES:

1. DOUBLE LEAF PIPE GATE SHALL BE PER EBRPD SD-301 W/MODIFIED WIDTH
2. LOCATIONS OF OPEN GATE LATCH POSTS SHALL BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER.
3. CENTER LATCH POST SHALL BE REMOVABLE

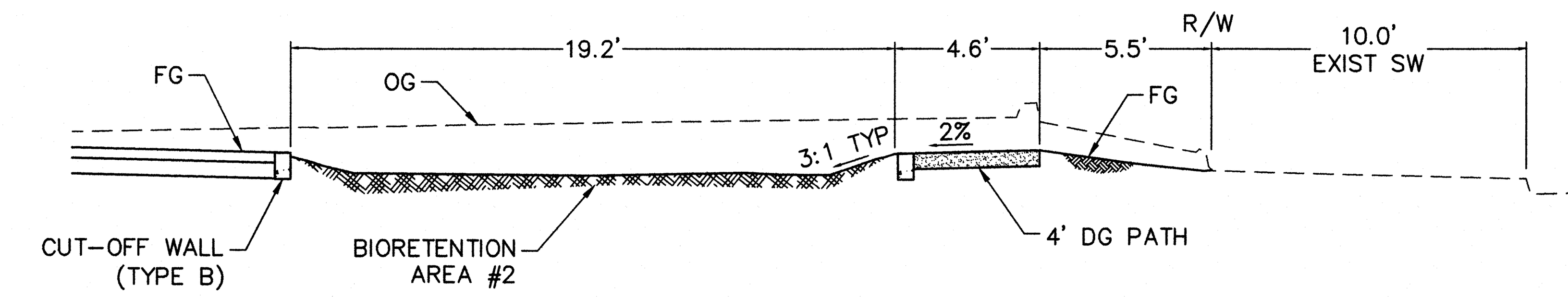
BIORETENTION AREA #2, #3, & DG PATH ENLARGEMENT DETAILS (1/10)

SCALE: 1"=10'



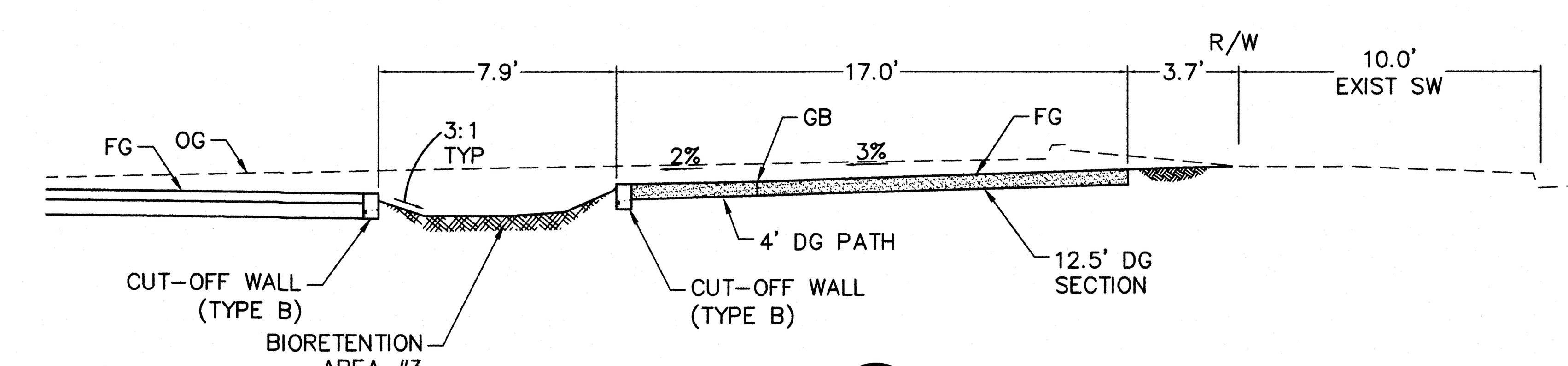
BIORETENTION AREA #4 & DG PATH ENLARGEMENT DETAILS (2/10)

SCALE: 1"=10'



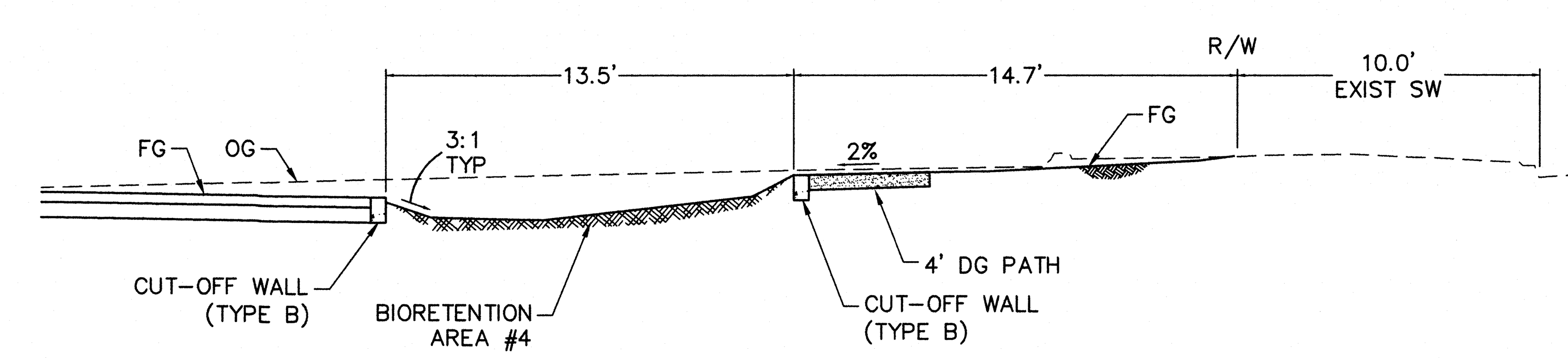
SECTION A

SCALE 1" = 5'



SECTION B

SCALE 1" = 5'



SECTION C

SCALE 1" = 5'

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CONSTRUCTION		SURVEY	
MAINTENANCE		TRAFFIC	
REAL ESTATE		ENVIRONMENTAL	

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD

WRECO
1243 Alpine Road, Suite 108
Walnut Creek, California 94596
(925) 941-0017
Fax (925) 941-0018

DRAWN: ANDREW SEKIOKA — CHECKED: GARRETT LOW
DESIGNED: ANDREW SEKIOKA — APPROVED: ANALETTE OCHOA

REGISTERED PROFESSIONAL ENGINEER — ANDREW SEKIOKA — No. 61122 — Exp. 12/31/18 — CIVIL — STATE OF CALIFORNIA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED: — REVIEWED: MOSES TSANG — APPROVAL RECOMMENDED:

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

SITE PLAN DETAILS

DATE: NOV 2017 — SCALE: AS SHOWN

WORK ORDER NO. F86020/R86020

SPECIFICATION NO. FC 3A-138

SHEET NO. 13 OF 57

L-04

FILE NO. **CB-955**

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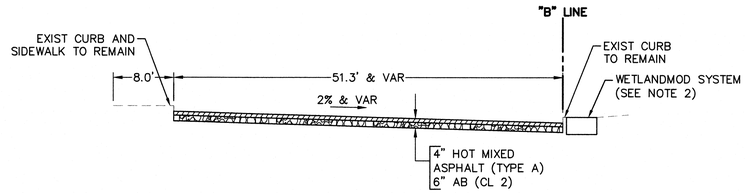
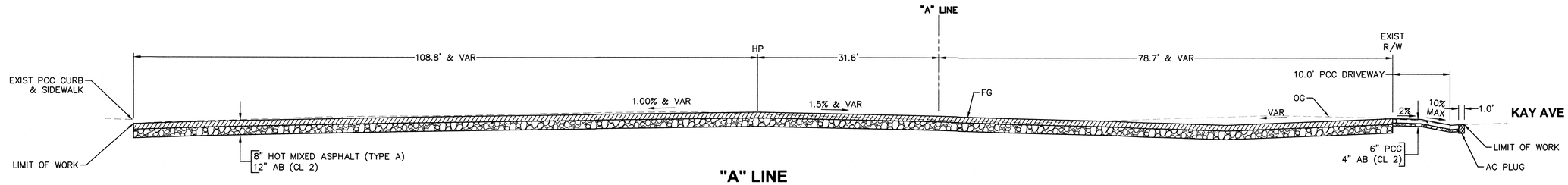


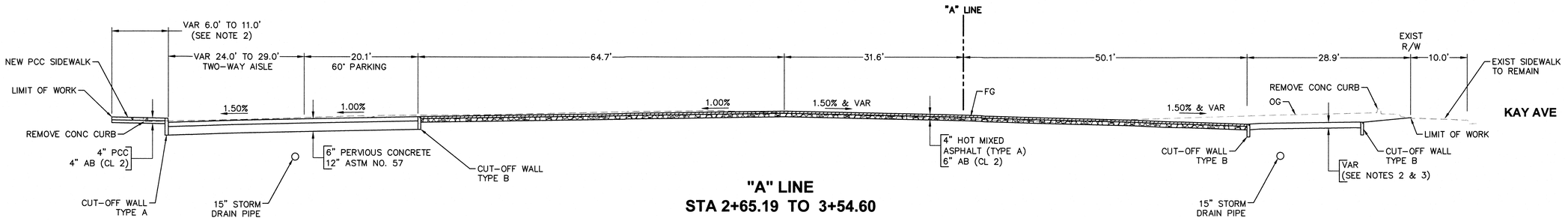
"B" LINE STA 0+06.00 TO 1+60.00

NOTES:

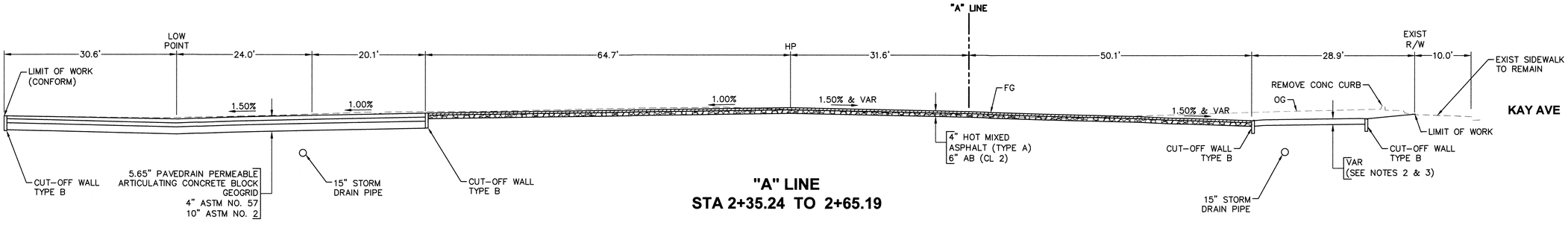
1. SEE CITY OF HAYWARD STANDARD DETAILS 2014 FOR SIDEWALK DETAILS.
2. SEE SITE PLANS FOR LIMITS OF CURB, GUTTER, SIDEWALK, BMP'S, AND PAVEMENT RECONSTRUCTION.
3. SEE SITE PLANS FOR BMP TYPE.
4. SEE CONSTRUCTION DETAILS SHEETS FOR CUT-OFF WALL DETAILS.



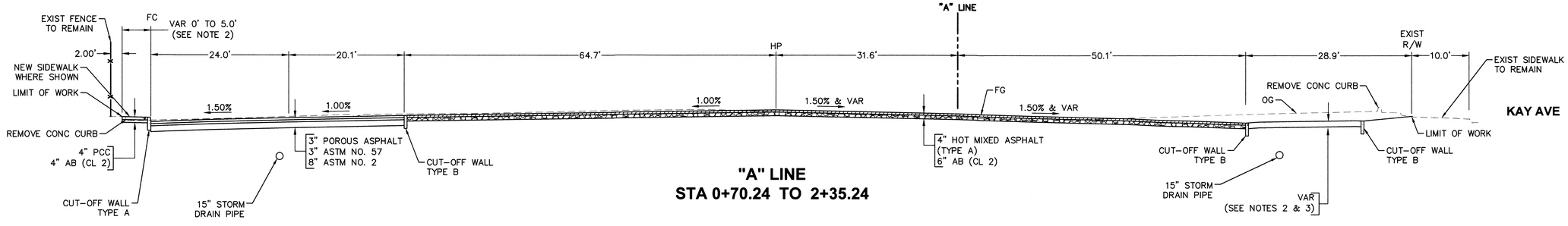
"A" LINE
STA 0+13.35 TO 0+70.24
STA 3+54.60 TO 3+94.33



"A" LINE
STA 2+65.19 TO 3+54.60



"A" LINE
STA 2+35.24 TO 2+65.19



"A" LINE
STA 0+70.24 TO 2+35.24

TYPICAL CROSS SECTIONS

SCALE: NTS

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

	REVIEWED BY:	DATE:
CONSTRUCTION		
MAINTENANCE		
REAL ESTATE		

	REVIEWED BY:	DATE:
SURVEY		
TRAFFIC		
ENVIRONMENTAL		

NO.	DESCRIPTION	BY	DATE	APPV'D
	REVISIONS			

PROFESSIONAL ENGINEER ANDREW SEKOKA No. 61122 Exp. 12/31/19 CIVIL STATE OF CALIFORNIA REGISTERED

wreeo
1243 Alpine Road, Suite 106
Walnut Creek, California 94596
(925) 941-0017
Fax (925) 941-0018

DRAWN: ANDREW SEKOKA
DESIGNED: ANDREW SEKOKA
CHECKED: GARRETT LOW
APPROVED: ANNETTE OCHOA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED: LUIS MENDEZ
APPROVAL RECOMMENDED: MOSES TSANG
HAYWARD ENGINEER: ANDREW SEKOKA

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

TYPICAL SECTION

DATE: NOV 2017
SCALE: AS SHOWN
WORK ORDER NO.: F86020/R86020
SPECIFICATION NO.: FC 3A-138
SHEET NO.: 14 OF 57
FILE NO.: CB-955

X-01

N:\C3D\FLOOD\F86020_Turner_Court_LID\Sheets-WRECO\14 TYPICAL SECTION X-01.dwg 10-18-17 09:22:41 AM Ilene

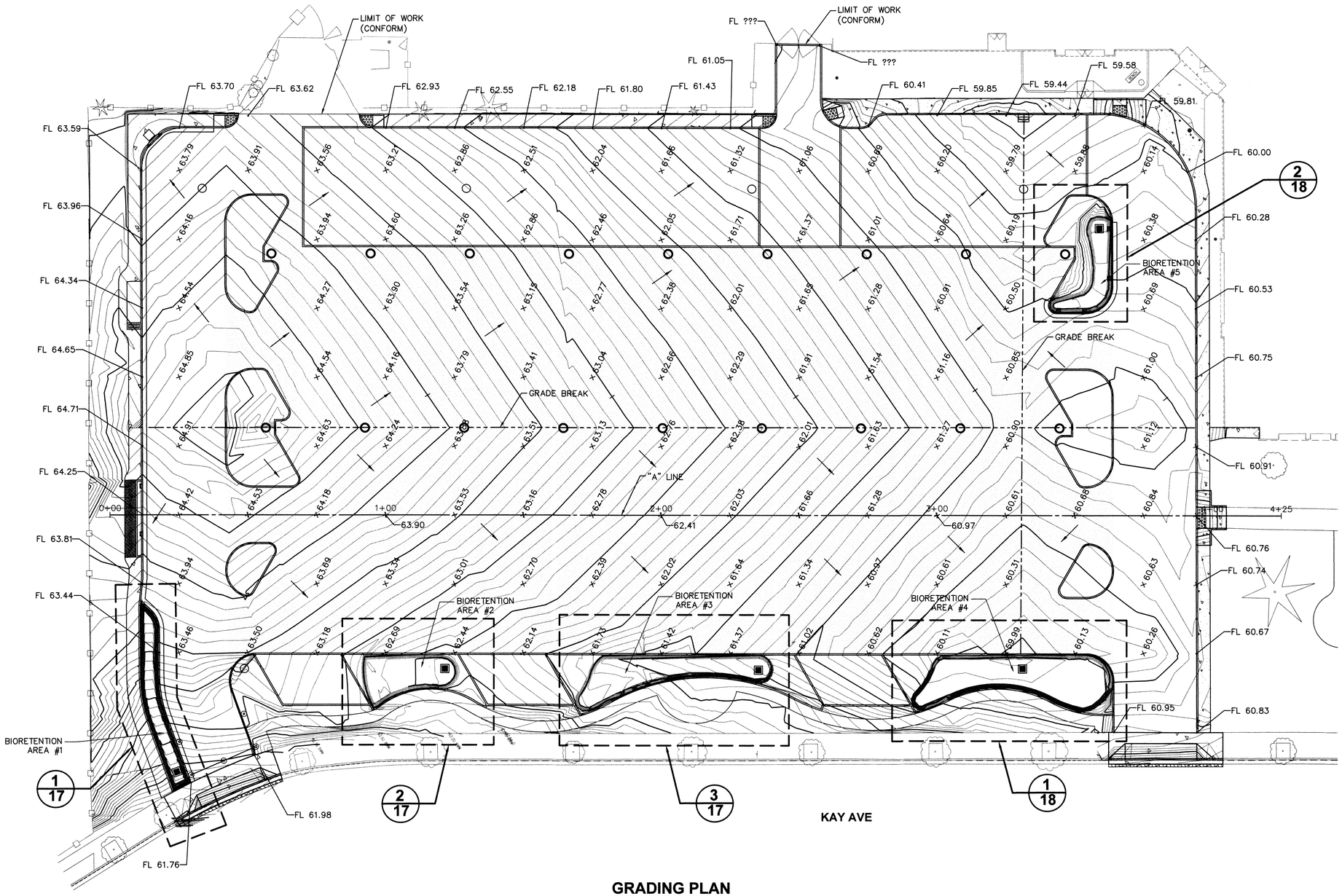
LEGEND:

x 60.00	PAVEMENT ELEVATION ON GRID
FL 60.00	FLOW LINE ELEVATION AT FACE OF CURB
ELEV 60.00	PAVEMENT ELEVATION AT SELECT LOCATIONS
○	SOLAR STRUCTURE COLUMN FOOTING
– – – – –	TOP OF CUT
— — —	TOE OF SLOPE
—·—·—	GRADE BREAK
——→	FLOW DIRECTION

NOTES:

1. SEE SHEET L-01 FOR LEGEND.
2. FINAL PAVEMENT ELEVATIONS SHOWN TYPICALLY ON 25'x25' GRID UNLESS NOTED OTHERWISE.
3. SEE SITE PLANS FOR CURB AND SIDEWALK ELEVATIONS.
4. SEE SITE PLANS FOR LIMITS OF PERVIOUS PAVEMENTS.

20 0 10 20 40 80
(IN FEET)
1"=20'



GRADING PLAN
SCALE 1" = 20'

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

REVIEWED BY:	DATE:
CONSTRUCTION	
MAINTENANCE	
REAL ESTATE	

REVIEWED BY:	DATE:
SURVEY	
TRAFFIC	
ENVIRONMENTAL	

NO.	DESCRIPTION	BY	DATE	APPV'D
	REVISIONS			

PROFESSIONAL ENGINEER ANDREW SKOOKA No. 61122 Exp. 12/31/19 CIVIL STATE OF CALIFORNIA

WRECO
1243 Alpine Road, Suite 108 Walnut Creek, California 94596
(925) 941-0017 Fax (925) 941-0018
CHECKED: GARRETT LOW
APPROVED: ANNETTE OCHOA
DRAWN: ANDREW SKOOKA
DESIGNED: ANDREW SKOOKA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY
RECOMMENDED: LINDY LEE
REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED: HANS KOCHNAVER

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

GRADING PLAN

DATE	NOV 2017
SCALE	AS SHOWN
WORK ORDER NO.	F86020/R86020
SPECIFICATION NO.	FC 3A-138
SHEET NO.	16 OF 57
FILE NO.	CB-955

G-01

N:\C3D\FLOOD\F86020_Turner_Court_LID\Sheets-WRECO\16-18-Grading Plan and Details.dwg 10-18-17 09:26:30 AM Ilene

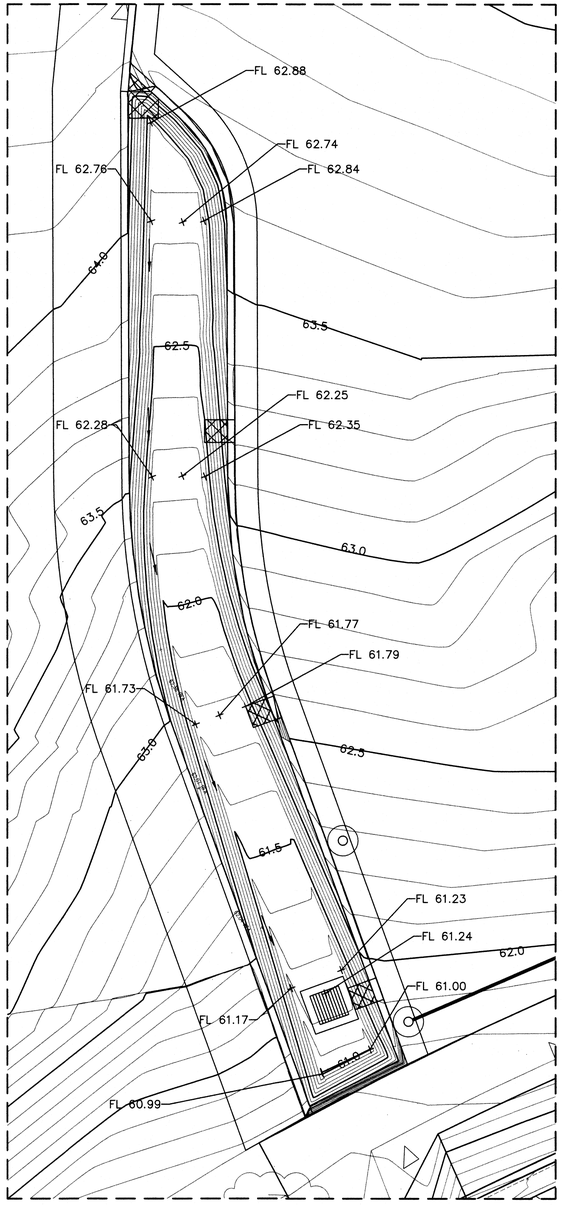
	REVIEWED BY:	DATE:
CONSTRUCTION		
MAINTENANCE		
REAL ESTATE		

	REVIEWED BY:	DATE:
SURVEY		
TRAFFIC		
ENVIRONMENTAL		

NOTES:

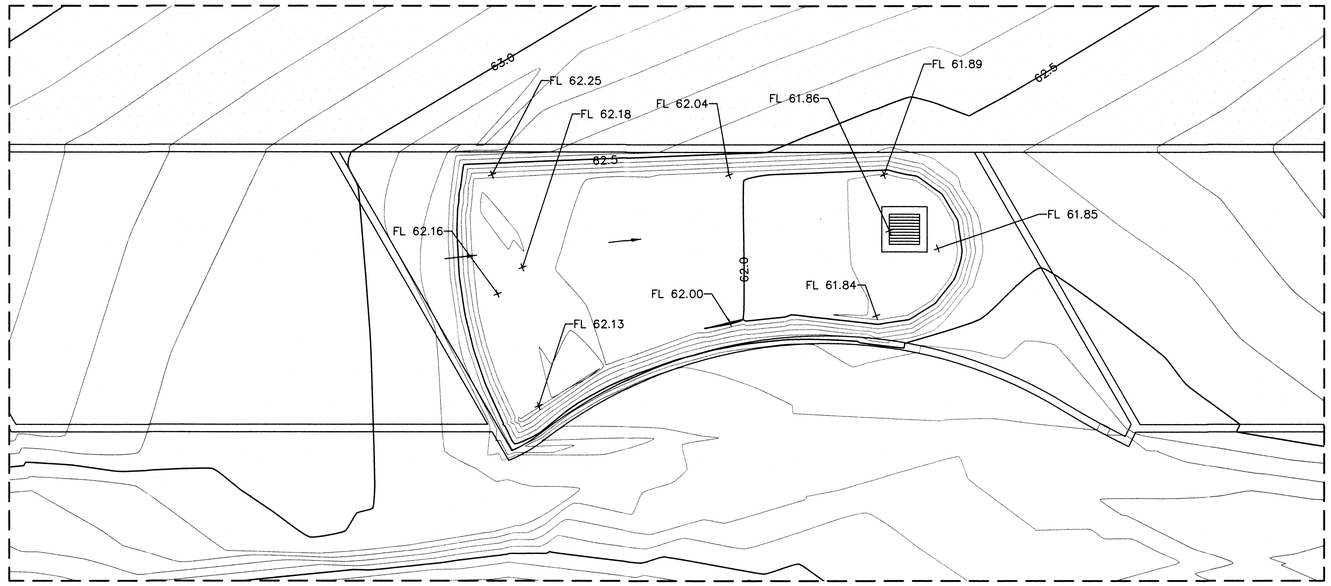
1. SEE SHEET G-01 FOR LEGEND, ADDITIONAL NOTES.
2. DETAILS SHOWN ON THIS SHEET ARE ONLY FOR GRADING WITHIN BIORETENTION AREAS. SEE SHEET G-01 FOR GRADING AND DETAILS OUTSIDE OF BIORETENTION AREAS.

5 0 2.5 5 10 20
(IN FEET)
1"=5'



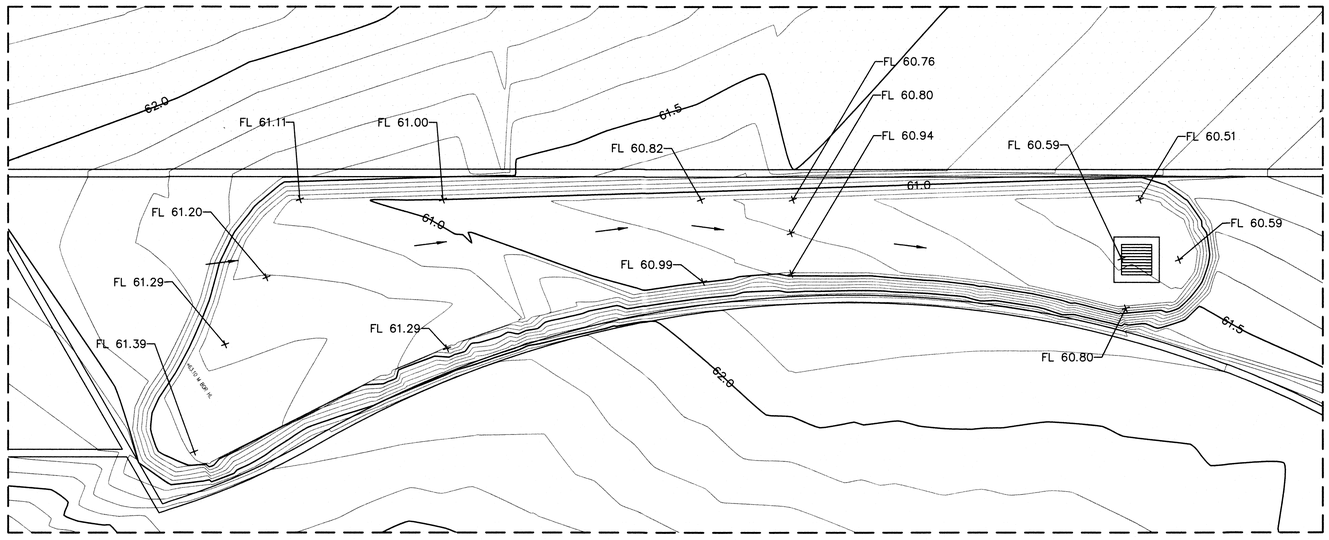
BIORETENTION AREA #1 GRADING DETAIL 1/16

SCALE: 1"=5'



BIORETENTION AREA #2 GRADING DETAIL 2/16

SCALE: 1"=5'



BIORETENTION AREA #3 GRADING DETAIL 3/16

SCALE: 1"=5'

REVISIONS				
NO.	DESCRIPTION	BY	DATE	APPVD
1				
2				
3				
4				
5				

REGISTERED PROFESSIONAL ENGINEER ANDREW SEKIOKA No. 61122 Exp. 12/31/19 CIVIL STATE OF CALIFORNIA

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Fax (925) 941-0018

DRAWN: ANDREW SEKIOKA
DESIGNED: ANDREW SEKIOKA
CHECKED: GARRETT LOW
APPROVED: ANJALETTE DOKKA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED: LEE THOMPSON
REVIEWED: MOSES TSANG
APPROVED: HAO ZHONG

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

GRADING PLAN

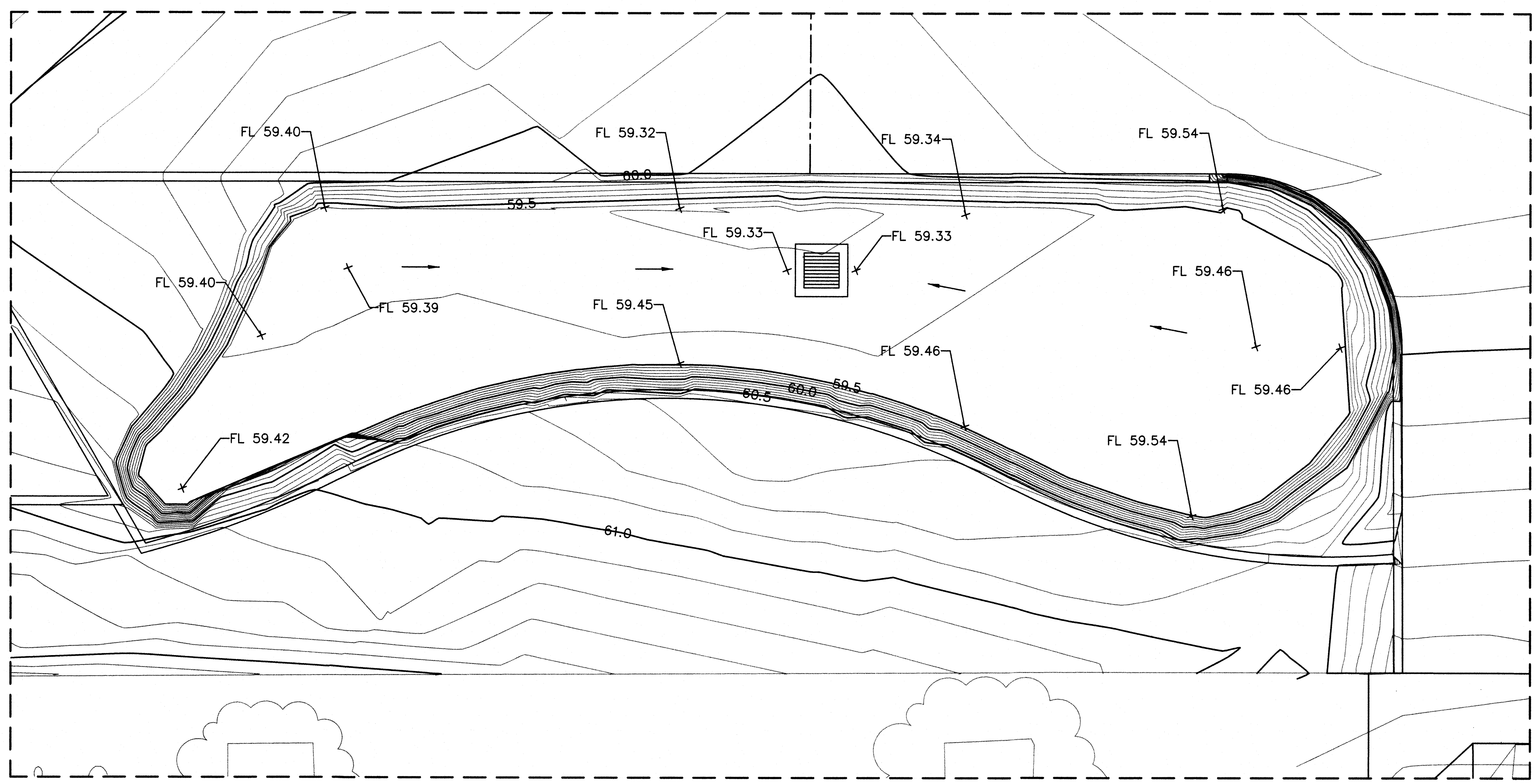
DATE: NOV 2017	SCALE: AS SHOWN
WORK ORDER NO.: F86020/R86020	
SPECIFICATION NO.: FC 3A-138	
SHEET NO.: 17 OF 57	
G-02	FILE NO.: CB-955

FOR REDUCED ENGLISH PLANS
ORIGINAL SCALE IS IN INCHES
0 1 2 3

N:\C3D\FLOOD\F86020_Turner_Court_LID\Sheets-WRECO\16-18-Grading Plan and Details.dwg 10-18-17 09:31:51 AM ilene

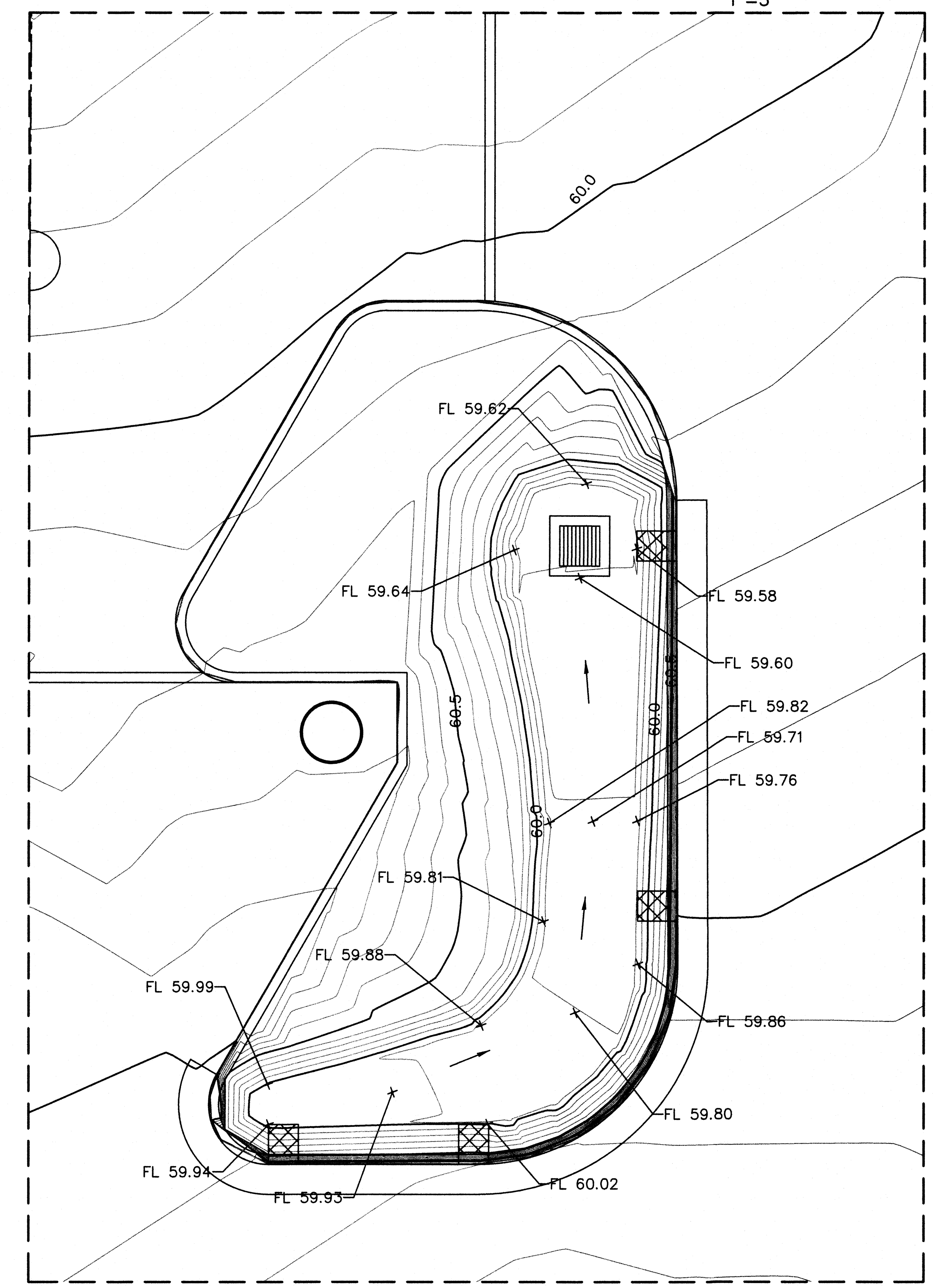
NOTES:

1. SEE SHEET G-01 FOR LEGEND, ADDITIONAL NOTES.
2. DETAILS SHOWN ON THIS SHEET ARE ONLY FOR GRADING WITHIN BIORETENTION AREAS. SEE SHEET G-01 FOR GRADING AND DETAILS OUTSIDE OF BIORETENTION AREAS.



BIORETENTION AREA #4 GRADING DETAIL (1/16)
SCALE: 1"=5'

5 0 2.5 5 10 20
(IN FEET)
1"=5'



BIORETENTION AREA #5 GRADING DETAIL (2/16)
SCALE: 1"=5'

REVIEWED BY:	DATE:	REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY	
MAINTENANCE		TRAFFIC	
REAL ESTATE		ENVIRONMENTAL	

N:\C30\FLOOD\F86020_Turner_Court_LID\Sheets-WRECO\16-18-Grading Plan and Details.dwg 10-18-17 09:32:39 AM Ilene

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD
5				
4				
3				
2				
1				

REGISTERED PROFESSIONAL ENGINEER ANDREW SEKIOKA No. 61122 Exp. 12/31/18 CIVIL STATE OF CALIFORNIA

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1243 Alpine Road, Suite 108
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(925) 941-0017
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DRAWN: ANDREW SEKIOKA
DESIGNED: ANDREW SEKIOKA
CHECKED: GARRETT LOW
APPROVED: ANALETTE OCHOA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY
REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED:

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

GRADING PLAN

DATE	SCALE
NOV 2017	AS SHOWN

WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 18 OF 57
FILE NO. CB-955

G-03

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES
0 1 2 3

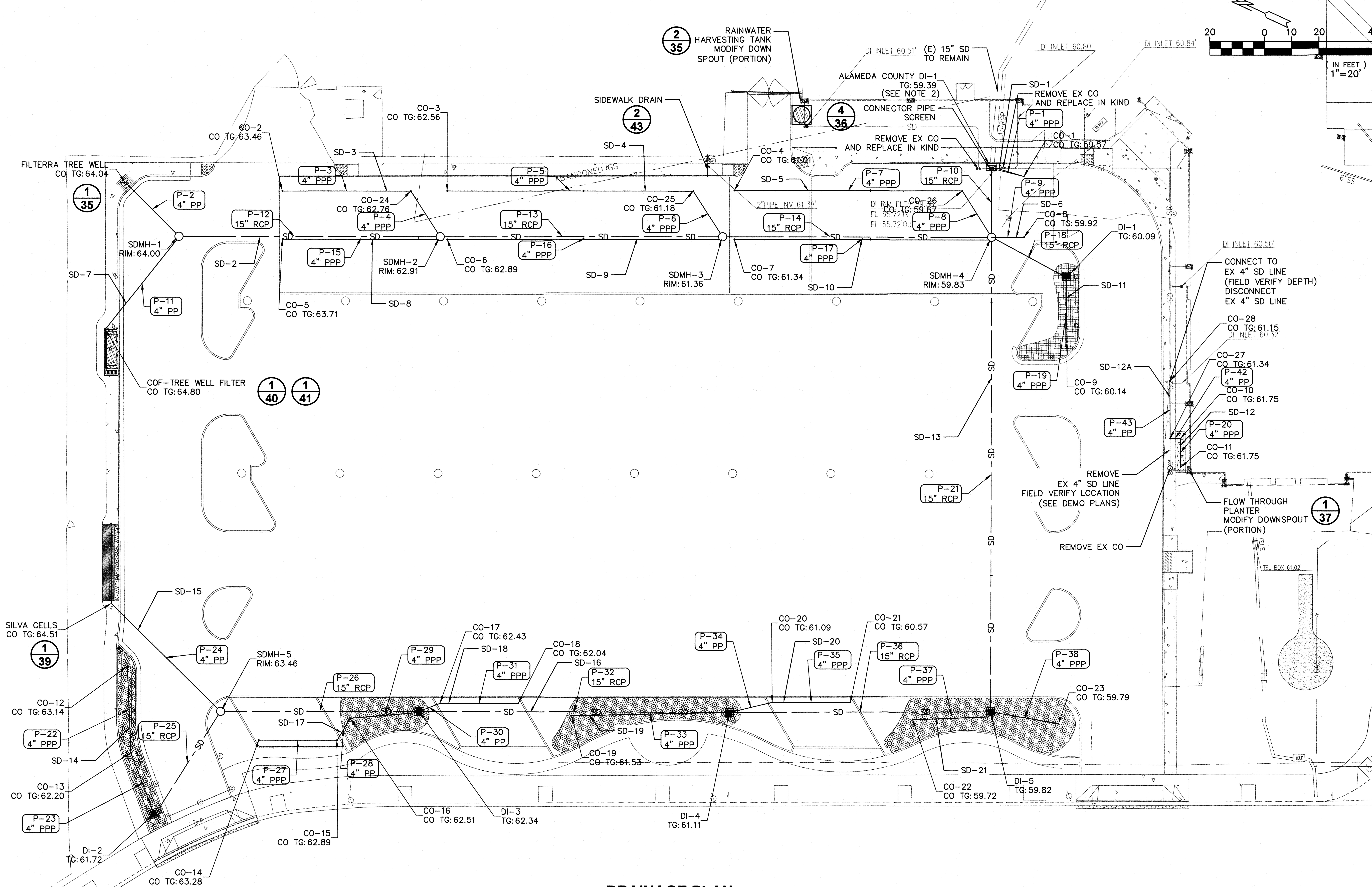
LEGEND:

Symbol	Description
▤	DRAINAGE INLET
▣	EXIST DRAINAGE INLET
○	STORM DRAIN MANHOLE
·	CLEANOUT
— — SD — (OR) ———	PROPOSED STORM DRAIN LINE
———	PROPOSED STORM DRAIN LINE/UNDERDRAIN
== XX" RCP ==	EXIST STORM DRAIN LINE

NOTES:

1. ALL SDMH SHALL BE ALAMEDA COUNTY STANDARD MANHOLE TYPE "B". SEE COUNTY STANDARD DETAIL SD-406.
2. ALL ALAMEDA COUNTY DRAINAGE INLETS NOT IN BIORETENTION AREAS SHALL BE ALAMEDA COUNTY STANDARD INLET TYPE "I". SEE ALAMEDA COUNTY STANDARD DETAILS SD-411.
3. SEE SHEET C-11 FOR BIORETENTION AREA DRAINAGE INLET DETAIL.
4. ALL EXISTING UNDERGROUND STORM DRAIN PIPES TO BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
5. UNLESS OTHERWISE NOTED, ALL EXISTING UNDERGROUND STORM DRAIN PIPES TO BE PROTECTED IN PLACE UPON FIELD VERIFIED.

20 0 10 20 40 80
(IN FEET)
1"=20'



DRAINAGE PLAN

SCALE: 1"=20'

REVIEWED BY:	DATE:	REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY	
MAINTENANCE		TRAFFIC	
REAL ESTATE		ENVIRONMENTAL	

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REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD

WRECO
1243 Alpine Road, Suite 108
Walnut Creek, California 94596
(925) 941-0017
Fax (925) 941-0018

DRAWN: PATRICK YIM
DESIGNED: ANDREA BROWN
CHECKED: ANALETTE OCHOA
APPROVED: ANALETTE OCHOA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY
REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED:

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

STORM DRAINAGE PLANS

DATE	SCALE
NOV 2017	AS SHOWN

WORK ORDER NO. F86020/R86020

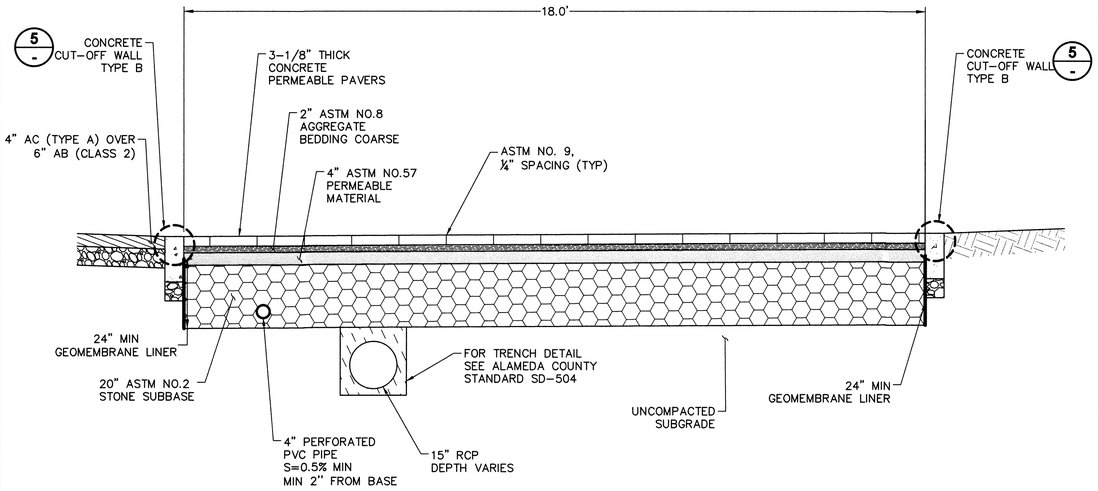
SPECIFICATION NO. FC 3A-138

SHEET NO. 19 OF 57

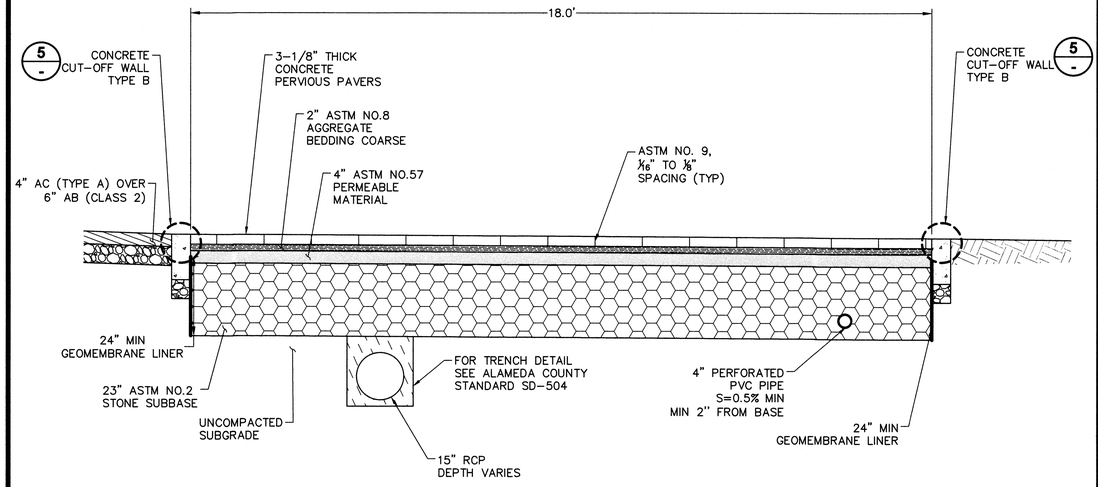
D-01

FILE NO. CB-955

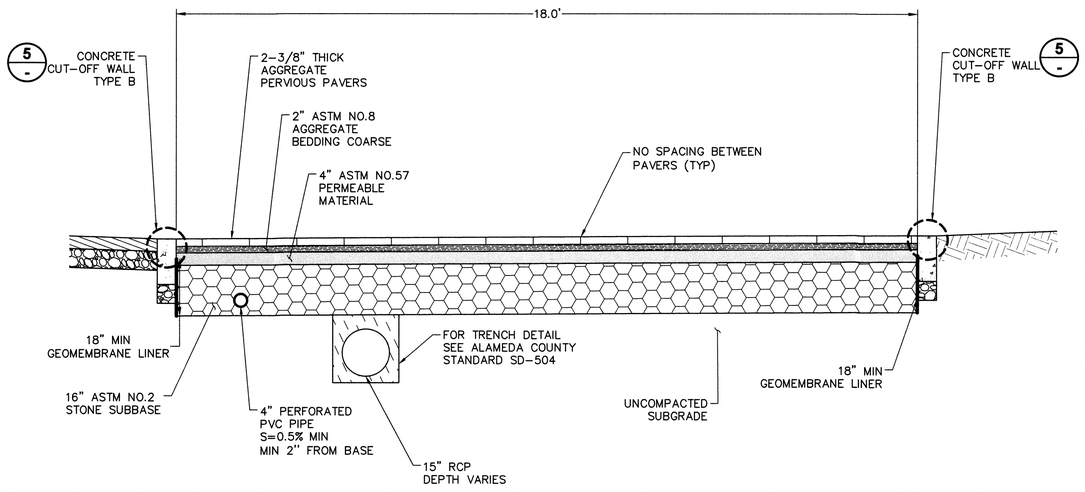
FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES
0 1 2 3



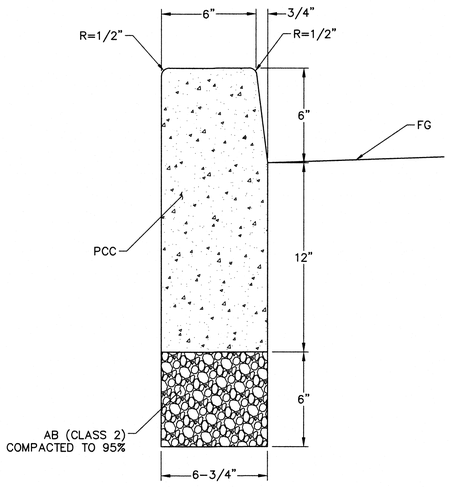
CONCRETE PERMEABLE PAVERS 1/-
NTS



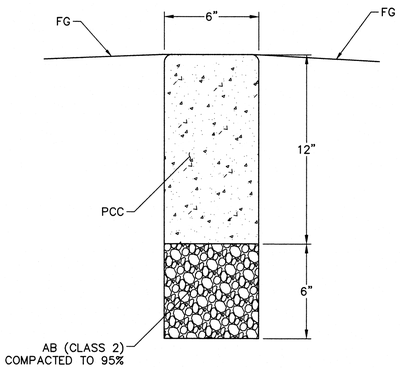
CONCRETE PERVIOUS PAVERS 2/-
NTS



AGGREGATE PERVIOUS PAVERS 3/-
NTS



CONCRETE CUT-OFF WALL TYPE A 4/-
NTS



CONCRETE CUT-OFF WALL TYPE B 5/-
NTS

REVISIONS				
NO.	DESCRIPTION	BY	DATE	APPVD
1				
2				
3				
4				
5				

ANALETTE OCHOA No. C 55279 Exp. 12/31/18 CIVIL STATE OF CALIFORNIA

REVIEWED BY:	DATE:	REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY	
MAINTENANCE		TRAFFIC	
REAL ESTATE		ENVIRONMENTAL	

WRECO
1243 Alpine Road, Suite 108 Walnut Creek, California 94596
(925) 941-0017 Fax (925) 941-0018

DRAWN: PATRICK YIM
DESIGNED: ANDREA BROWN
CHECKED: ANALETTE OCHOA
APPROVED: ANALETTE OCHOA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

CONSTRUCTION DETAILS

DATE	NOV 2017
SCALE	AS SHOWN
WORK ORDER NO.	F86020/R86020
SPECIFICATION NO.	FC 3A-138
SHEET NO.	33 OF 57
FILE NO.	CB-955

C-01

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

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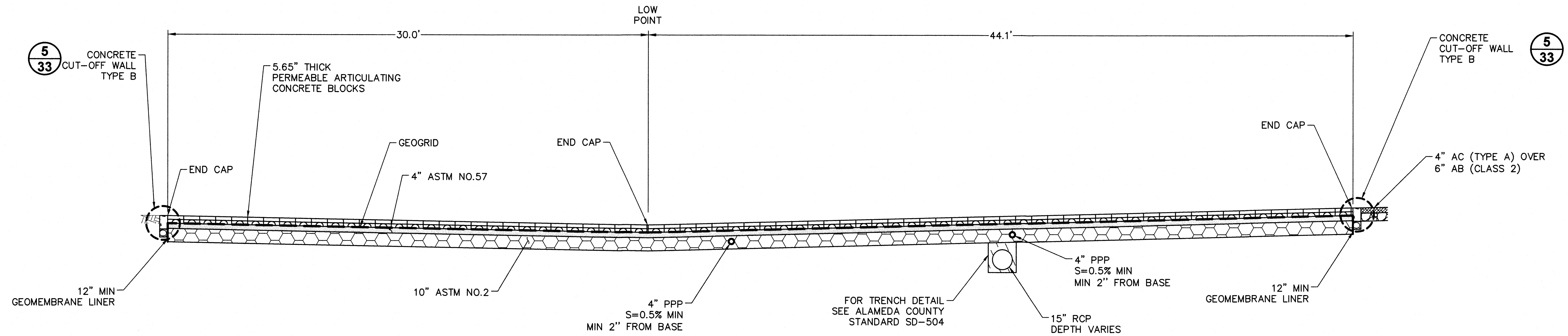
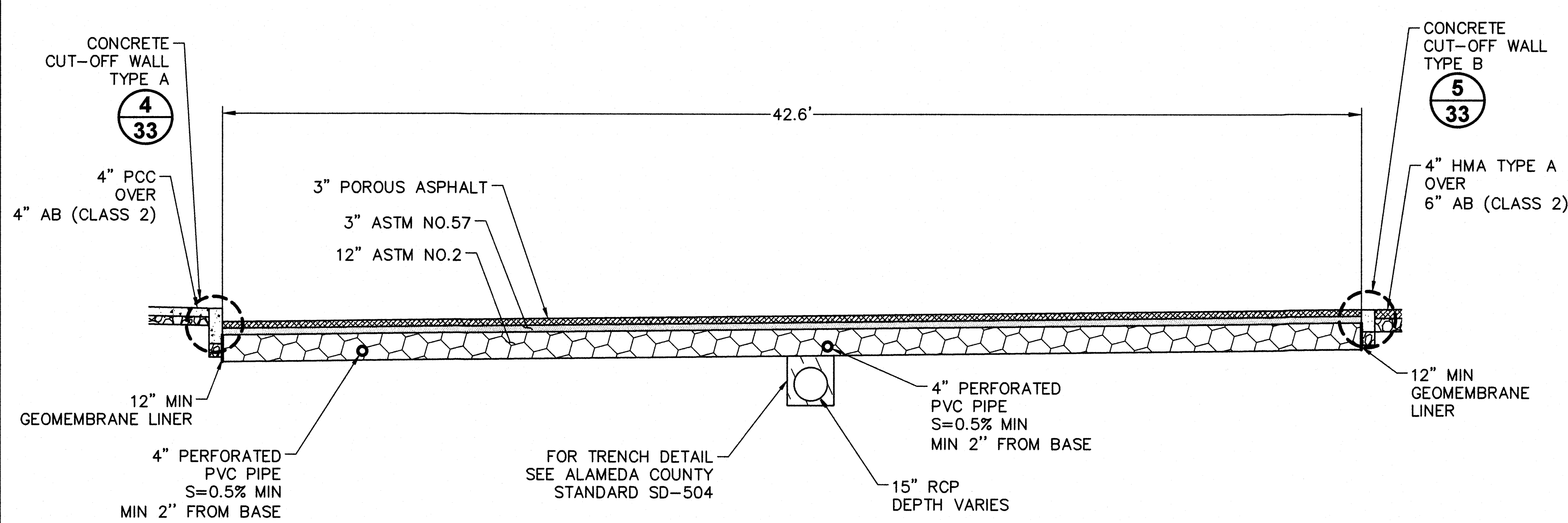
CONSTRUCTION	REVIEWED BY:	DATE:	SURVEY	REVIEWED BY:	DATE:
MAINTENANCE			TRAFFIC		
REAL ESTATE			ENVIRONMENTAL		



PERMEABLE ARTICULATING CONCRETE BLOCKS (1/-)

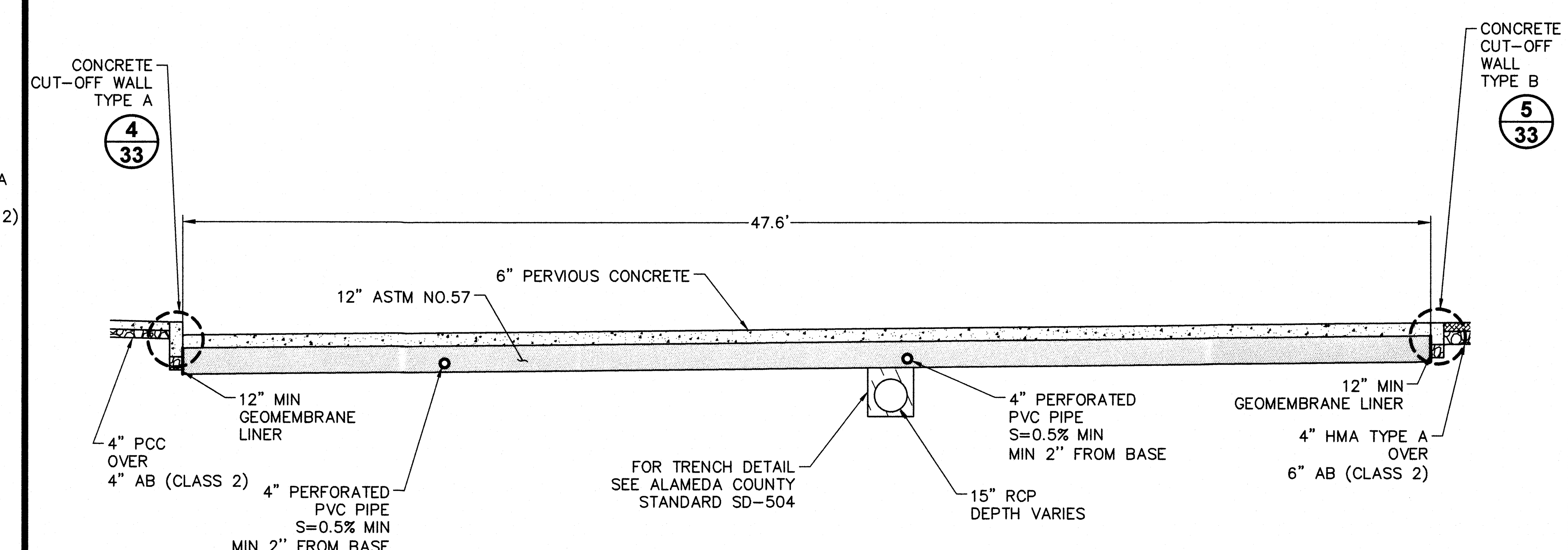
NTS

ELEVATION



POROUS ASPHALT (2/-)

NTS



PERVIOUS CONCRETE (3/-)

NTS

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD
1				
2				
3				
4				
5				
6				

WRECO
1243 Alpine Road, Suite 108
Walnut Creek, California 94596
(925) 941-0017
Fax (925) 941-0018

DRAWN: PATRICK YIM
DESIGNED: ANDREA BROWN
CHECKED: ANALETTE OCHOA
APPROVED: ANALETTE OCHOA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED: MOSES TSANG
APPROVED/RECOMMENDED: HANK ACKERMAN

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

CONSTRUCTION DETAILS

DATE: NOV 2017 | SCALE: AS SHOWN

WORK ORDER NO. F86020/R86020

SPECIFICATION NO. FC 3A-138

SHEET NO. 34 OF 57

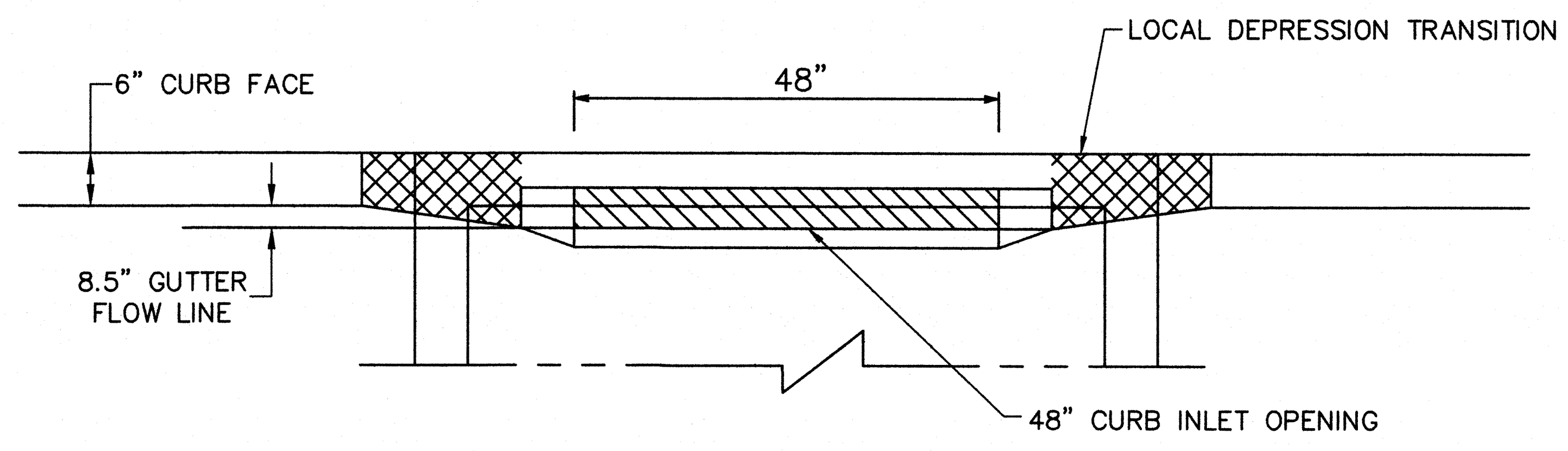
FILE NO. CB-955

C-02

N:\C3D\FLOOD\F86020_Turner_Court_LID\Sheets-WRECO\33-45-Construction Details.dwg 10-16-17 04:14:18 PM Ilene

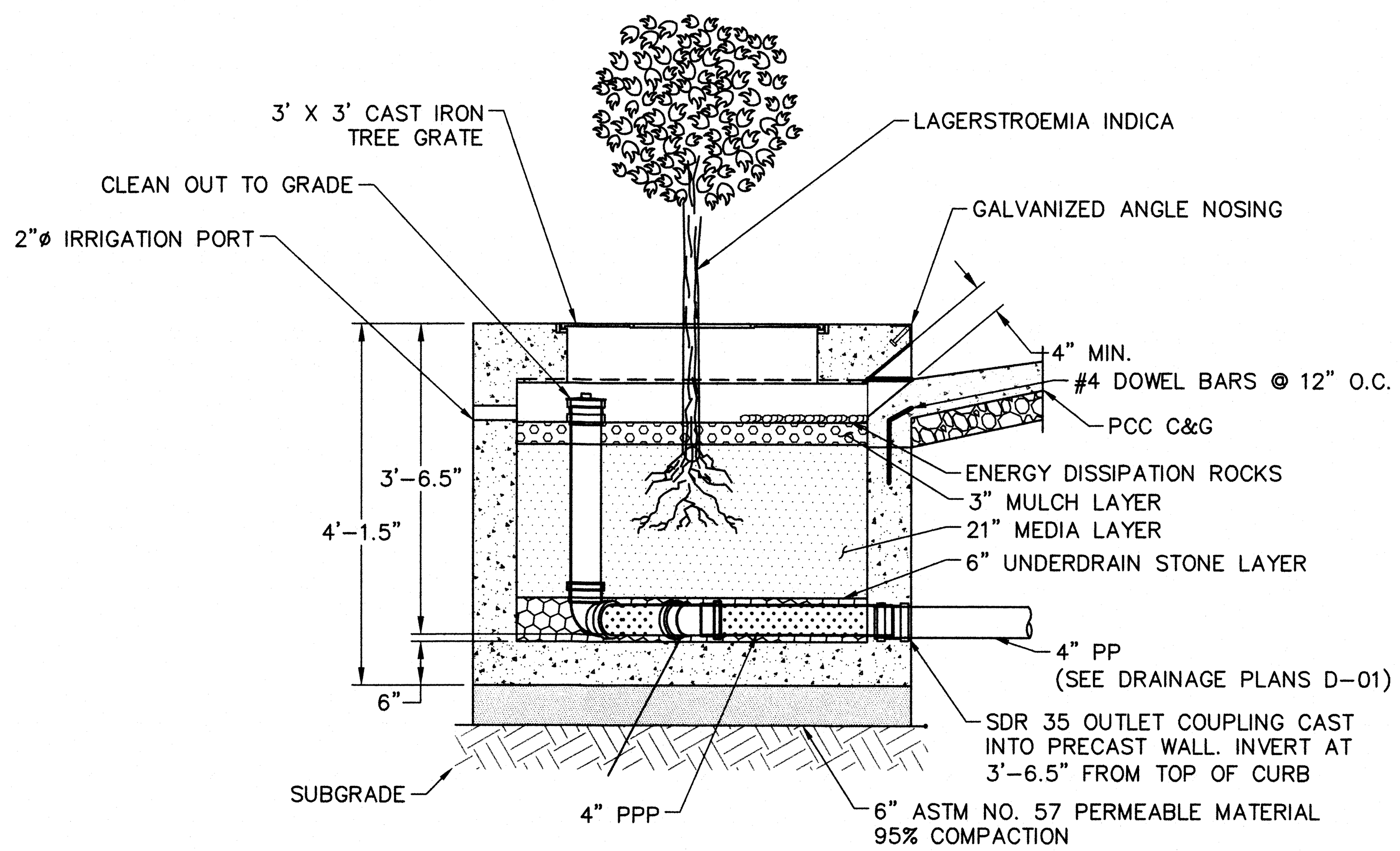
FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

REVIEWED BY:	DATE:		REVIEWED BY:	DATE:
CONSTRUCTION			SURVEY	
MAINTENANCE			TRAFFIC	
REAL ESTATE			ENVIRONMENTAL	



ELEVATION

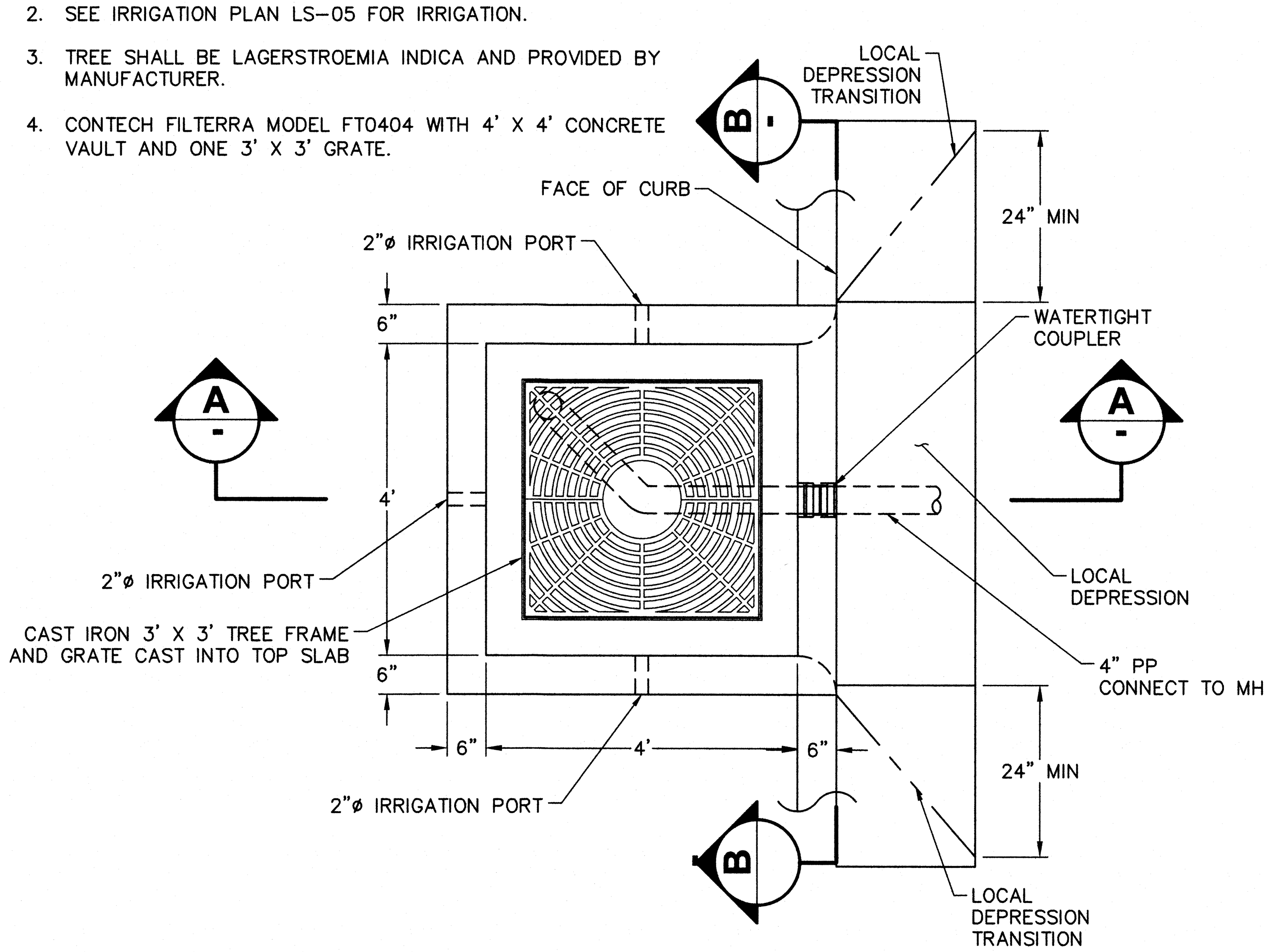
SECTION B
NTS



SECTION A
NTS

NOTES:

1. GRATES SHALL BE BOLTED INTO INLET WALLS.
2. SEE IRRIGATION PLAN LS-05 FOR IRRIGATION.
3. TREE SHALL BE LAGERSTROEMIA INDICA AND PROVIDED BY MANUFACTURER.
4. CONTECH FILTERRA MODEL FT0404 WITH 4' X 4' CONCRETE VAULT AND ONE 3' X 3' GRATE.

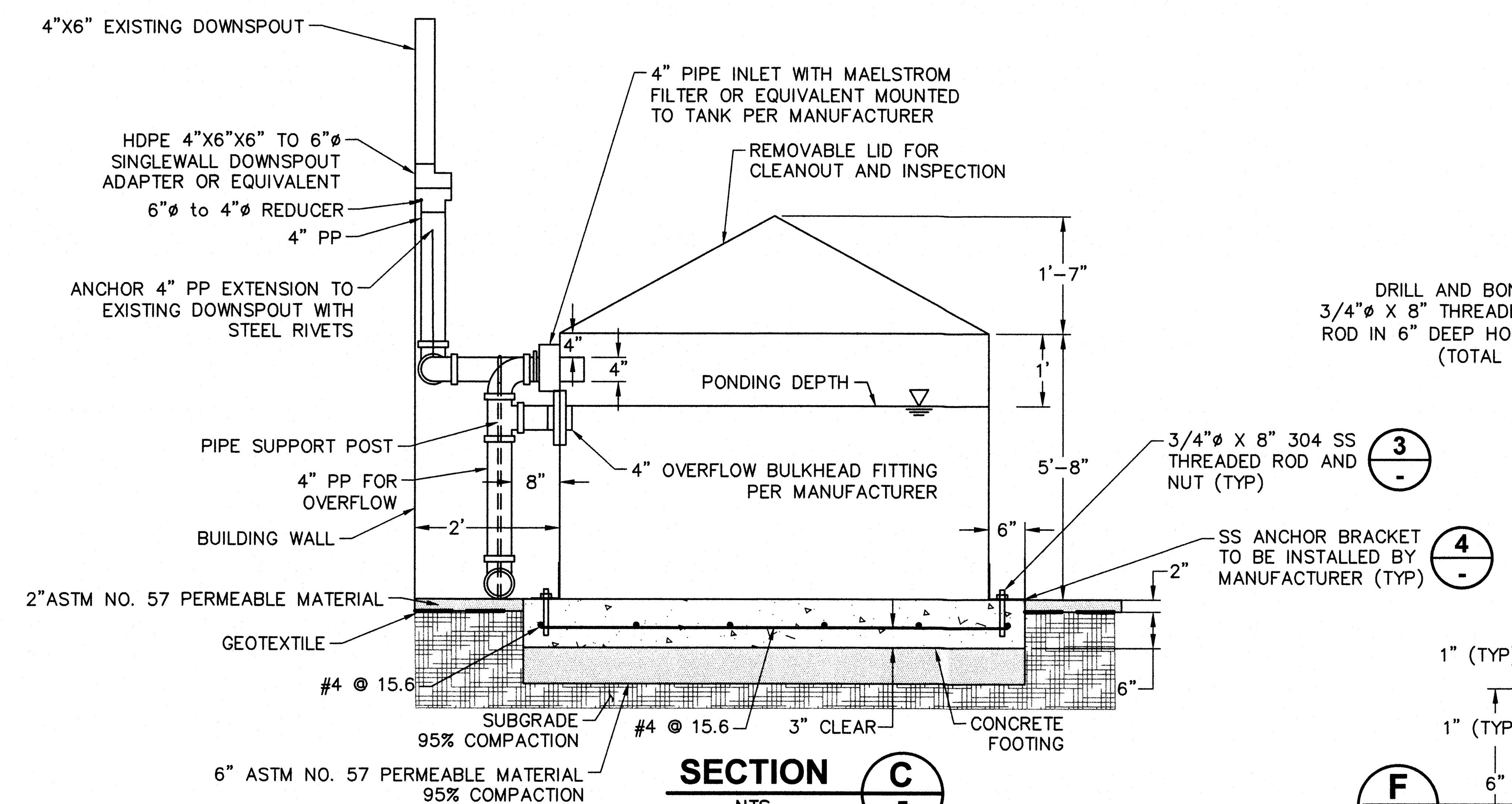


FILTERRA TREE WELL 1
NTS

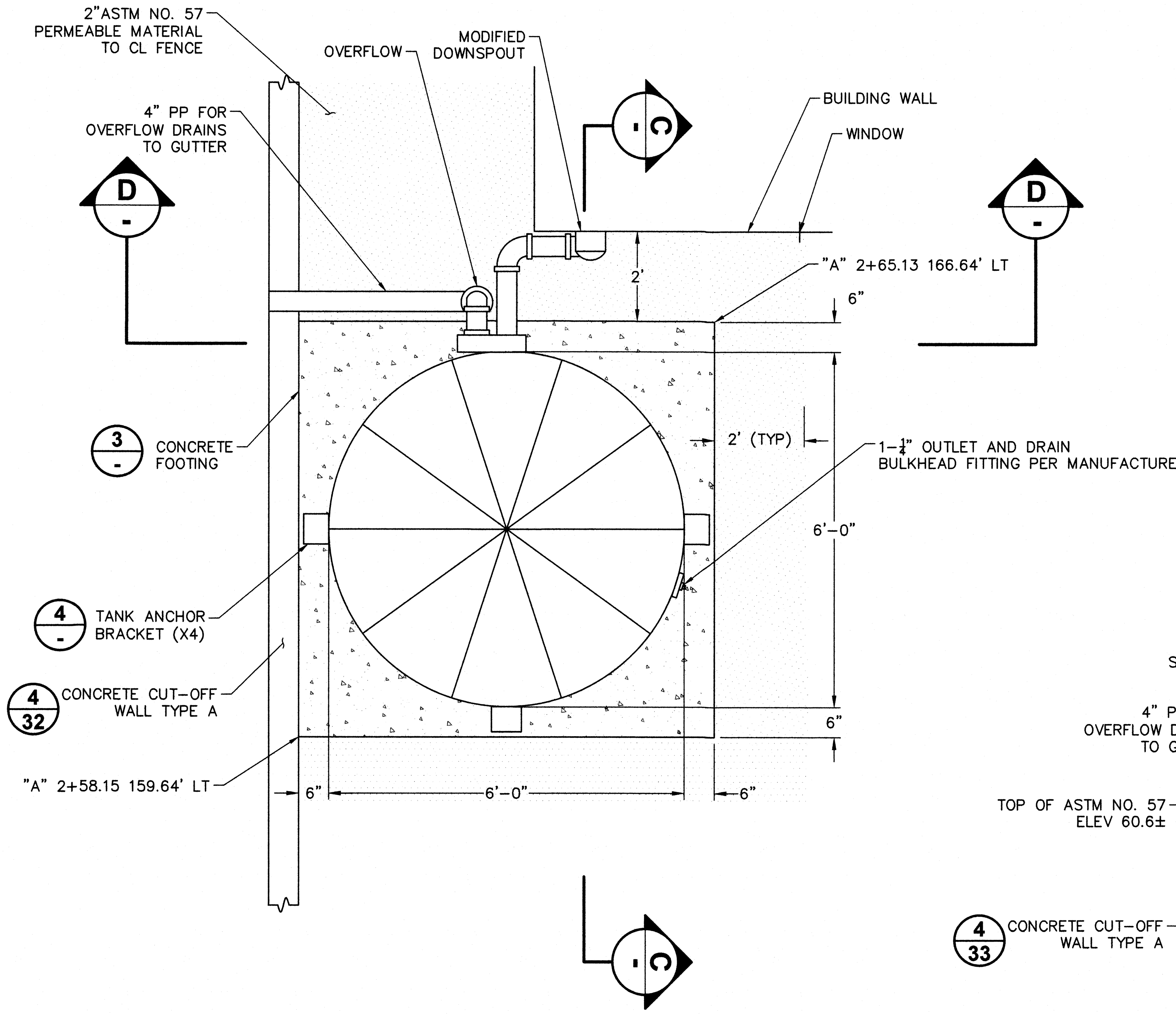
NTS

NOTES:

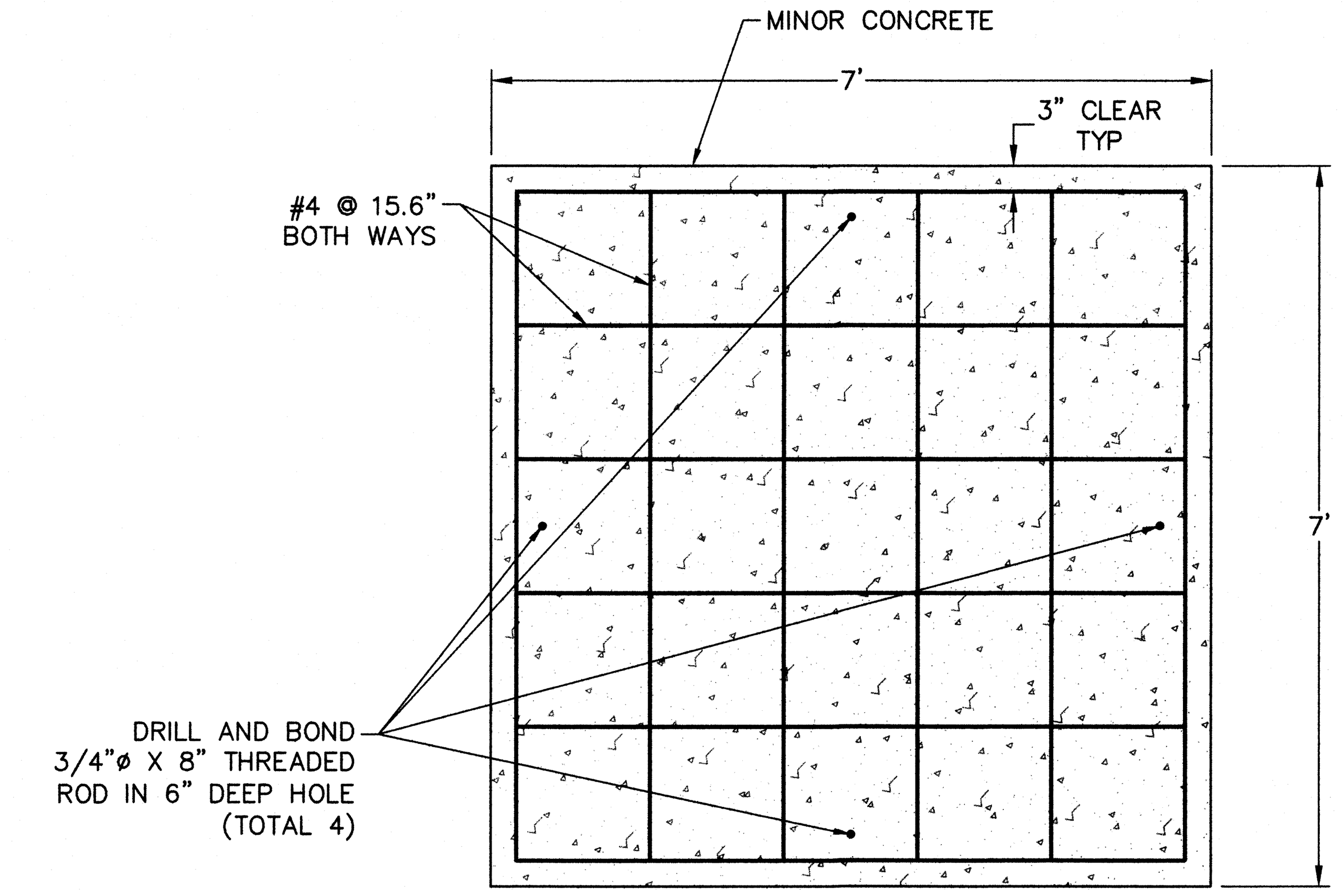
1. MANUFACTURER SHALL INSTALL ANCHOR BRACKETS, MAELSTROM FILTER OR EQUIVALENT, AND BULKHEAD FITTINGS TO TANK PRIOR TO SHIPMENT.



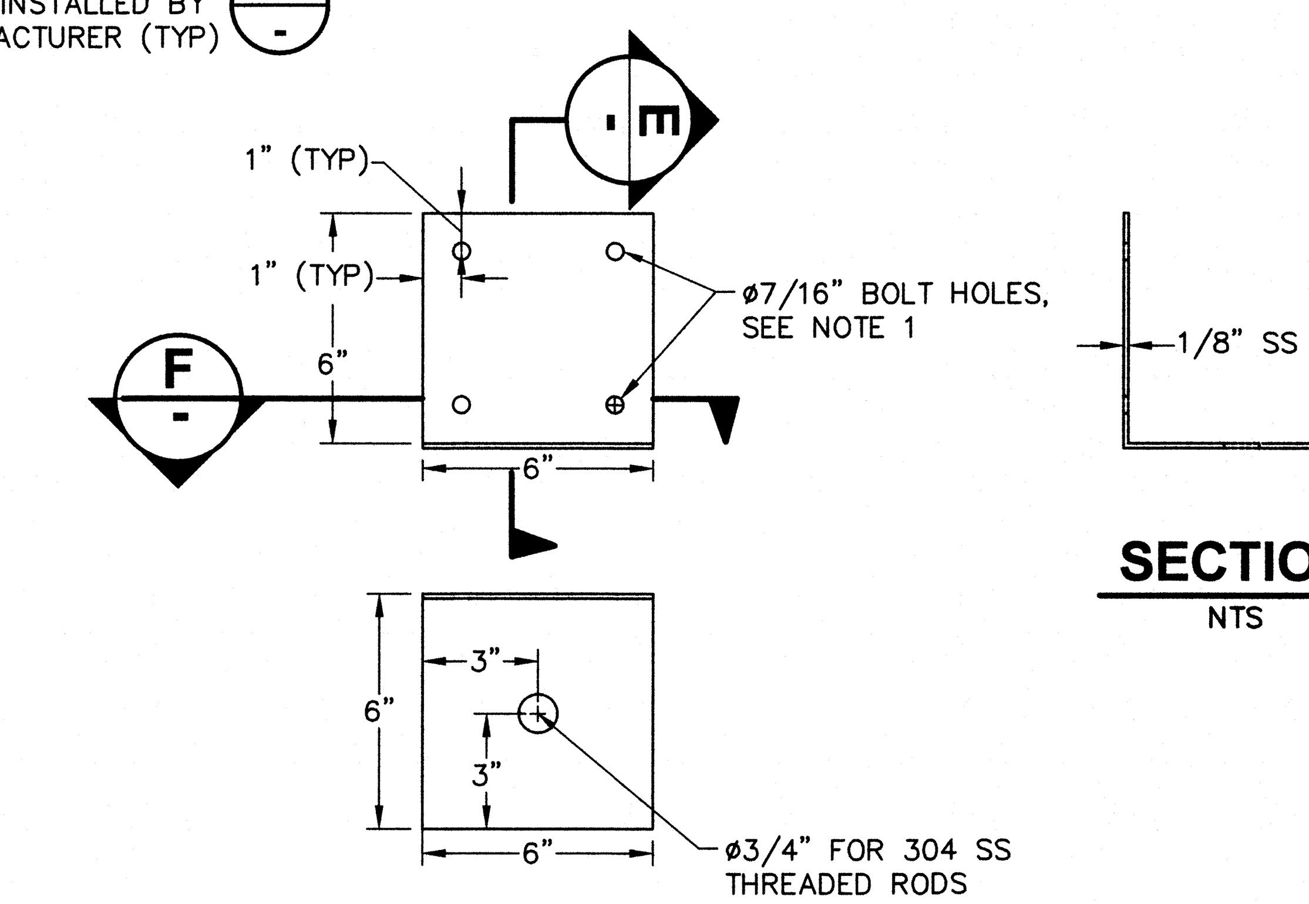
SECTION C
NTS



RAINWATER HARVESTING SYSTEM - PLAN VIEW 2
NTS



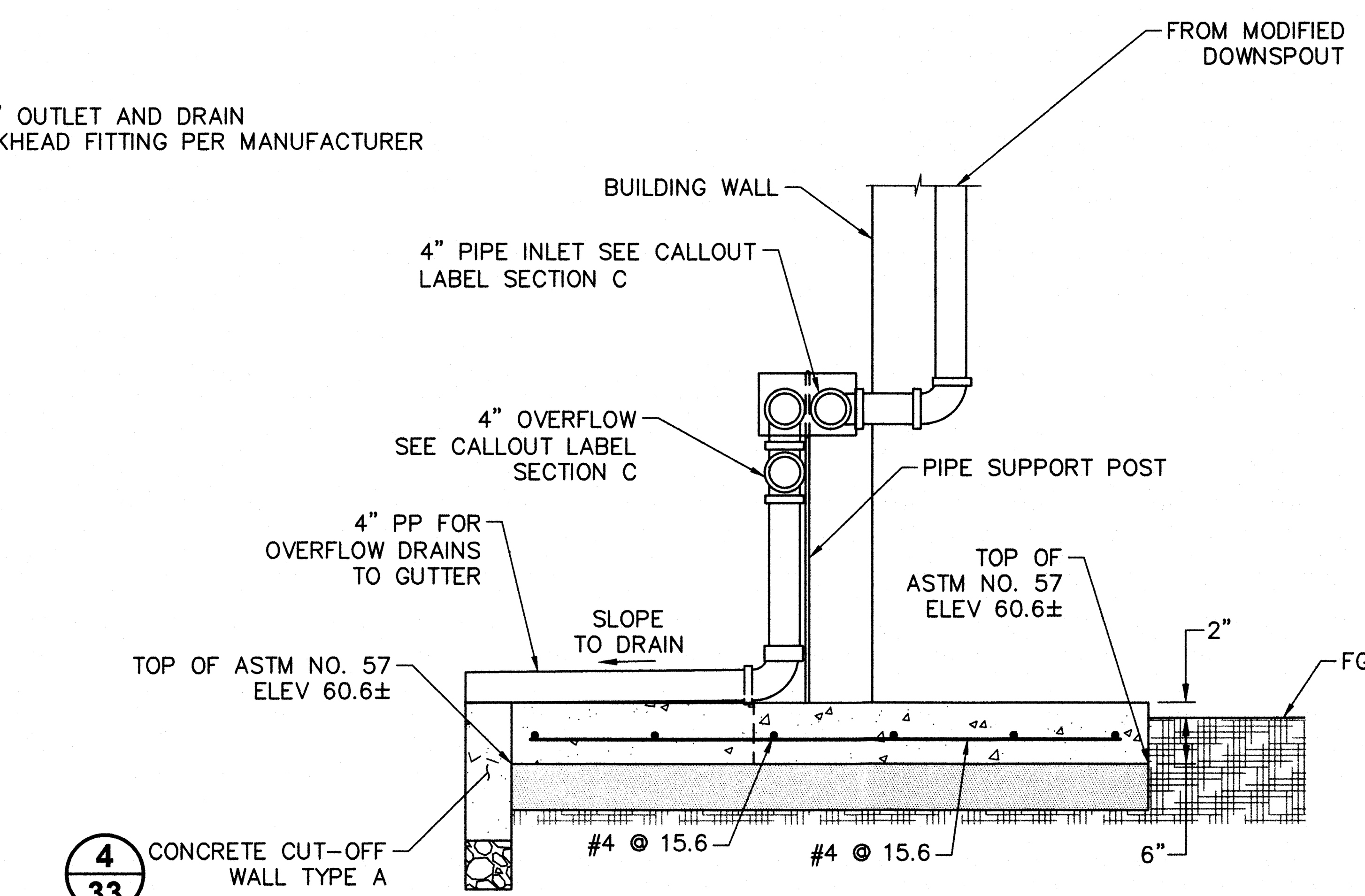
CONCRETE FOOTING PLAN 3



SECTION E
NTS

SECTION F
NTS

ANCHOR BRACKET DETAIL 4
NTS



SECTION D
NTS

NO.	DESCRIPTION	BY	DATE	APPV'D

REVISIONS

WRECO
1243 Alpine Road, Suite 108
Walnut Creek, California 94596
(925) 941-0017
Fax (925) 941-0018

DRAWN: PATRICK YIM
CHECKED: ANALETTE OCHOA
DESIGNED: ANDREA BROWN
APPROVED: ANALETTE OCHOA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED: HANK HOERMAN

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

CONSTRUCTION DETAILS

DATE	SCALE
NOV 2017	AS SHOWN

WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 35 OF 57
FILE NO. CB-955

C-03

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES
0 1 2 3

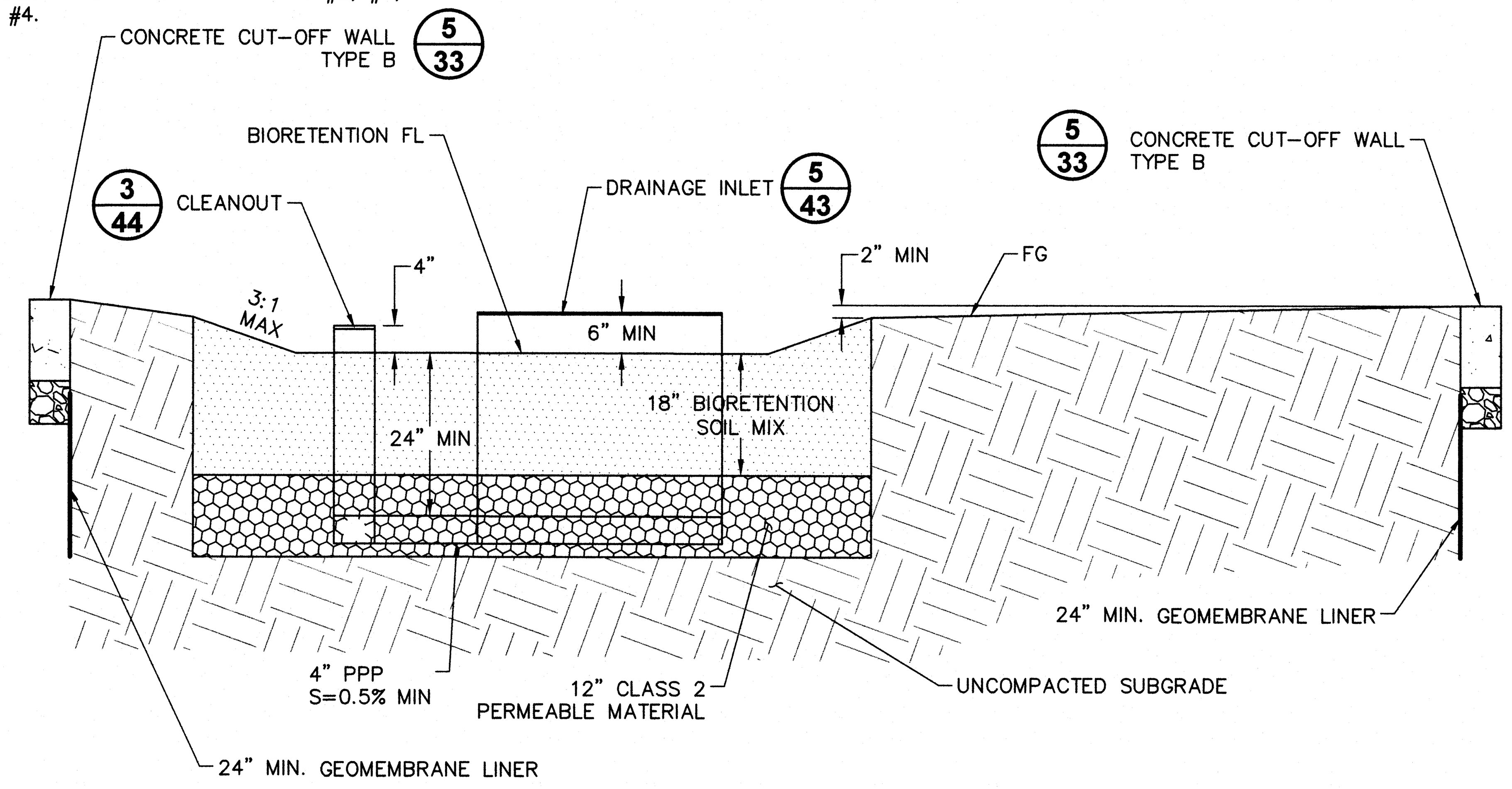
N:\C3D\FLOOD\F86020_Turner_Court_LID\Sheets-WRECO\33-45-Construction Details.dwg 10-18-17 10:52:24 AM ilene

REVIEWED BY:	DATE:
CONSTRUCTION	
MAINTENANCE	
REAL ESTATE	

REVIEWED BY:	DATE:
SURVEY	
TRAFFIC	
ENVIRONMENTAL	

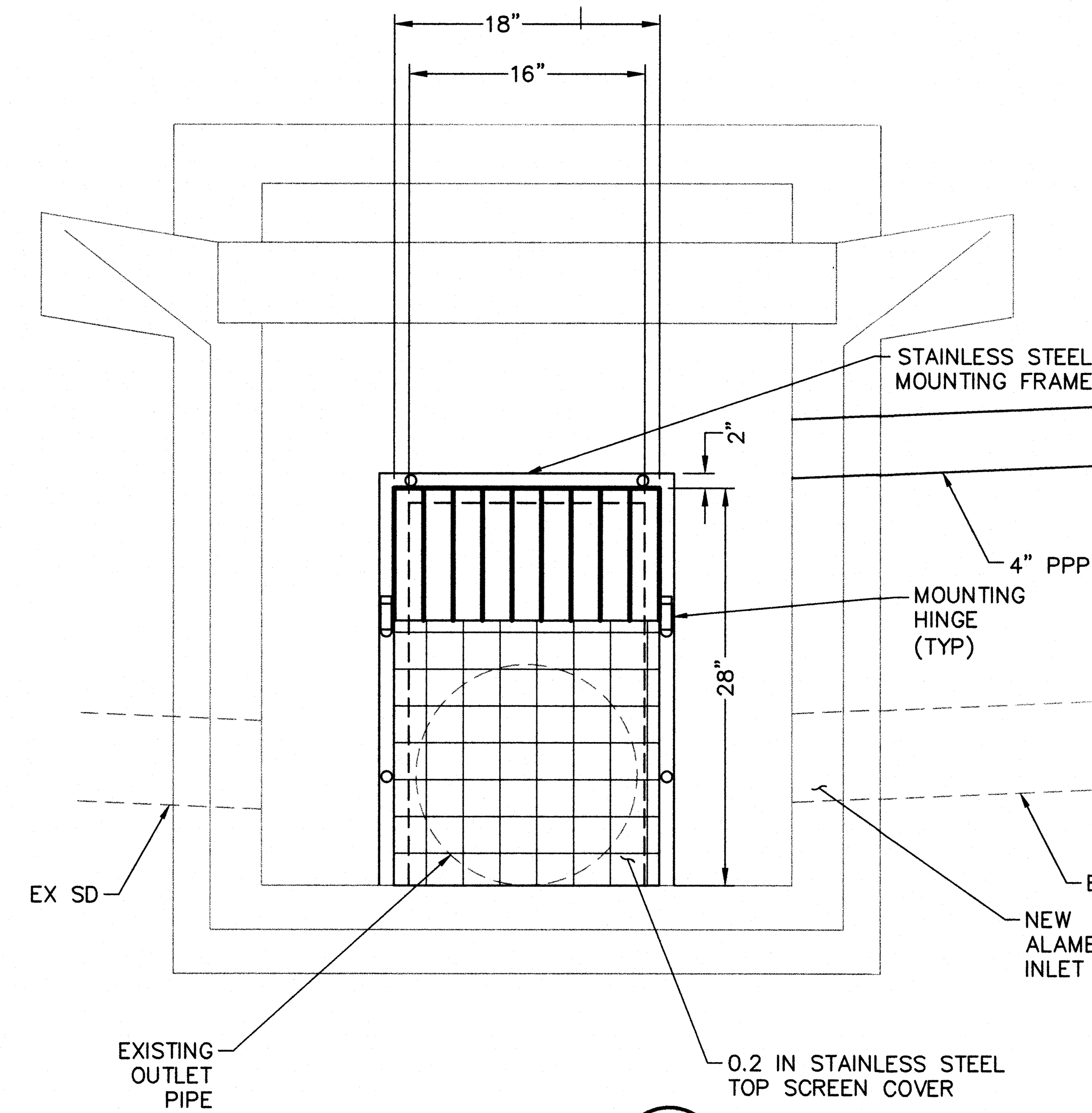
NOTES:

1. SEE SITE PLAN SHEETS L-03 AND L-04 FOR ADDITIONAL LAYOUT DETAILS.
2. SEE PLANTING PLAN LS-01 FOR PLANTING.
3. APPLIES TO BIORETENTION AREAS #2, #3, AND #4.



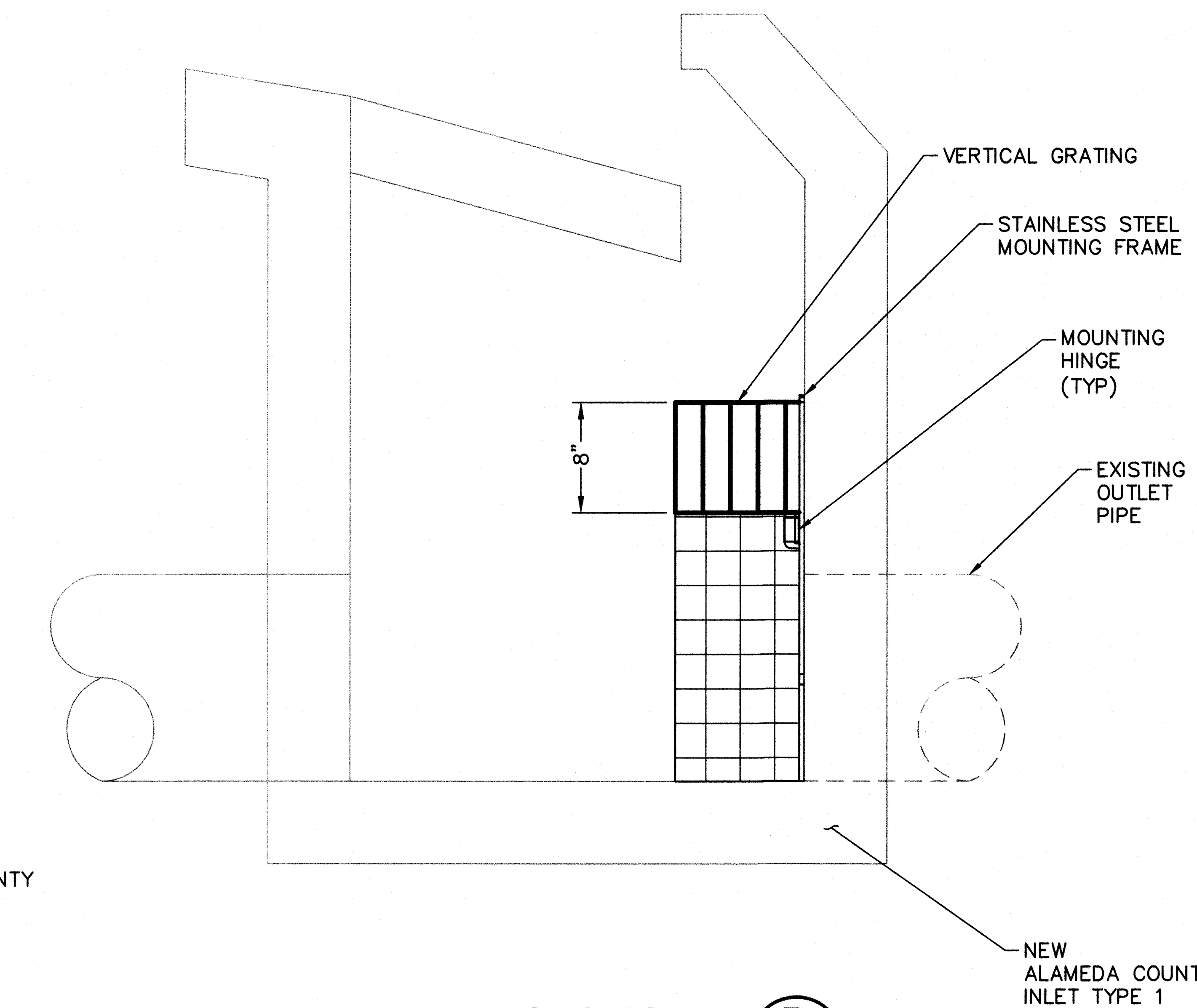
BIORETENTION AREA TYPICAL SECTION 3/-

NTS



SECTION A/-

NTS

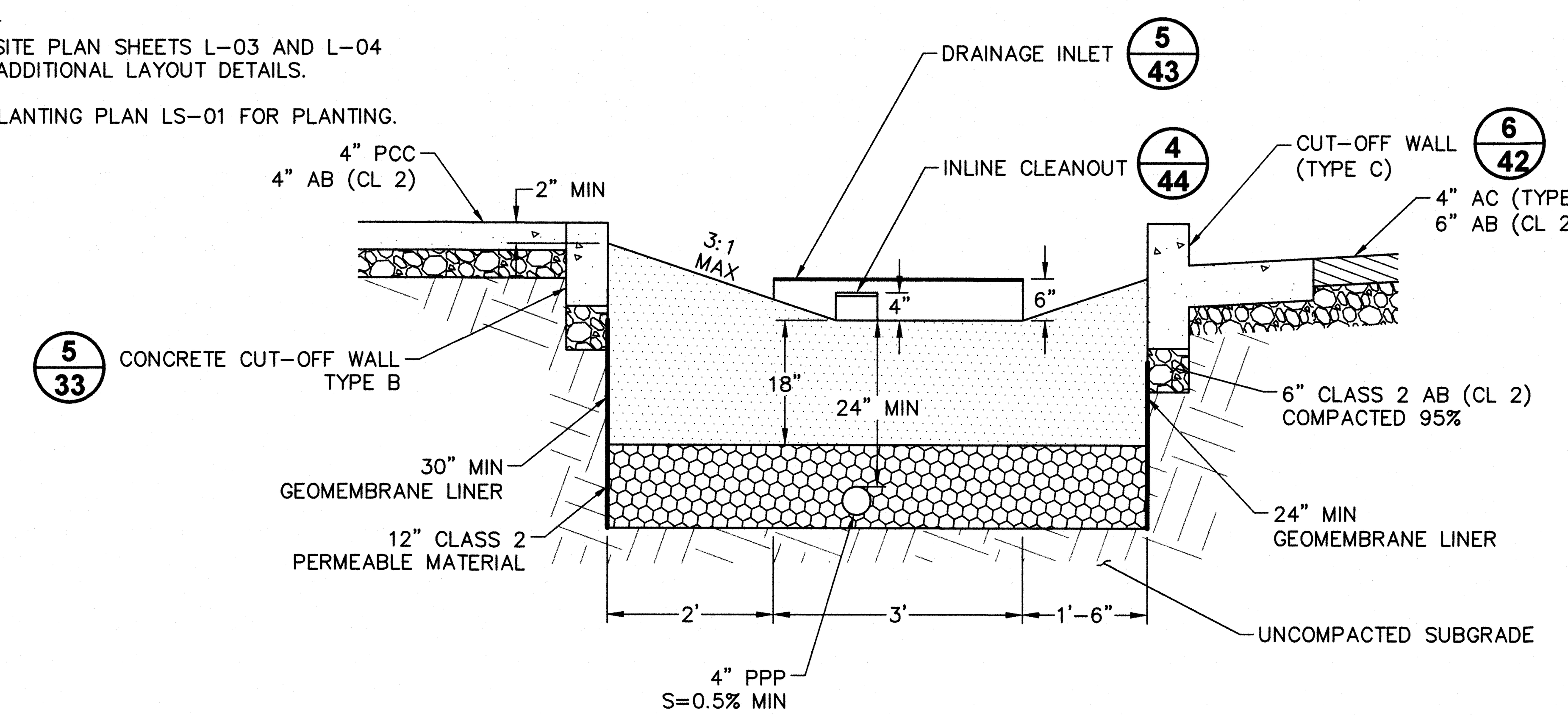


SECTION B/-

NTS

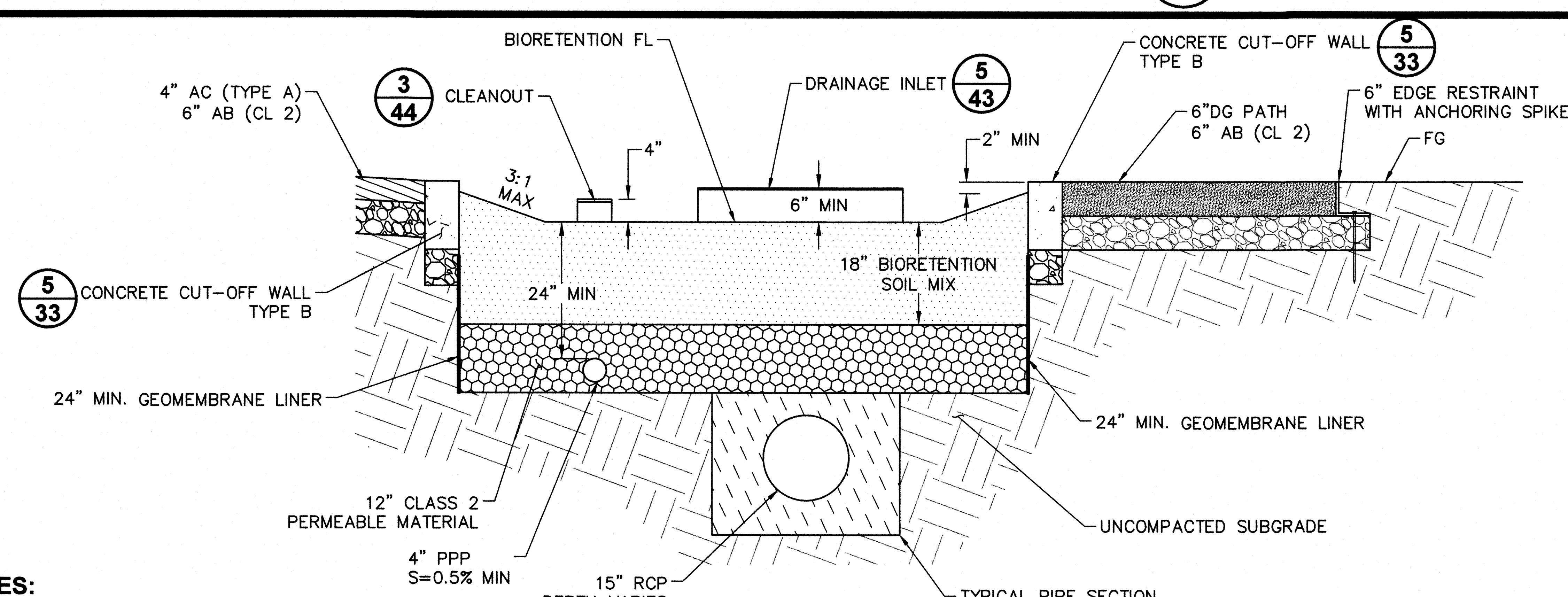
NOTES:

1. SEE SITE PLAN SHEETS L-03 AND L-04 FOR ADDITIONAL LAYOUT DETAILS.
2. SEE PLANTING PLAN LS-01 FOR PLANTING.



BULB OUT BIORETENTION AREA TYPICAL SECTION 2/-

NTS

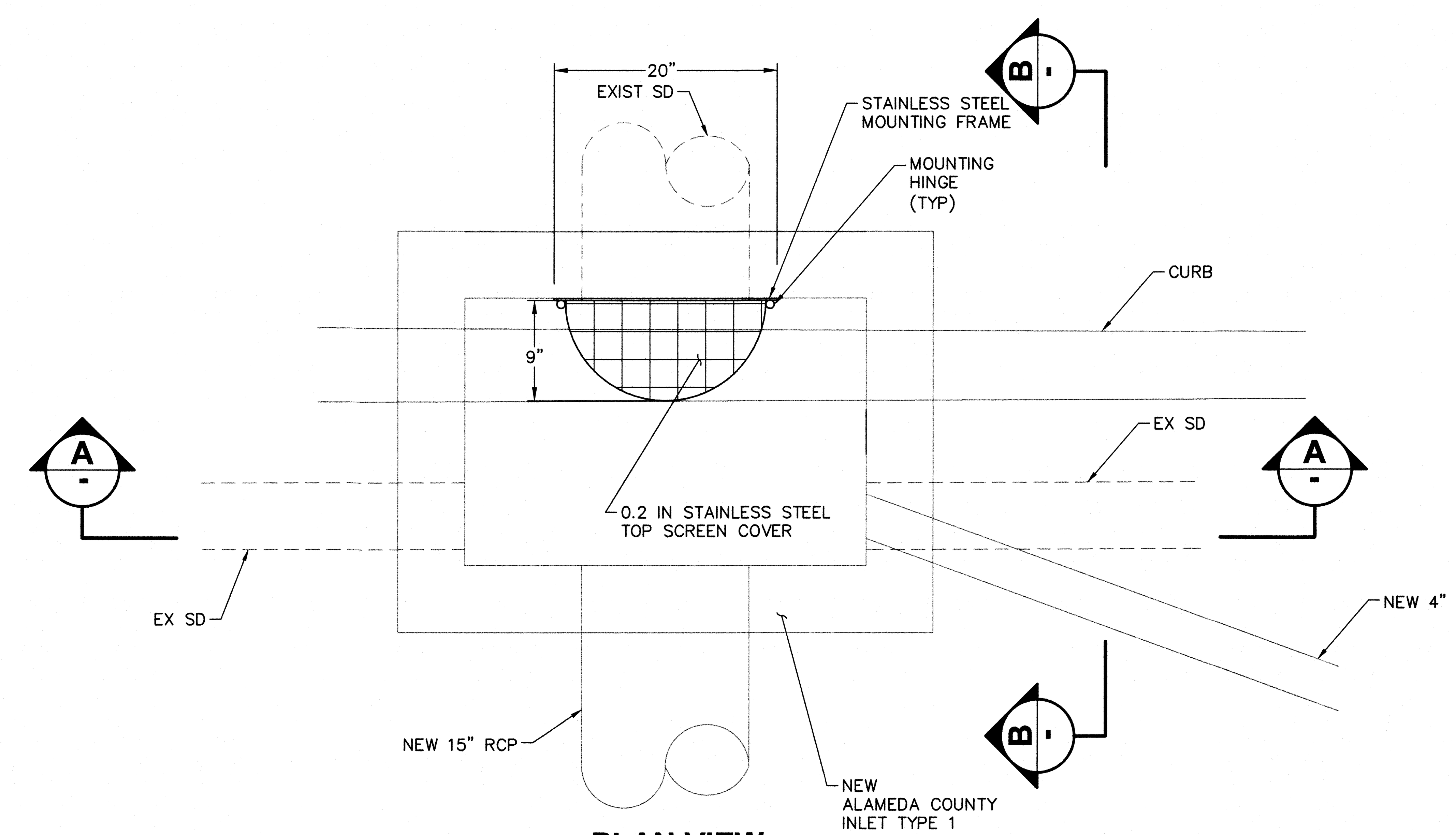


NOTES:

1. SEE SITE PLAN SHEETS L-03 AND L-04 FOR ADDITIONAL LAYOUT DETAILS.
2. SEE PLANTING PLAN LS-01 FOR PLANTING.

BIORETENTION AREA TYPICAL SECTION 1/-

NTS



PLAN VIEW

NOTES:

1. FOR DRAINAGE INLET DETAILS NOT SHOWN SEE ALAMEDA COUNTY DETAIL SHEET SD-411.

CONNECTOR PIPE SCREEN FOR ALAMEDA COUNTY DI-1 AT "SD-13" 1+99.28 4/-

NTS

NO.	DESCRIPTION	BY	DATE	APPV'D
1				
2				
3				
4				
5				

REVISIONS

ANALETTE OCHOA No. C 55279 Exp. 12/31/18 CIVIL

WRECO
1243 Alpine Road, Suite 108 Walnut Creek, California 94596
(925) 941-0017 Fax (925) 941-0018

DRAWN: PATRICK YIM
DESIGNED: ANDREA BROWN
CHECKED: ANALETTE OCHOA
APPROVED: ANALETTE OCHOA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED: HANK ACKERMAN

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

CONSTRUCTION DETAILS

DATE	SCALE
NOV 2017	AS SHOWN

WORK ORDER NO. F86020/R86020

SPECIFICATION NO. FC 3A-138

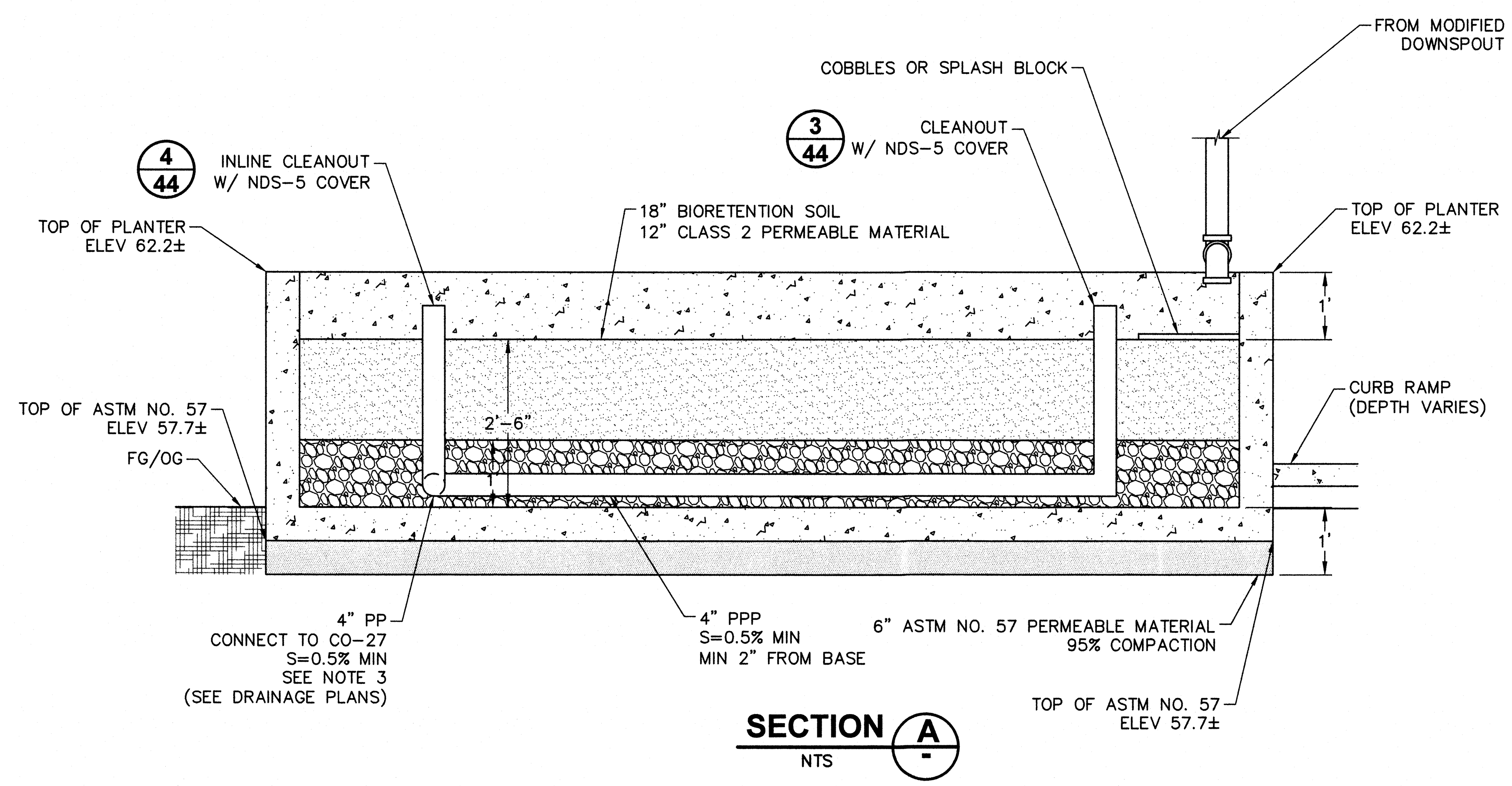
SHEET NO. 36 OF 57

C-04

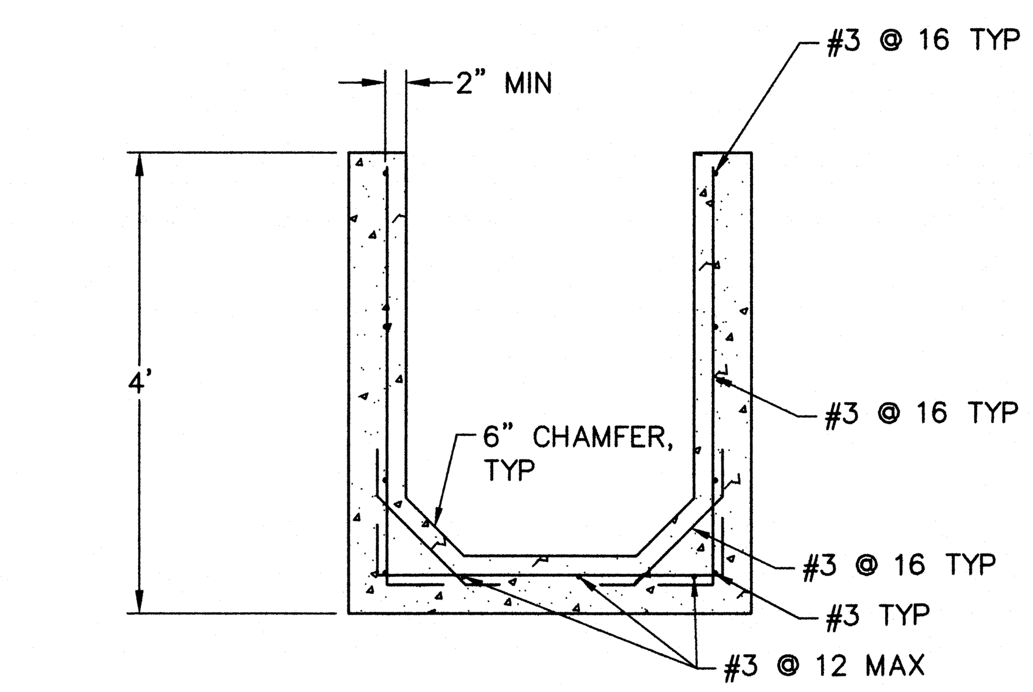
FILE NO. CB-955

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

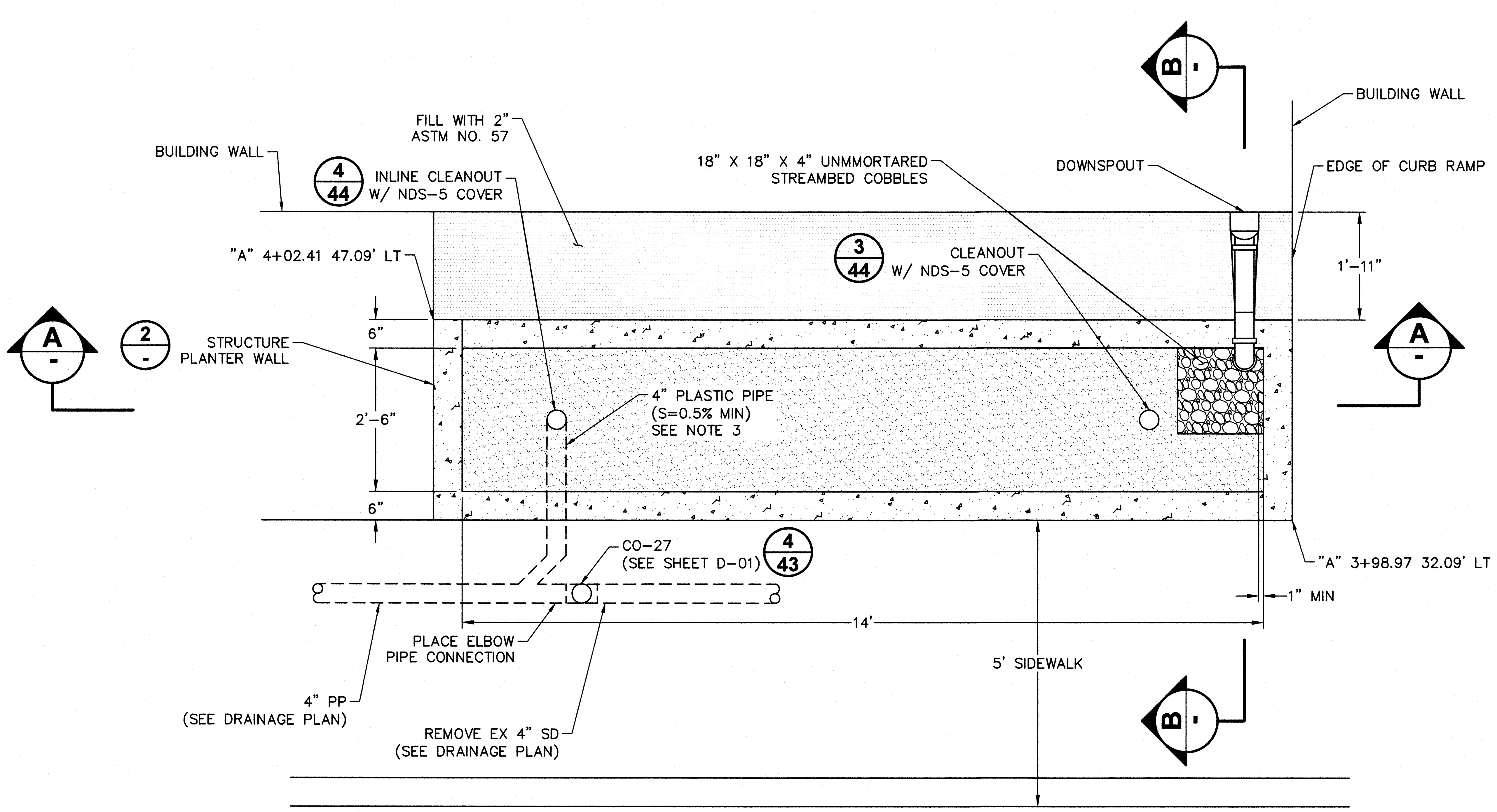
N:\C30\FLOOD\F86020_Turner_Court_LID\Sheets-WRECO\33-45-Construction Details.dwg 10-17-17 09:42:52 AM Ilene



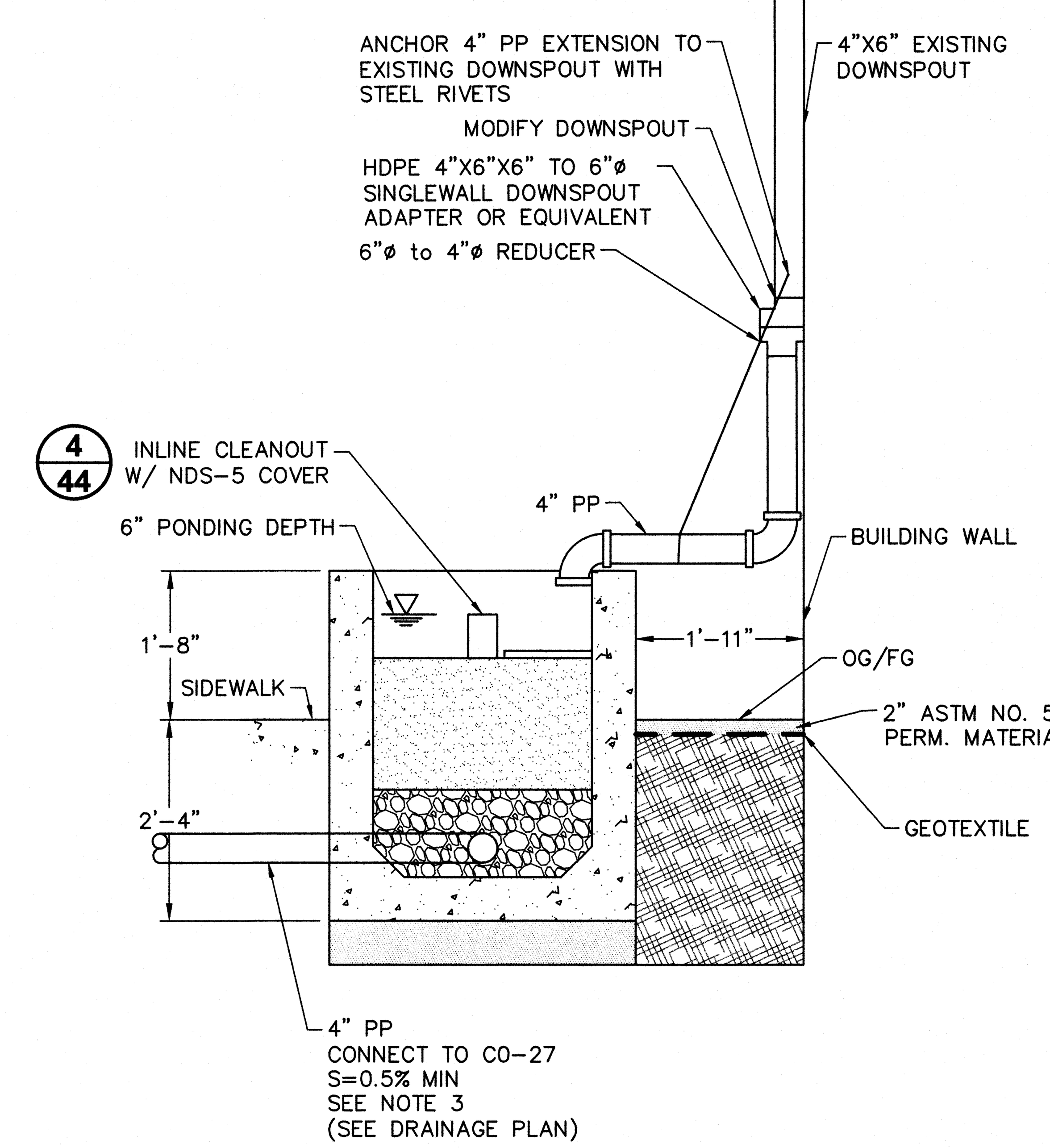
SECTION A/-
NTS



STRUCTURAL PLANTER WALL 2/-
NTS



FLOW-THROUGH PLANTER - PLAN VIEW 1/-
NTS



SECTION B/-
NTS

NOTES:

1. SEE PLANTING PLAN LS-01 FOR PLANTING.
2. SEE IRRIGATION PLAN LS-05 FOR IRRIGATION
3. CONNECT TO EXISTING 4" SD LINE. SEE SHEET D-01 FOR ADDITIONAL LAYOUT DETAILS.

REVIEWED BY:	DATE:	REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY	
MAINTENANCE		TRAFFIC	
REAL ESTATE		ENVIRONMENTAL	

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REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD

WRECO
1243 Alpine Road, Suite 108 Walnut Creek, California 94596 (925) 941-0017 Fax (925) 941-0018
DRAWN: PATRICK YIM
DESIGNED: ANDREA BROWN
CHECKED: ANALETTE OCHOA
APPROVED: ANALETTE OCHOA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY
REVIEWED:
REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED:

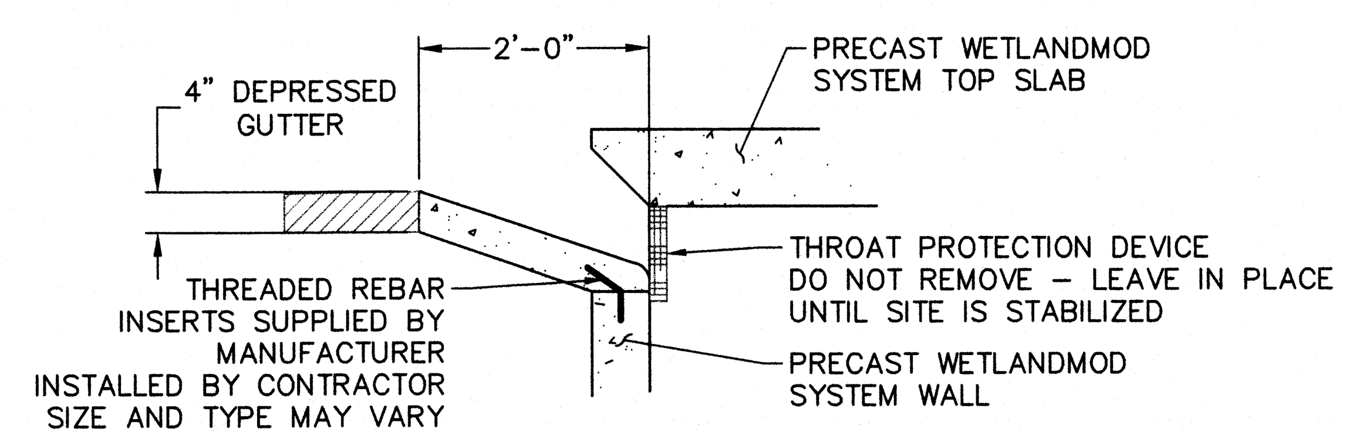
LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

CONSTRUCTION DETAILS

DATE NOV 2017 | SCALE AS SHOWN
WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 37 OF 57
FILE NO. CB-955

C-05

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3



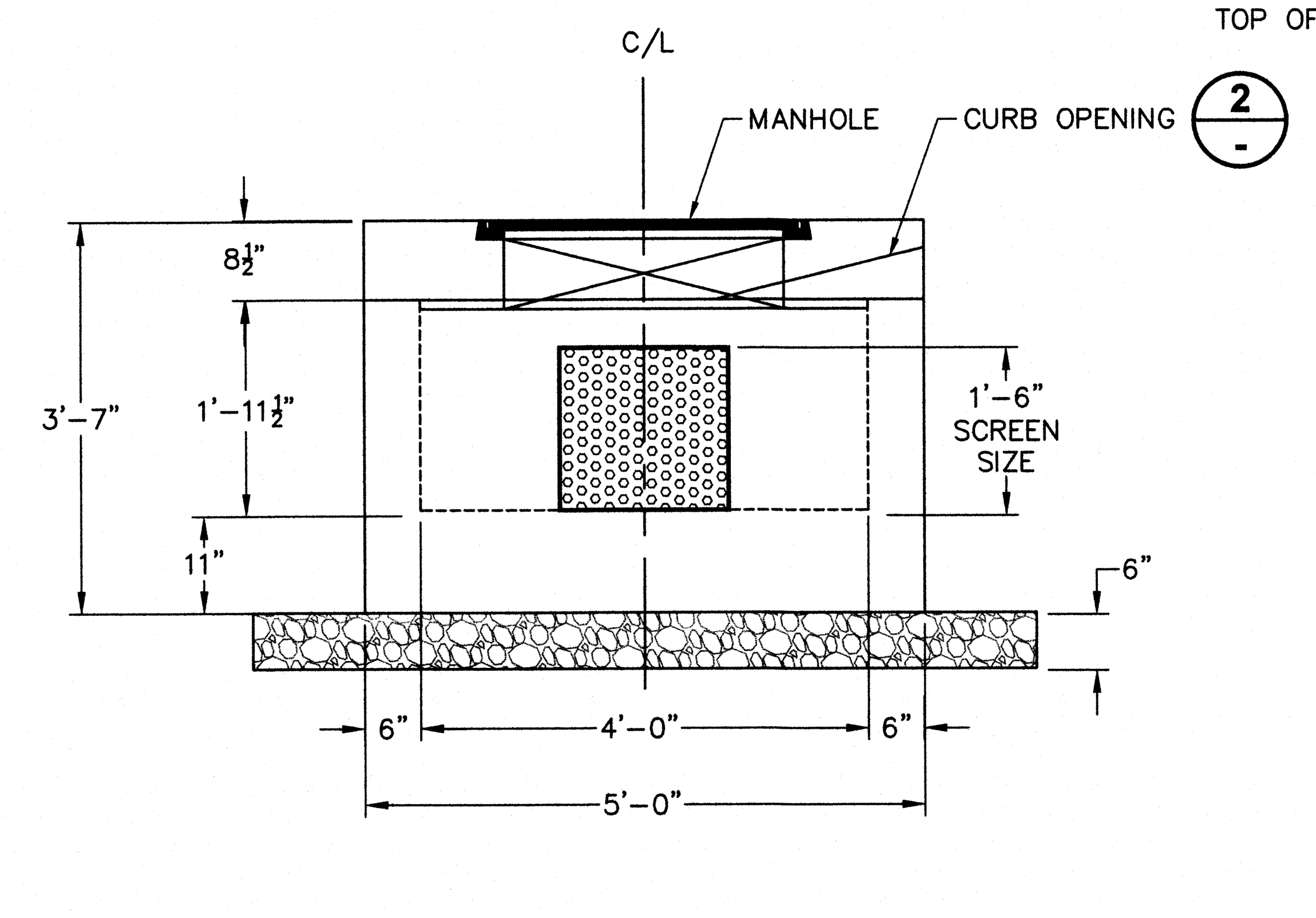
CURB OPENING DETAIL 2/-

INSTALLATION NOTES:

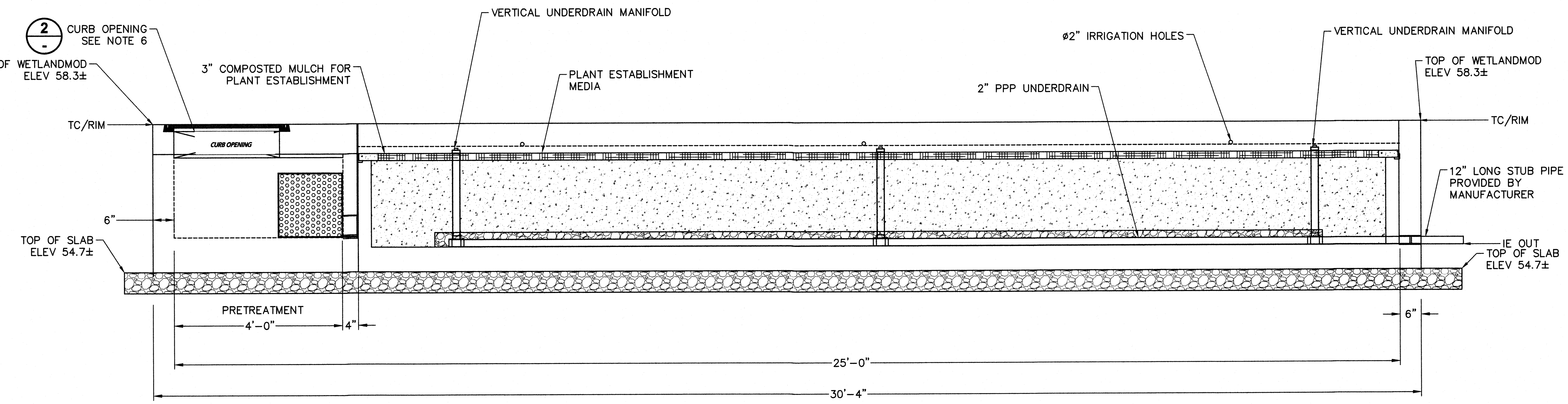
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. CONTRACTOR TO INSTALL 6" LEVEL ROCK BASE OF ASTM NO. 57.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON-SHRINK GROUT PER MANUFACTURERS STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. FOR PLANTING AND IRRIGATION DETAILS, SEE THE PLANTING AND IRRIGATION DETAILS SHEETS.

GENERAL NOTES:

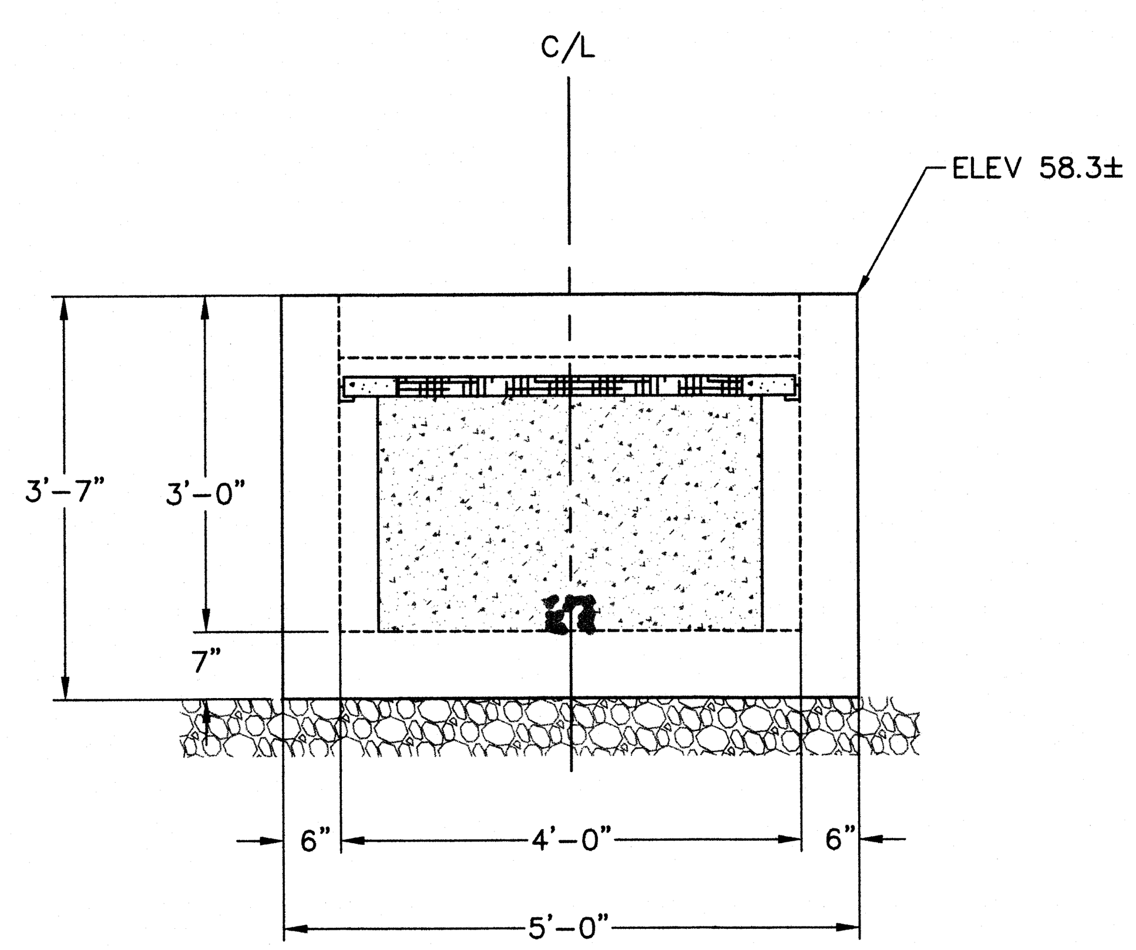
1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.



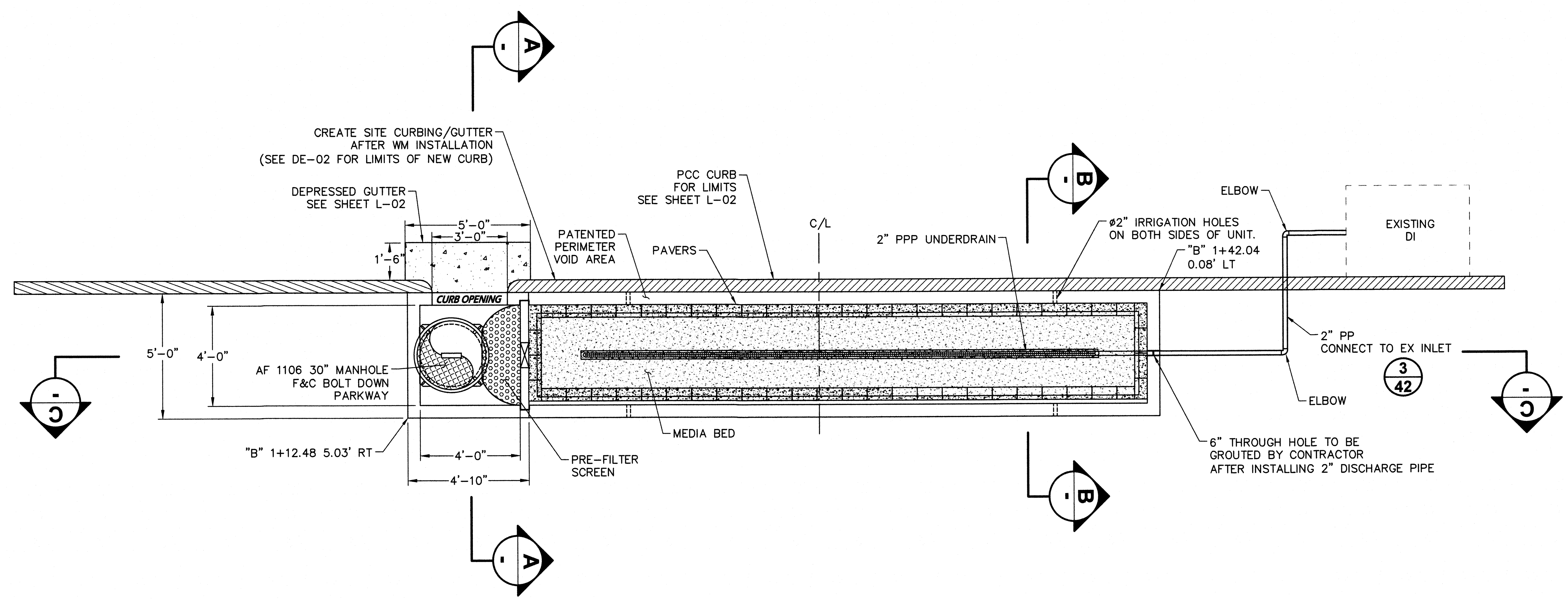
LEFT END VIEW A/-



SECTION VIEW C/-
NTS



RIGHT END VIEW B/-



WETLANDMOD SYSTEM - PLAN VIEW 1/-
NTS

REVIEWED BY:	DATE:		REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY		
MAINTENANCE		TRAFFIC		
REAL ESTATE		ENVIRONMENTAL		

NO.	DESCRIPTION	BY	DATE	APPV'D
REVISIONS				

WRECO
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(925) 941-0017 Fax (925) 941-0018

DRAWN: PATRICK YIM · DESIGNED: ANDREA BROWN · CHECKED: ANALETTE OCHOA · APPROVED: ANALETTE OCHOA

REVIEWED: ILENE · REVIEWED: MOSES TSANG · APPROVAL RECOMMENDED: HANK AOKI

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

CONSTRUCTION DETAILS

DATE	SCALE
NOV 2017	AS SHOWN

WORK ORDER NO. F86020/R86020

SPECIFICATION NO. FC 3A-138

SHEET NO. 38 OF 57

C-06 · FILE NO. CB-955

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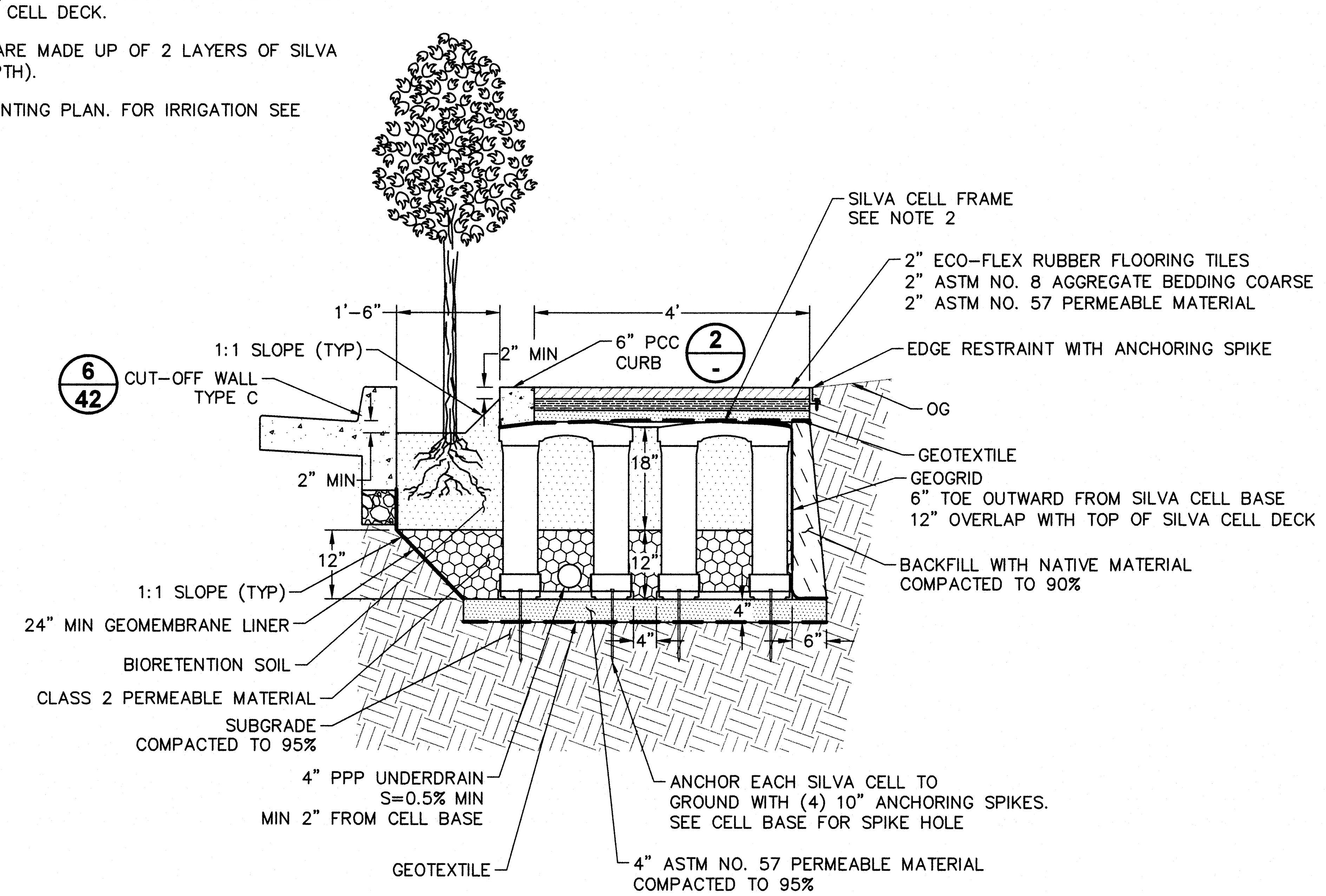
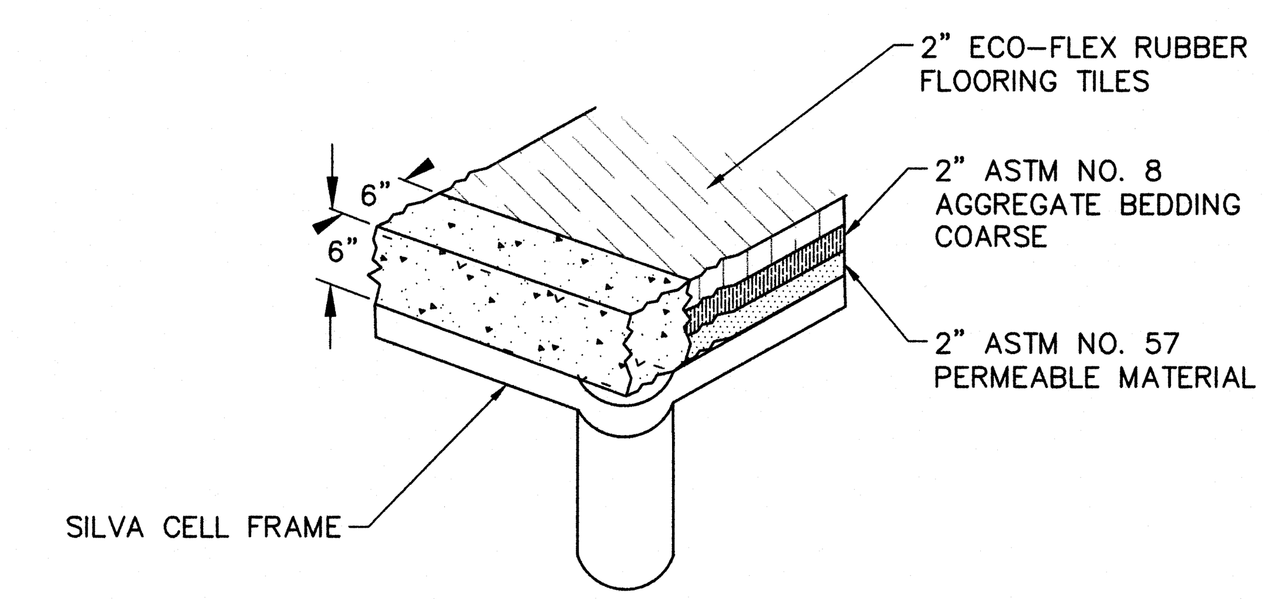
FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

NOTES:

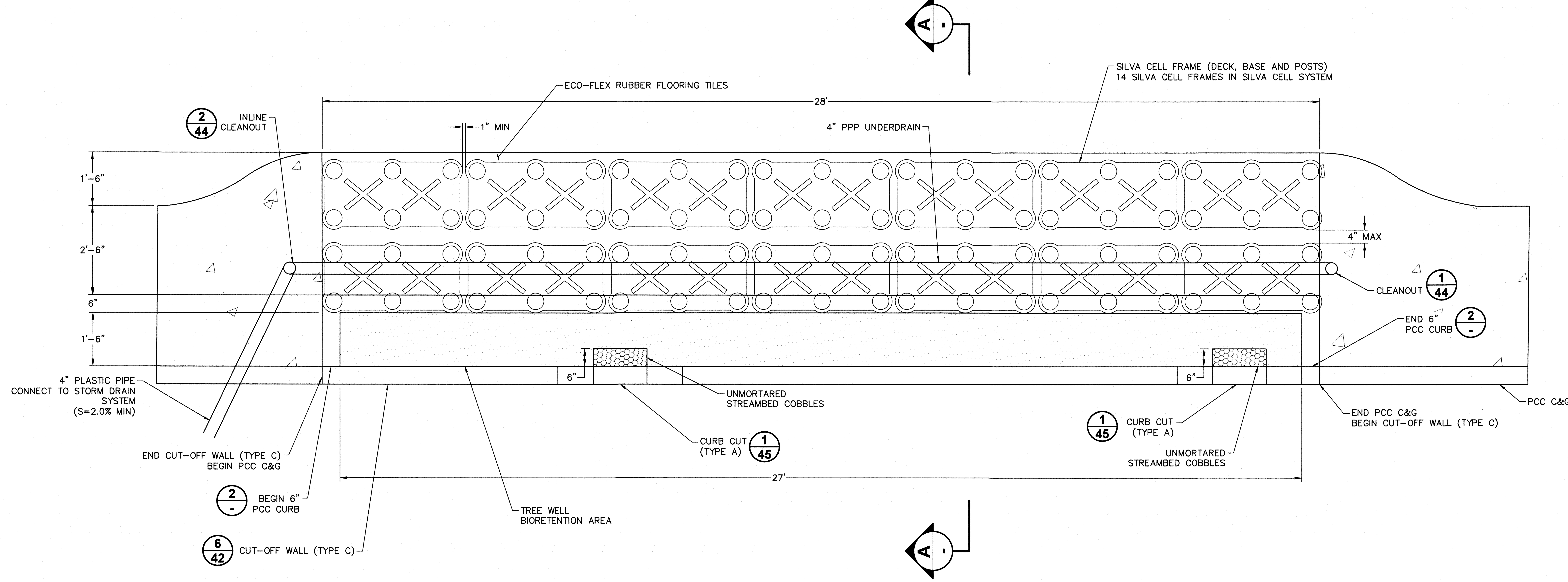
1. 3/16" X 14" ZIP TIES, ATTACHING GEOGRID TO SILVA CELLS AT EACH LEVEL AND AT CELL DECK.
2. SILVA CELL FRAMES ARE MADE UP OF 2 LAYERS OF SILVA CELLS (30.9" TOTAL DEPTH).
3. FOR PLANTS SEE PLANTING PLAN. FOR IRRIGATION SEE IRRIGATION PLAN.



SECTION A
NTS



6" PCC CURB 2
NTS



SILVA CELLS - PLAN VIEW 1
NTS

REVIEWED BY:	DATE:	REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY	
MAINTENANCE		TRAFFIC	
REAL ESTATE		ENVIRONMENTAL	

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD

WRECO
1243 Alpine Road, Suite 108
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COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

CONSTRUCTION DETAILS

DATE: NOV 2017 | SCALE: AS SHOWN
WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 39 OF 57
FILE NO. CB-955
C-07

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

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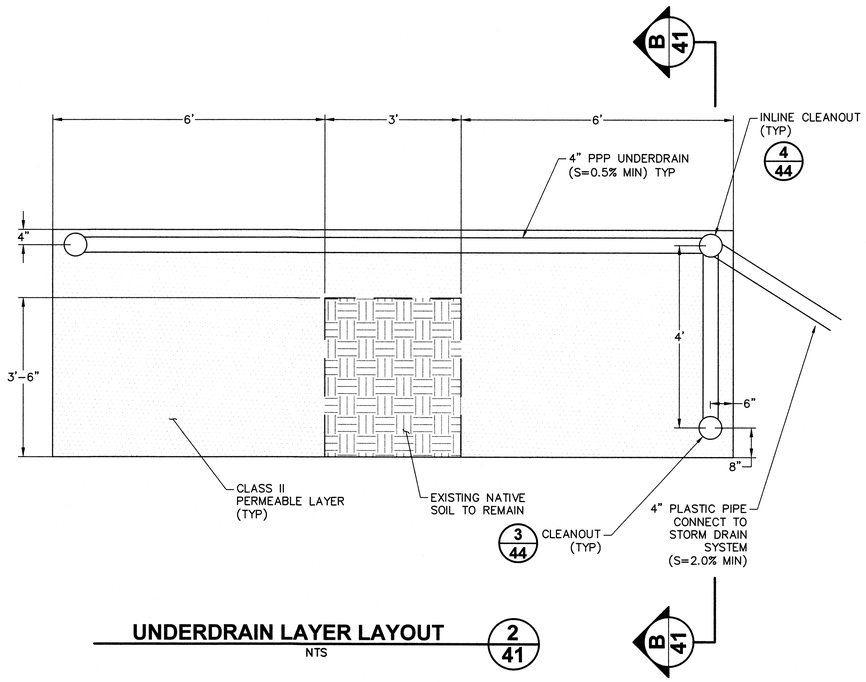
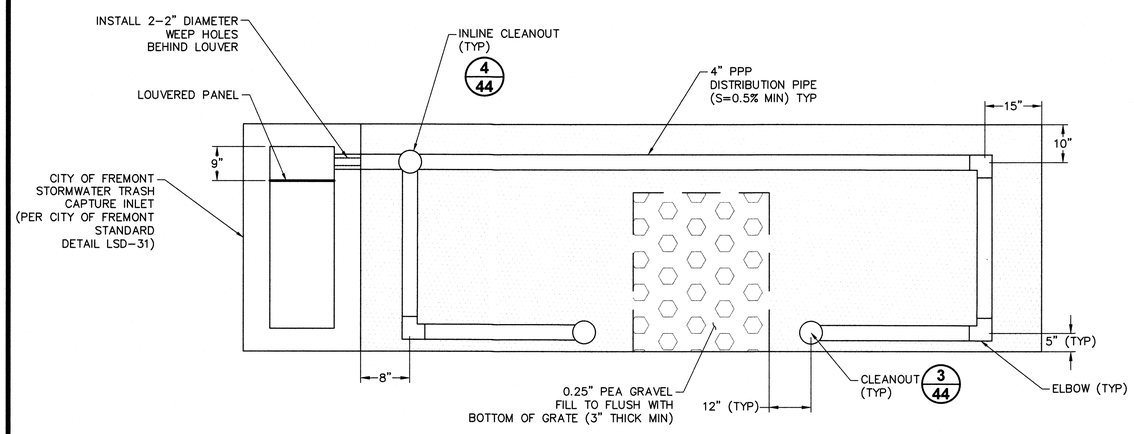


UNDERDRAIN LAYER LAYOUT

NTS

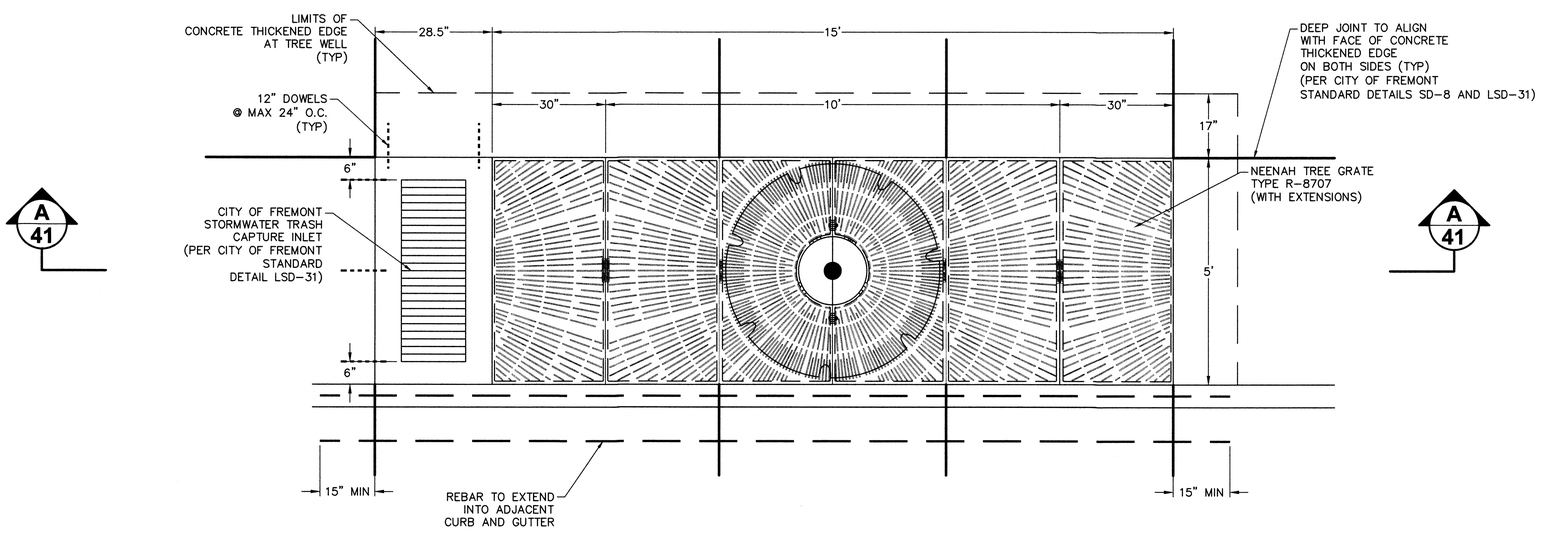
2
41



DISTRIBUTION PIPE LAYER LAYOUT

NTS

3
41



CITY OF FREMONT TREE WELL - PLAN

NTS

1
10

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

REVISIONS				
NO.	DESCRIPTION	BY	DATE	APP'VD
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REVIEWED BY:	DATE:		REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY		
MAINTENANCE		TRAFFIC		
REAL ESTATE		ENVIRONMENTAL		

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CHECKED: ANALETTE OCHOA
APPROVED: ANALETTE OCHOA

REVIEWED: MOSES TSANG
APPROVED FOR COMMISSION: HANK KOPERNIAK

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

CONSTRUCTION DETAILS

DATE	SCALE
NOV 2017	AS SHOWN

WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 40 OF 57
FILE NO. CB-955

C-08

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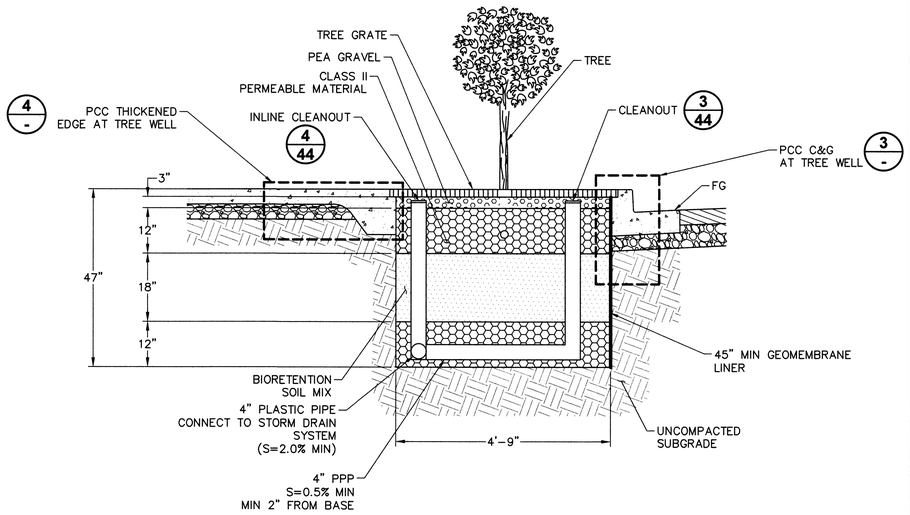
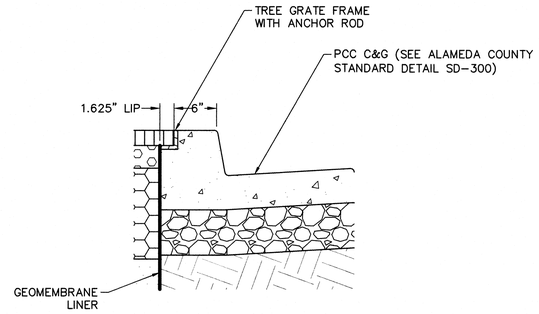
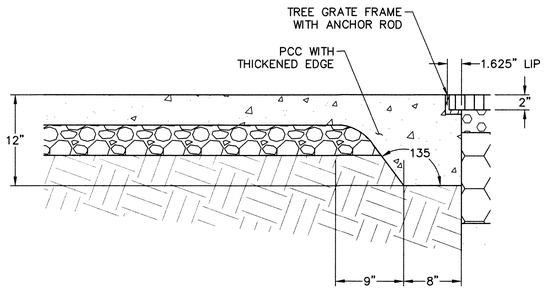


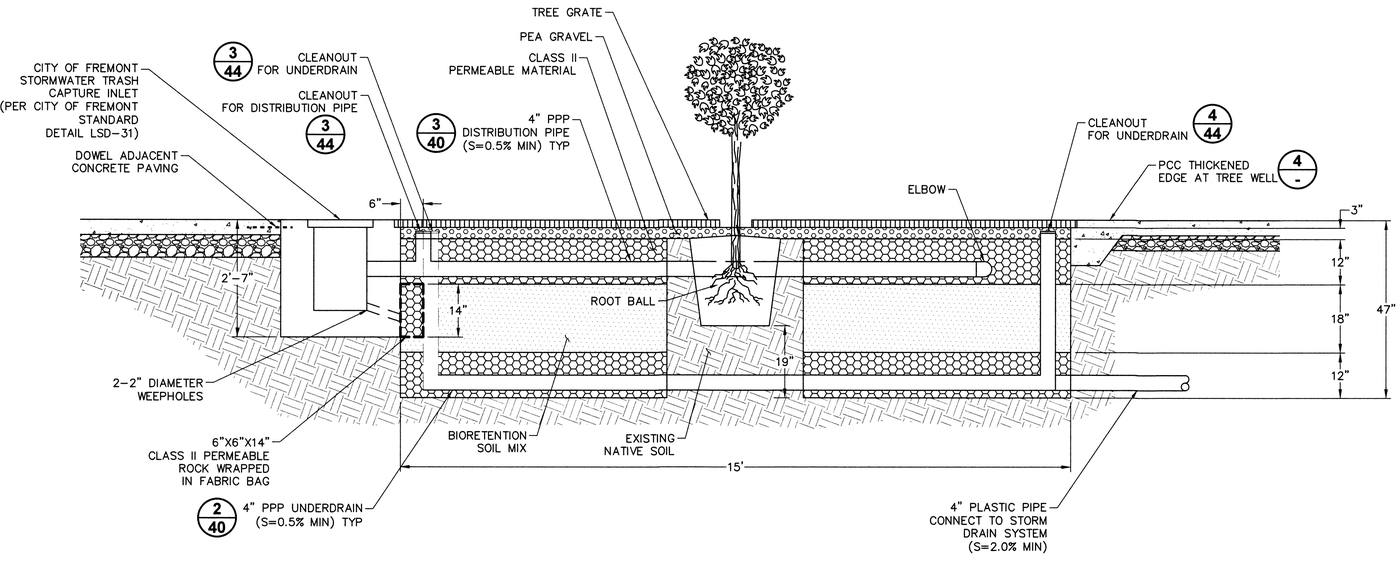
SECTION B
NTS



PCC C&G AT TREE WELL 3/-
NTS



PCC THICKENED EDGE AT TREE WELL 4/-
NTS



SECTION A
NTS

NOTES:

1. SEE PLANTING PLAN LS-01 FOR PLANTING.
2. SEE IRRIGATION PLAN LS-05 FOR IRRIGATION

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

	REVIEWED BY:	DATE:	REVIEWED BY:	DATE:
CONSTRUCTION			SURVEY	
MAINTENANCE			TRAFFIC	
REAL ESTATE			ENVIRONMENTAL	

NO.	DESCRIPTION	BY	DATE	APP'D
1				
2				
3				
4				
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REVISIONS

ANNETTE M. OCHOA No. C 55279 Exp. 12/31/18 CIVIL STATE OF CALIFORNIA REGISTERED PROFESSIONAL ENGINEER

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APPROVED: ANNETTE OCHOA
DESIGNED: ANDREA BROWN

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED: LENA CHEUNG
REVIEWED: MOSES TSANG
APPROVED RECOMMENDED: HANK FOEBAHR

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

CONSTRUCTION DETAILS

DATE: NOV 2017
SCALE: AS SHOWN
WORK ORDER NO.: F86020/R86020
SPECIFICATION NO.: FC 3A-138
SHEET NO.: 41 OF 57
FILE NO.: CB-955

C-09

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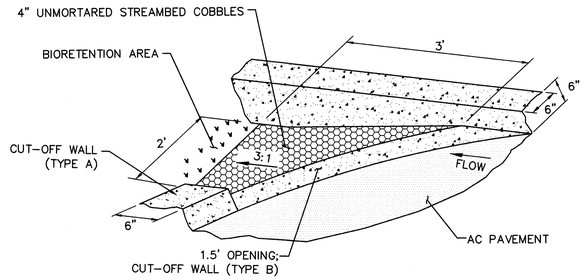
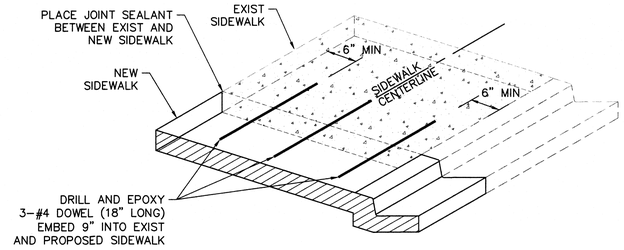


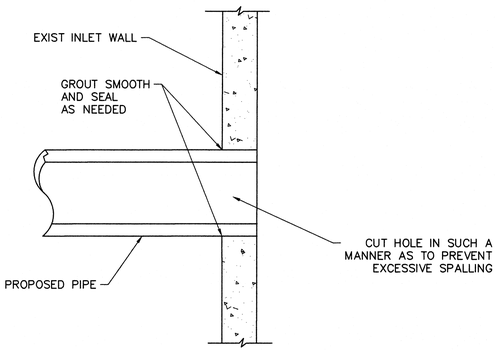
BIORETENTION AREA OPENING 1

NTS



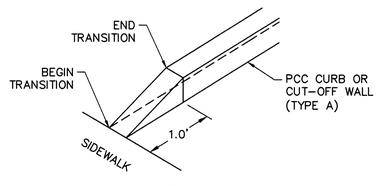
DRILL AND BOND DOWEL INTO EXISTING SIDEWALK 2

NTS



NEW PIPE CONNECT TO EXISTING INLET DETAIL FOR EX DI-1 AT "SD-22" 0+10.14 3

NTS



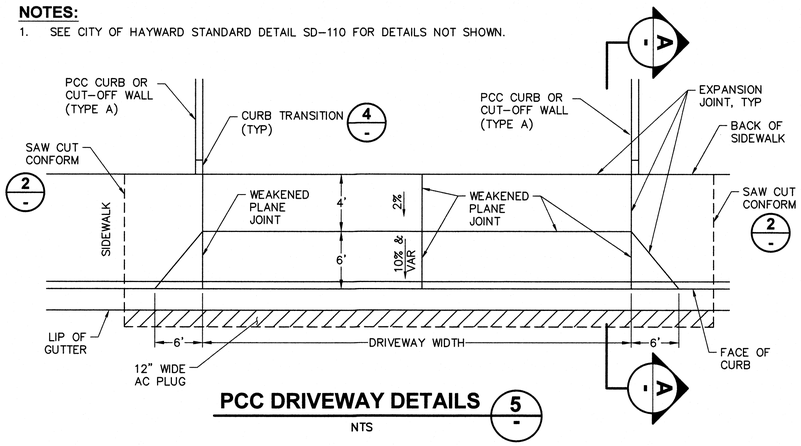
ISOMETRIC

DRIVEWAY CURB TRANSITION 4

NTS

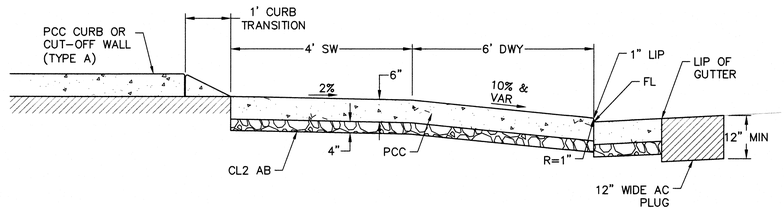
NOTES:

1. SEE CITY OF HAYWARD STANDARD DETAIL SD-110 FOR DETAILS NOT SHOWN.



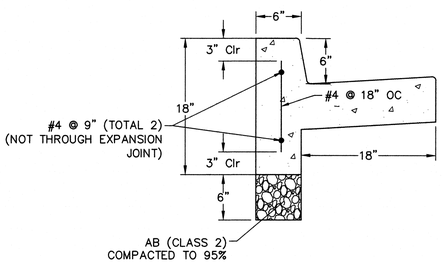
PCC DRIVEWAY DETAILS 5

NTS



SECTION A

NTS



NOTES:

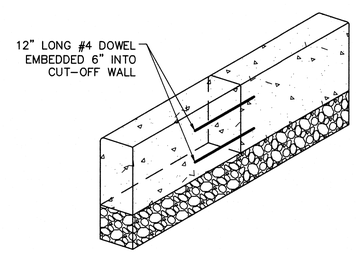
1. FOR CURB AND GUTTER DETAILS NOT SHOWN, SEE ALAMEDA COUNTY STANDARD SD-300.

CUT-OFF WALL (TYPE C) 6

NTS

NOTES:

1. TOP OF CUT-OFF WALL (TYPE A) NOT SHOWN.
2. DOWELS ARE NOT REQUIRED IF WALLS ARE POURED MONOLITHICALLY.

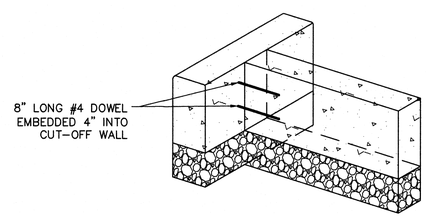


DRILL AND BOND DETAIL FOR CUT-OFF WALLS (PARALLEL) 7

NTS

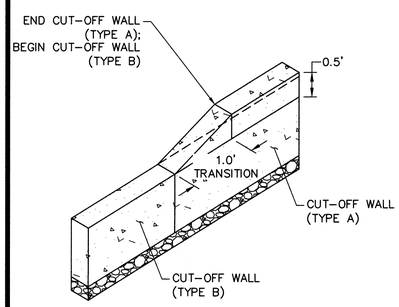
NOTES:

1. TOP OF CUT-OFF WALL (TYPE A) NOT SHOWN.
2. DOWELS ARE NOT REQUIRED IF WALLS ARE POUR MONOLITHICALLY.



DRILL AND BOND DETAIL FOR CUT-OFF WALLS (ANGLED) 8

NTS



CUT-OFF WALL TRANSITION 9

NTS

REVISIONS				
NO.	DESCRIPTION	BY	DATE	APP'D
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	REVIEWED BY:	DATE:
CONSTRUCTION		
MAINTENANCE		
REAL ESTATE		

	REVIEWED BY:	DATE:
SURVEY		
TRAFFIC		
ENVIRONMENTAL		

PROFESSIONAL ENGINEER ANALETTE OCHOA No. C 55279 Exp. 12/31/18 CIVIL State of California

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DRAWN: PATRICK YIM
DESIGNED: ANDREA BROWN

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED: ELSA VALDEZ
REVIEWED: MOSES TSANG
APPROVED: HUNG PHAN

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

CONSTRUCTION DETAILS

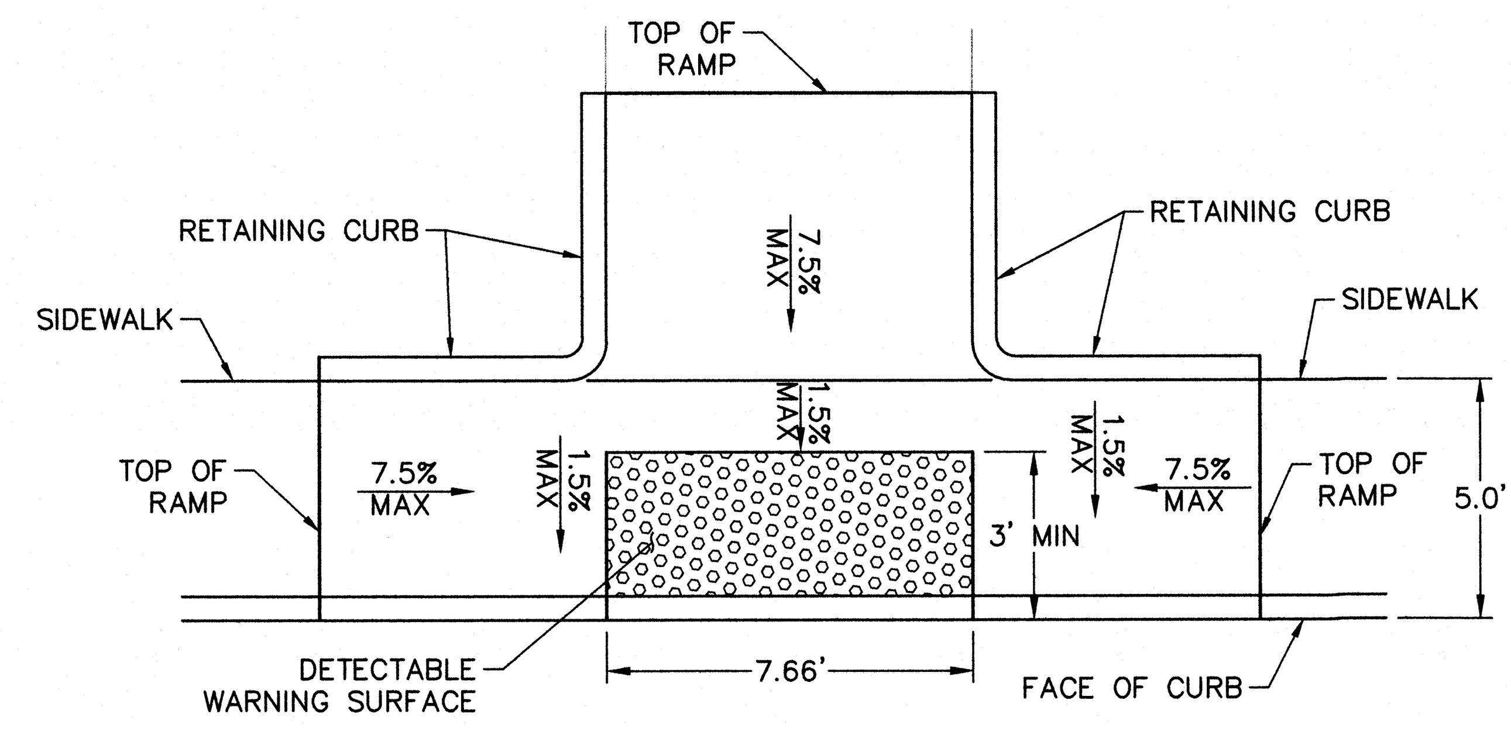
DATE	NOV 2017
SCALE	AS SHOWN
WORK ORDER NO.	F86020/R86020
SPECIFICATION NO.	FC 3A-138
SHEET NO.	42 OF 57
FILE NO.	CB-955

C-10

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

N: \C3D\FLOOD\F86020_Turner_Court_LID\Sheets-WREEO\33-45-Construction Details.dwg 10-17-17 10:57:26 AM Ilene

REVIEWED BY:	DATE:		REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY		
MAINTENANCE		TRAFFIC		
REAL ESTATE		ENVIRONMENTAL		

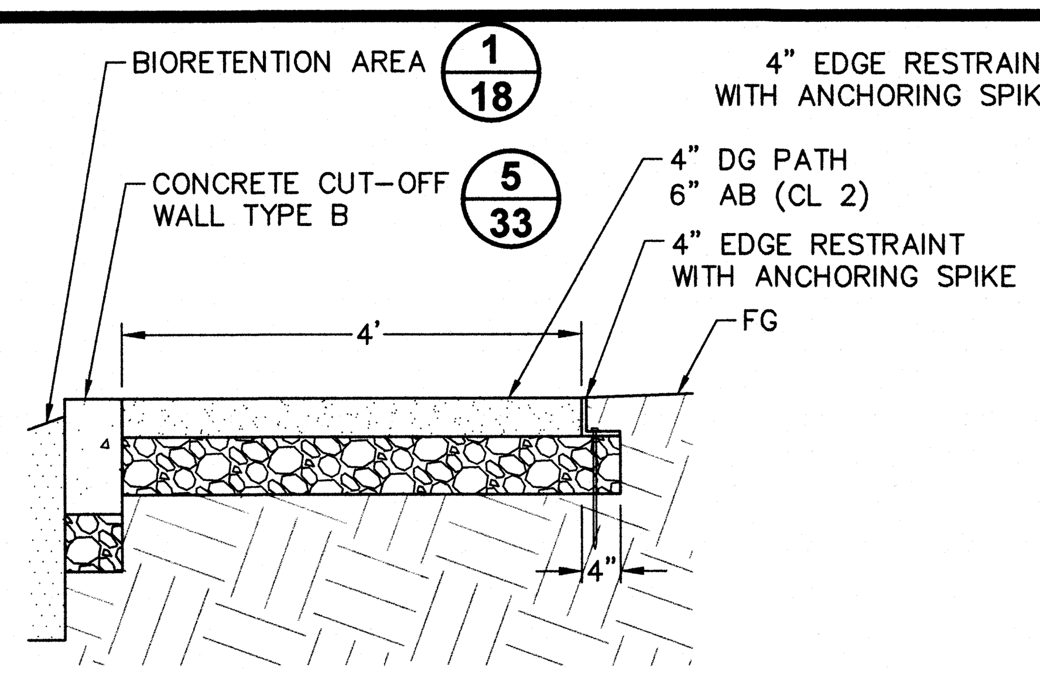


CURB RAMP (CASE C MOD 1) 1/10

NTS

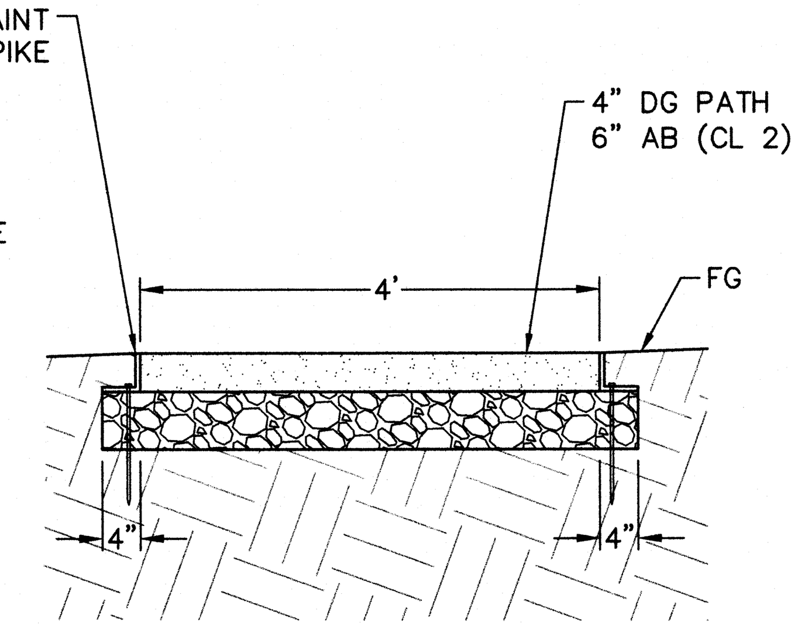
NOTES:

1. FOR CURB RAMP DETAILS NOT SHOWN, SEE CALTRANS 2015 STANDARD PLAN REVISED STANDARD PLAN (RSP) A88A.



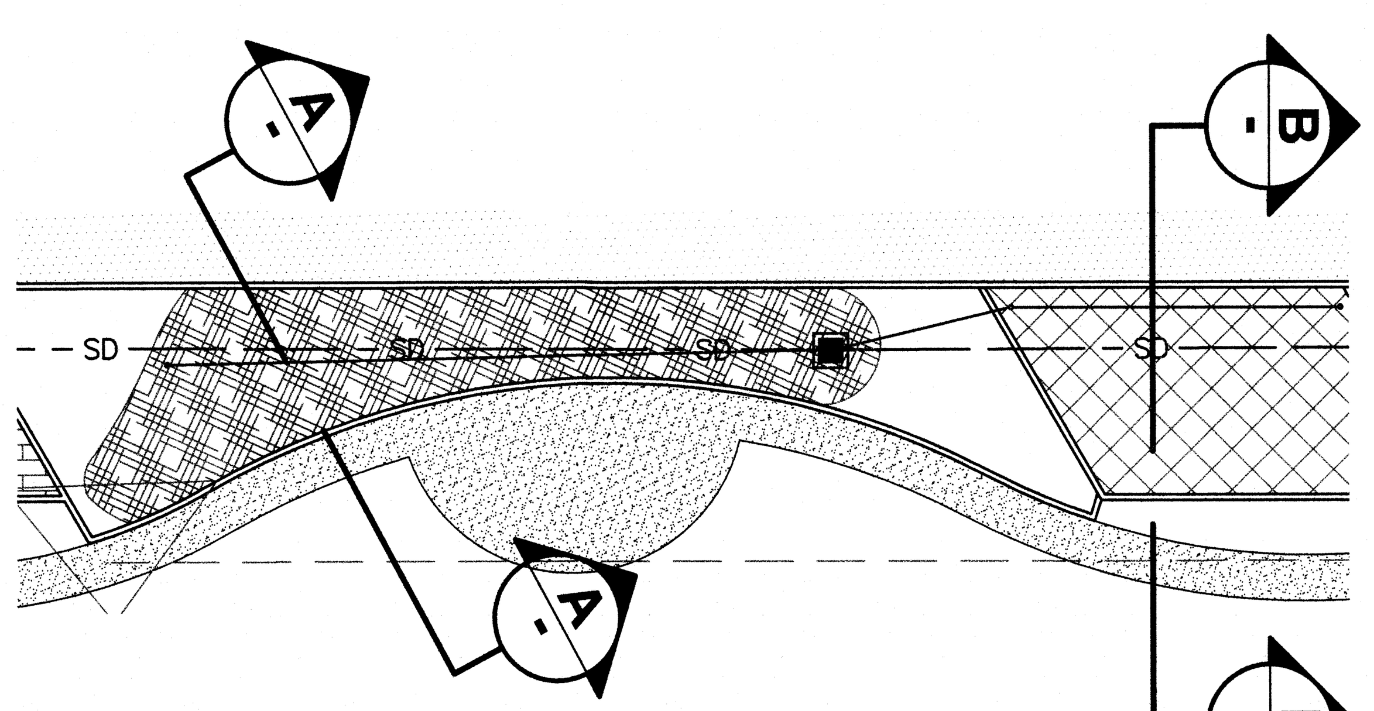
SECTION A/-

NTS



SECTION B/-

NTS

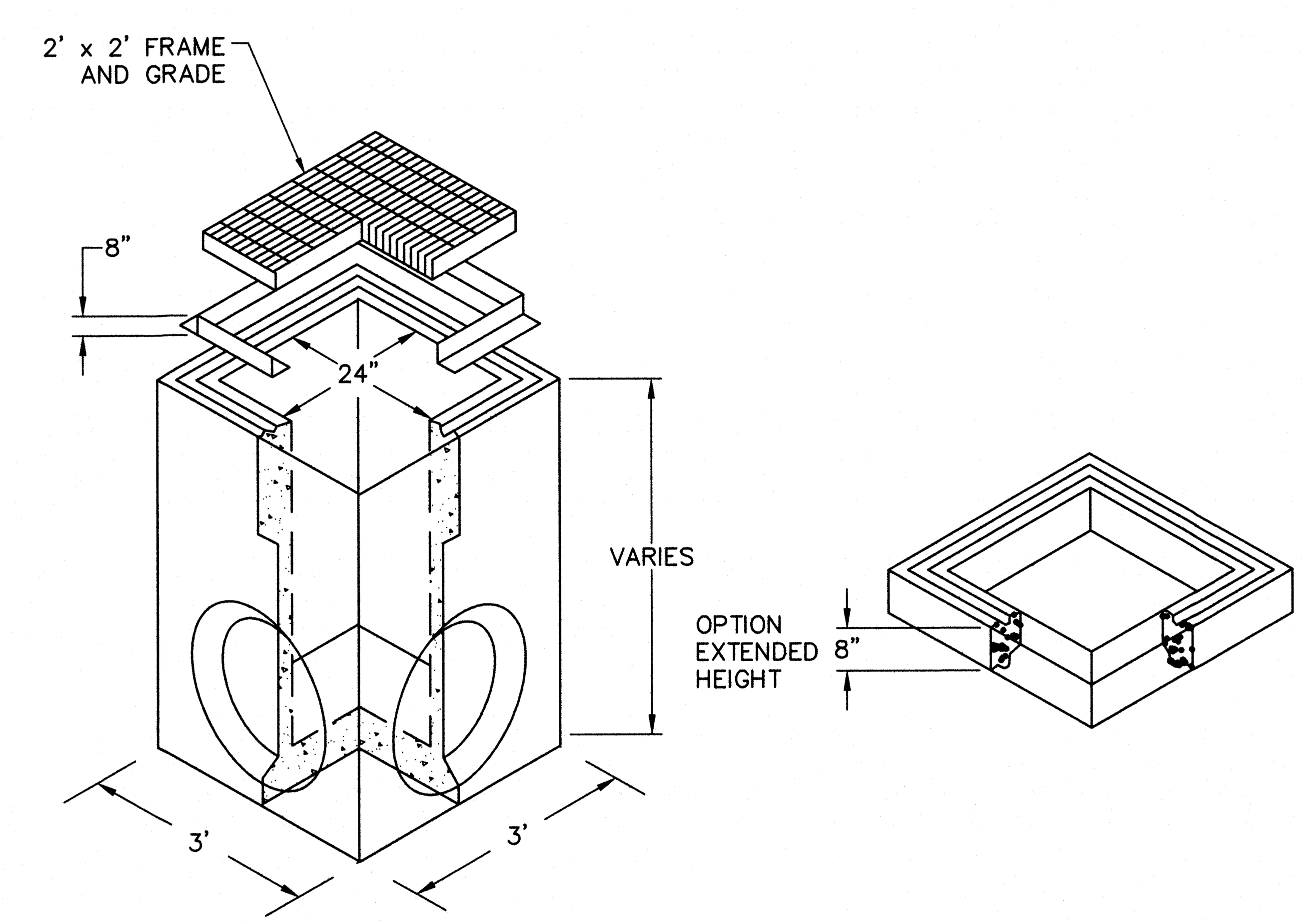


PLAN VIEW

NTS

DECOMPOSED GRANITE PATH 3/10

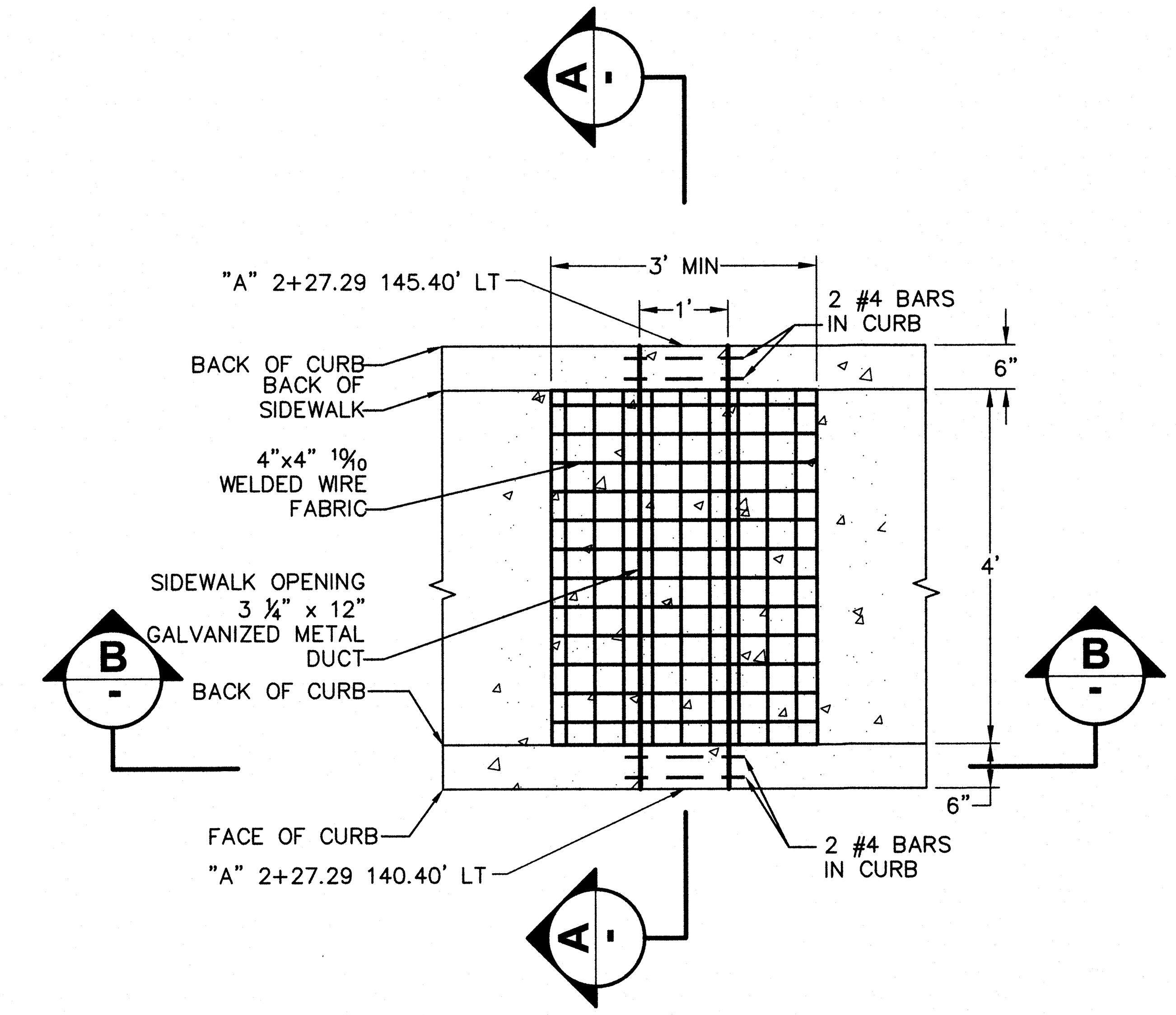
NTS



JENSEN PRECAST OR SIMILAR APPROVED

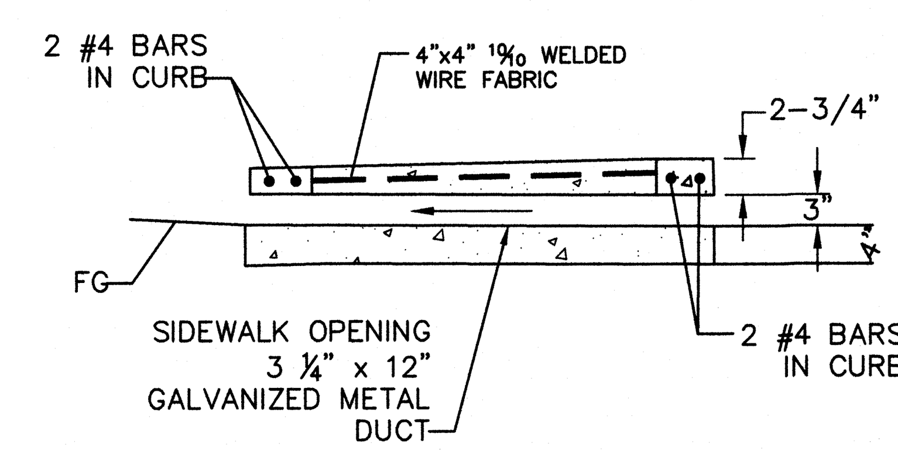
DRAINAGE INLET 4/-

NTS



PLAN VIEW

NTS



SECTION A/-

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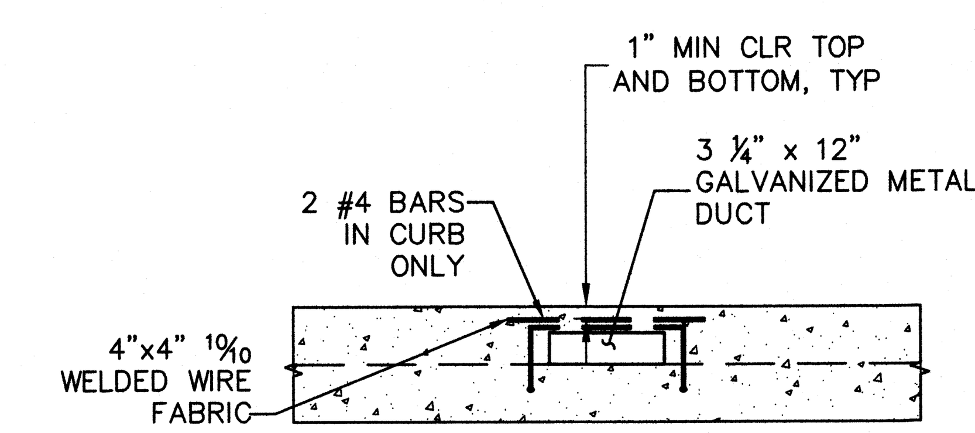

SECTION B/-

NTS

SIDEWALK DRAIN 2/19

NTS

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPV'D

wreco

1243 Alpine Road, Suite 108
Walnut Creek, California 94596
(925) 941-0017
Fax (925) 941-0018

DESIGNED: ANDREA BROWN
DRAWN: PATRICK YIM
CHECKED: ANALETTE OCHOA
APPROVED: ANALETTE OCHOA

ANALETTE OCHOA No. C 55279 Exp. 12/31/18 CIVIL STATE OF CALIFORNIA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED:
MOSES TSANG
APPROVAL RECOMMENDED:

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

CONSTRUCTION DETAILS

DATE	SCALE
NOV 2017	AS SHOWN

WORK ORDER NO. F86020/R86020

SPECIFICATION NO. FC 3A-138

SHEET NO. 43 OF 57

C-11

FILE NO. CB-955

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

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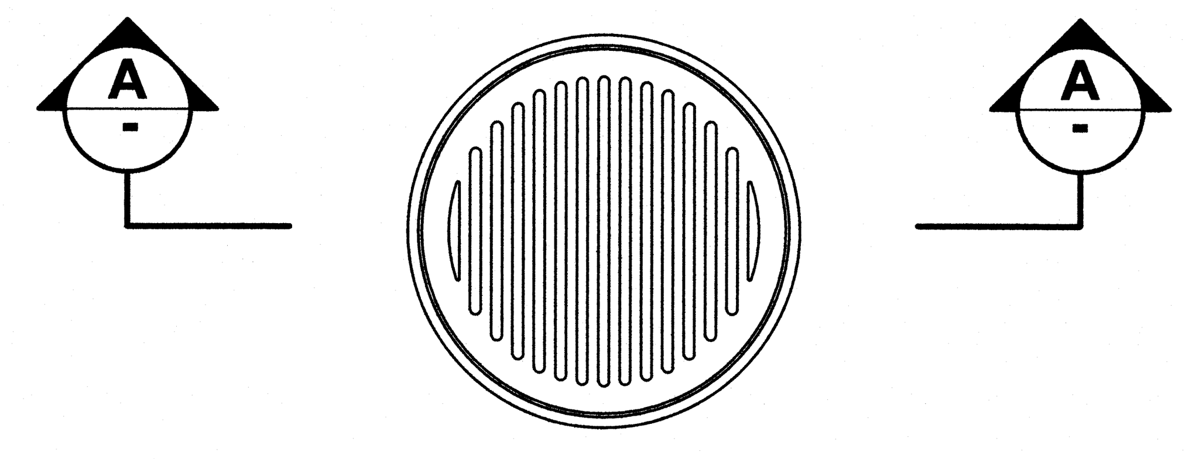
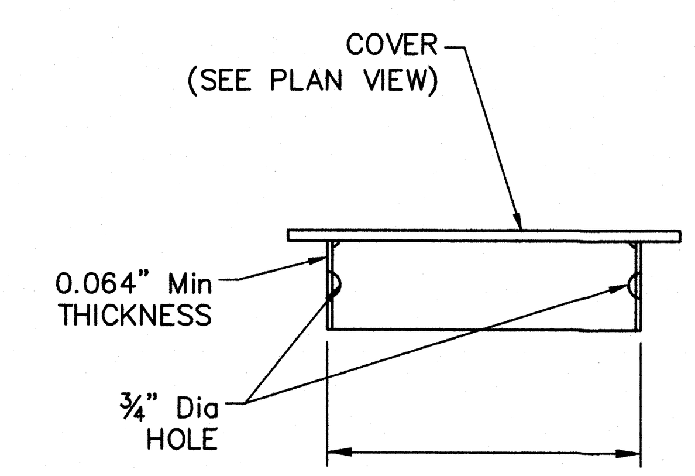


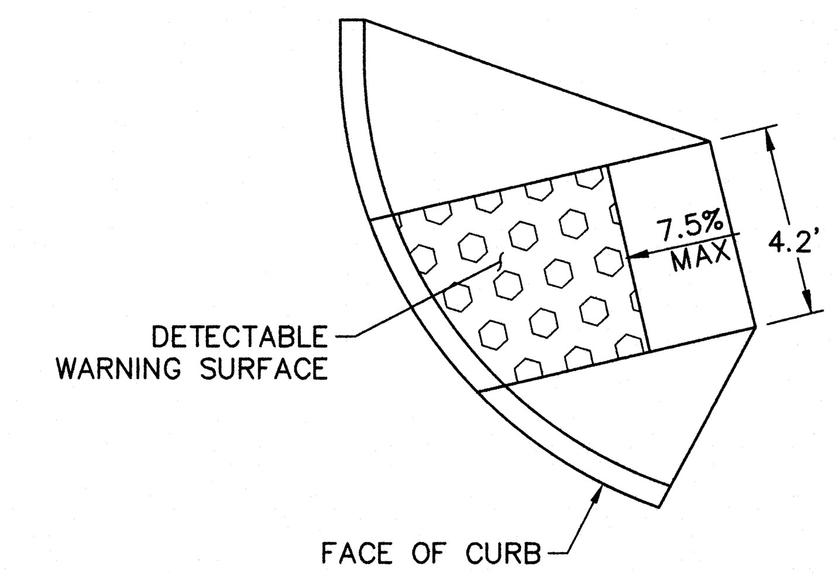
PLAN VIEW



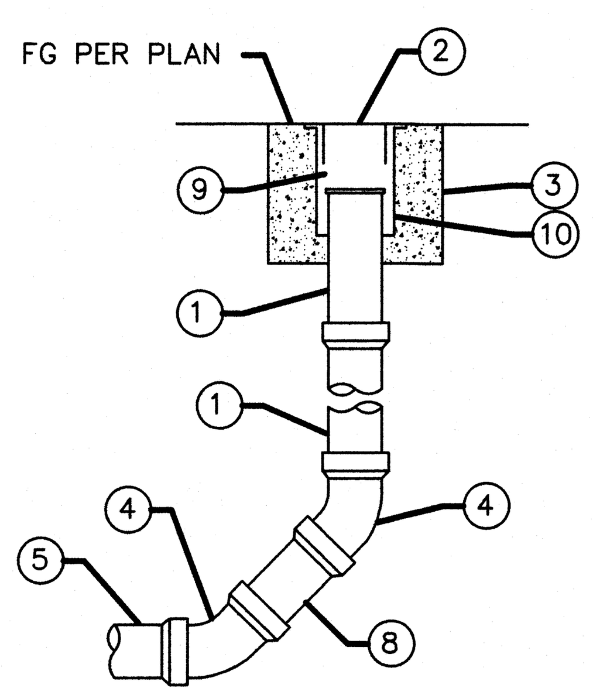
SECTION (A / -)
NTS

CLEANOUT COVER (5 / -)
NTS

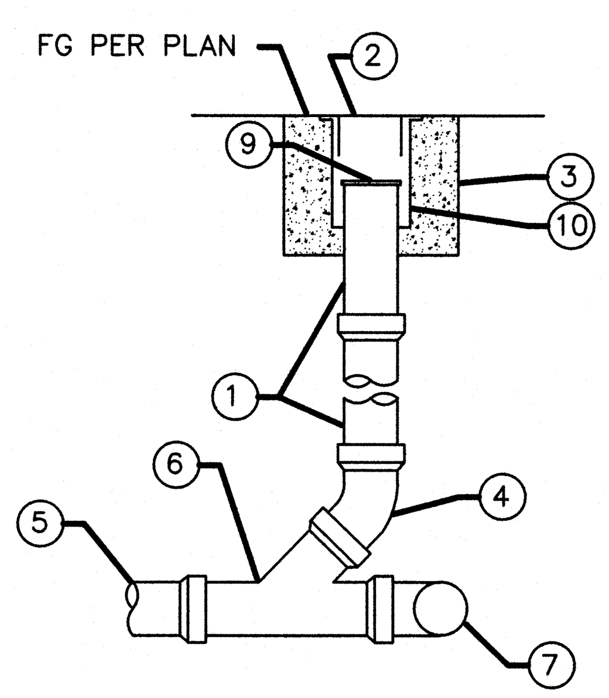
NOTE:
CLEANOUT COVER SHALL BE NDS-05



CURB RAMP (CASE A MOD) (6 / -)
NTS



CLEANOUT (1 / -)
NTS

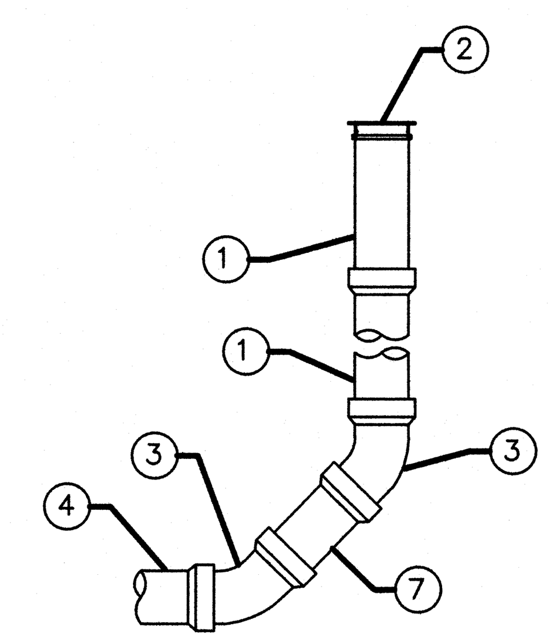


INLINE CLEANOUT (2 / -)
NTS

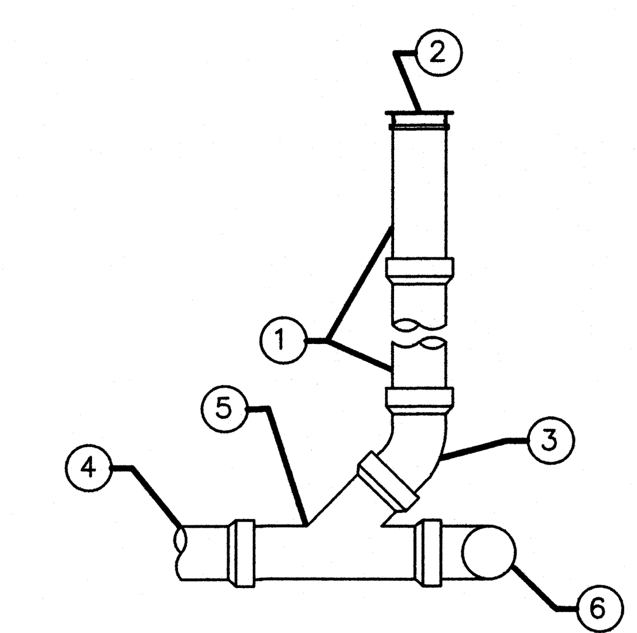
NOTES:

1. CLEANOUTS TO BE INSTALLED WHERE INDICATED ON PLANS. WHERE CONCRETE RING CONFLICTS WITH ADJACENT STRUCTURES. CONTRACTOR TO ADJUST HORIZONTAL LOCATION OF RING AND CLEANOUT AS APPROVED BY THE ENGINEER. ACCOMODATE OFFSET FROM PVC DRAINAGE PIPE WITHIN RISER SECTION BY ADJUSTING FITTINGS.

(1) CLEANOUT PIPE DIAMETER TO BE 4".
(2) 10"' CAST IRON BOX COVER MARKED "STORM WATER" FLUSH WITH FINISHED SURFACE
(3) CONCRETE RING, 22" DIA X 12" DEEP
(4) 45° PVC ELBOW
(5) PVC SUBDRAIN PER PLAN
(6) STANDARD PVC WYE BRANCH
(7) PVC ELBOW WHERE OCCURS.
(8) SIZE PER NOTE 1 X REQUIRED LENGTH PVC PIPE
(9) PRESS FIT PVC END CAP (FEMALE)
(10) 10" PVC, C-900 (CLEANOUT BOX)



CLEANOUT (3 / -)
NTS



INLINE CLEANOUT (4 / -)
NTS

NOTES:

1. CLEANOUTS TO BE INSTALLED WHERE INDICATED ON PLANS. WHERE CONCRETE RING CONFLICTS WITH ADJACENT STRUCTURES. CONTRACTOR TO ADJUST HORIZONTAL LOCATION OF RING AND CLEANOUT AS APPROVED BY THE ENGINEER. ACCOMODATE OFFSET FROM PVC DRAINAGE PIPE WITHIN RISER SECTION BY ADJUSTING FITTINGS.

2. FOR 4" UNDERDRAIN TO EX 6" SD LINE AT FRONT ENTRANCE, USE 4" TO 6" WYE (2 / 45) CONNECTOR AND GROUT IN PLACE.

(1) CLEANOUT PIPE DIAMETER TO BE 4".
(2) CLEANOUT COVER, SEE DETAIL 5.
(3) 45° PVC ELBOW
(4) PVC SUBDRAIN PER PLAN
(5) STANDARD PVC WYE BRANCH (SEE NOTE 2)
(6) PVC ELBOW WHERE OCCURS.
(7) SIZE PER NOTE 1 X REQUIRED LENGTH PVC PIPE

REVIEWED BY:	DATE:		REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY		
MAINTENANCE		TRAFFIC		
REAL ESTATE		ENVIRONMENTAL		

N:\C3D\FLOOD\F86020_Turner_Court_LID\Sheets-WRECO\33-45-Construction Details.dwg 10-17-17 11:07:21 AM Ilene

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD

WRECO
1243 Alpine Road, Suite 108
Walnut Creek, California 94596
(925) 941-0017
Fax (925) 941-0018

DRAWN: PATRICK YIM
DESIGNED: ANDREA BROWN
CHECKED: ANALETTE OCHOA
APPROVED: ANALETTE OCHOA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY
REVIEWED: MOSES TSANG
APPROVED/RECOMMENDED: HANK ACKERMAN

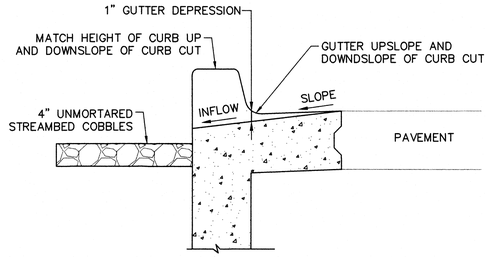
LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

CONSTRUCTION DETAILS

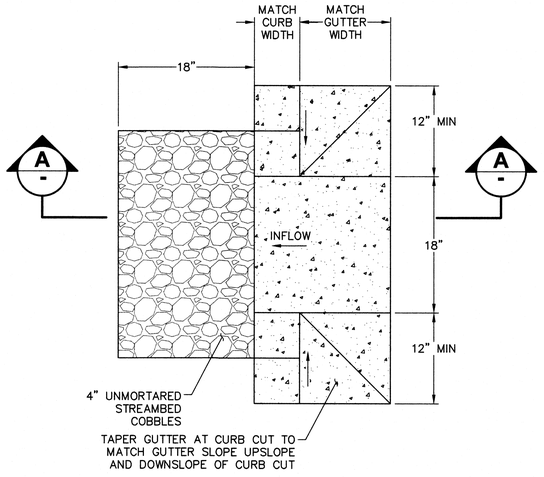
DATE NOV 2017
SCALE AS SHOWN
WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 44 OF 57
FILE NO. CB-955

C-12

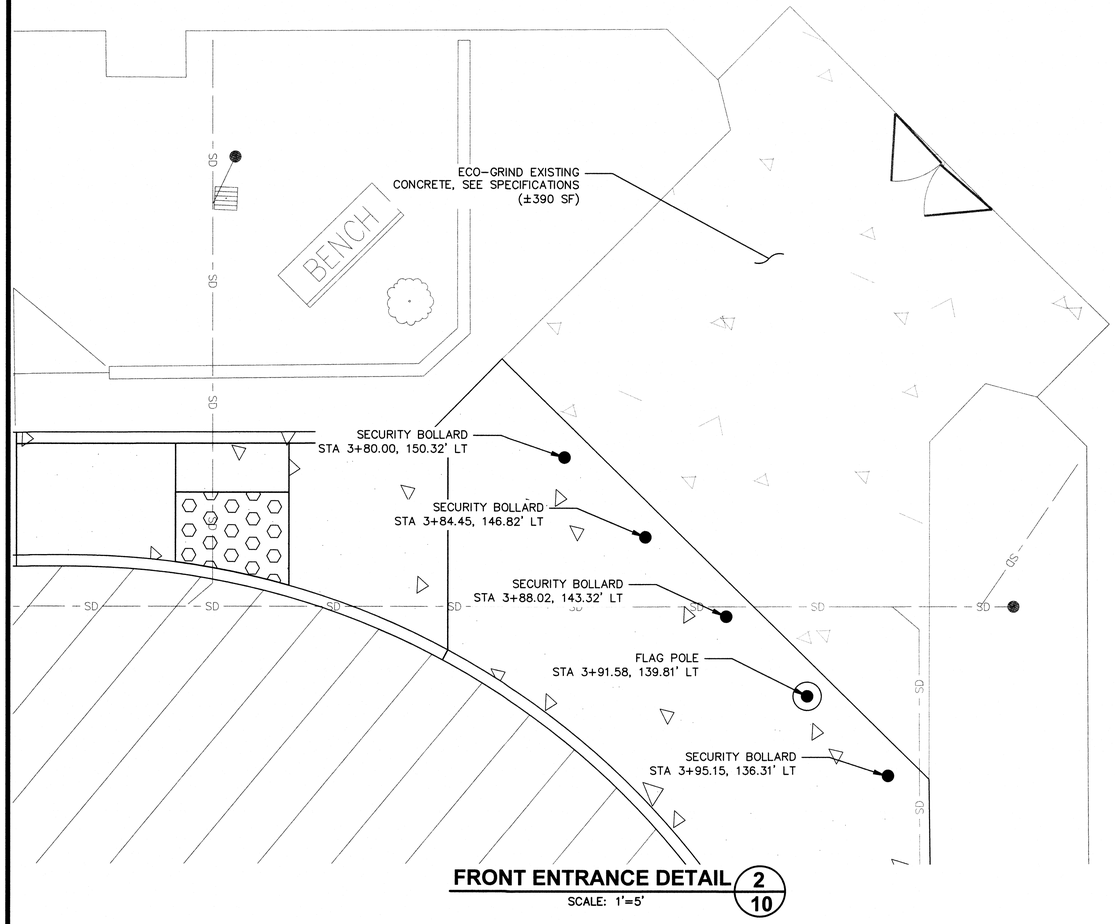
FOR REDUCED ENGLISH PLANS
ORIGINAL SCALE IS IN INCHES
0 1 2 3



SECTION A - A
NTS



CURB CUT (TYPE A) - PLAN VIEW 1/-
NTS



FRONT ENTRANCE DETAIL 2/10
SCALE: 1'=5'

NO.	DESCRIPTION	BY	DATE	APPVD
5				
4				
3				
2				
1				

REVISIONS

	REVIEWED BY:	DATE:
CONSTRUCTION		
MAINTENANCE		
REAL ESTATE		

	REVIEWED BY:	DATE:
SURVEY		
TRAFFIC		
ENVIRONMENTAL		

PROFESSIONAL ENGINEER — ANALETTE OCHOA — No. C 55279 — Exp. 12/31/18 — CIVIL — STATE OF CALIFORNIA

WREECO
1243 Alpine Road, Suite 108
Walnut Creek, California 94596
(925) 941-0017
Fax (925) 941-0018

DRAWN: PATRICK YIM
CHECKED: ANALETTE OCHOA
DESIGNED: ANDREA BROWN
APPROVED: ANALETTE OCHOA

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

RECOMMENDED: [signature]
REVIEWED: MOSES TSANG
APPROVED: HANK FESSANT

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

CONSTRUCTION DETAILS

DATE	SCALE
NOV 2017	AS SHOWN

WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 45 OF 57
FILE NO. CB-955

C-13

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

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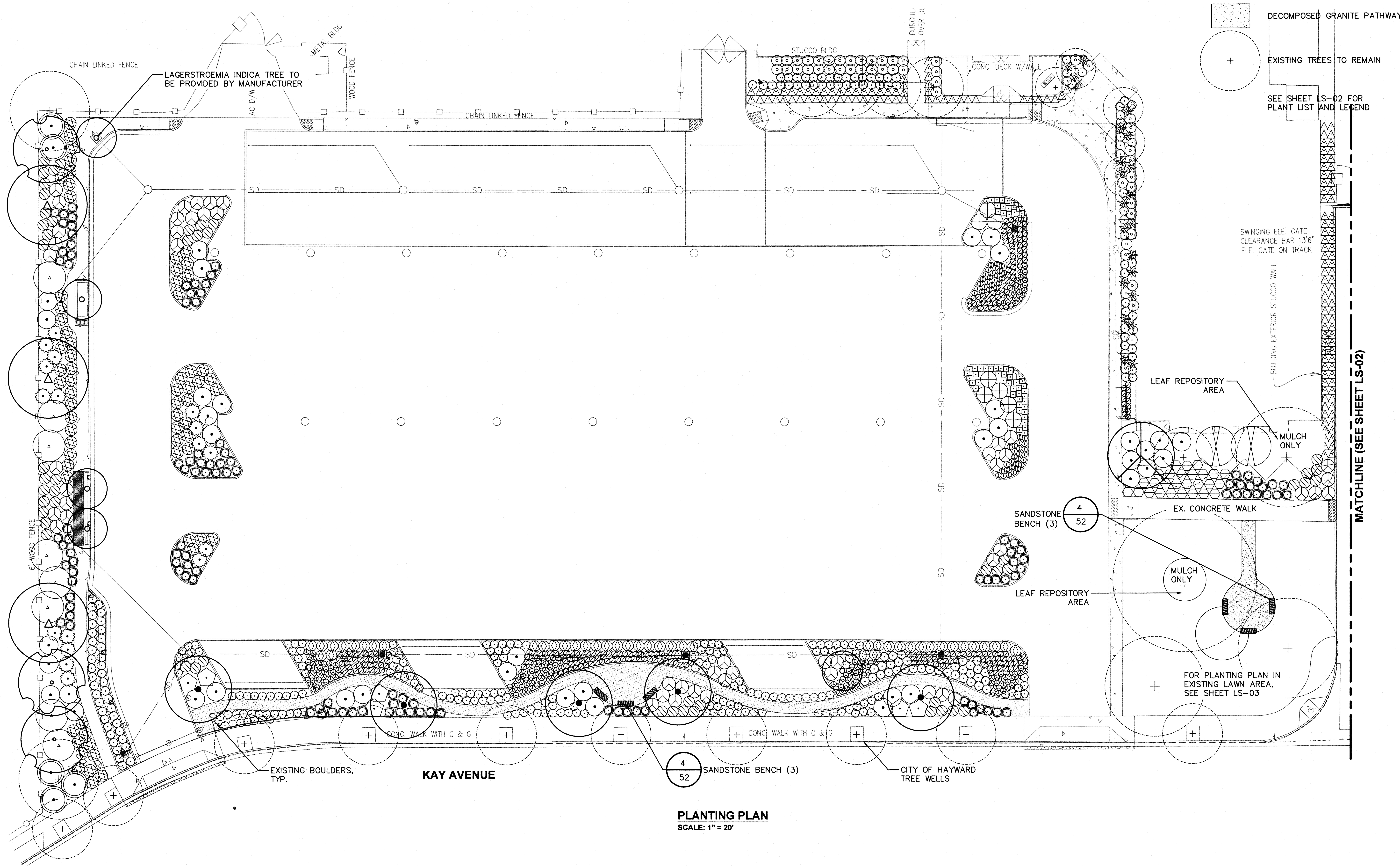
REVIEWED BY:	DATE:	REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY	
MAINTENANCE		TRAFFIC	
REAL ESTATE		ENVIRONMENTAL	

20 0 10 20 40 80
(UNITS IN FEET)

LEGEND

- CONCRETE PAVING, S.C.D.
- DECOMPOSED GRANITE PATHWAY
- EXISTING TREES TO REMAIN

SEE SHEET LS-02 FOR PLANT LIST AND LEGEND



PLANTING PLAN
SCALE: 1" = 20'

NO.	DESCRIPTION	BY	DATE	APPV'D
REVISIONS				

LICENSED LANDSCAPE ARCHITECT — STATE OF CALIFORNIA

PGAdesign
LANDSCAPE ARCHITECTS
tel 510.465.1284 PGAdesign.com
444 17th Street, Oakland, CA 9461.

DRAWN: DANIEL ...
DESIGNED: CHRIS KENT, DANIEL ...

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY
REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED: HANK ACKERMAN

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

PLANTING PLAN

DATE	SCALE
NOV 2017	AS SHOWN

WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 48 OF 57
FILE NO. CB-955
LS-01

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

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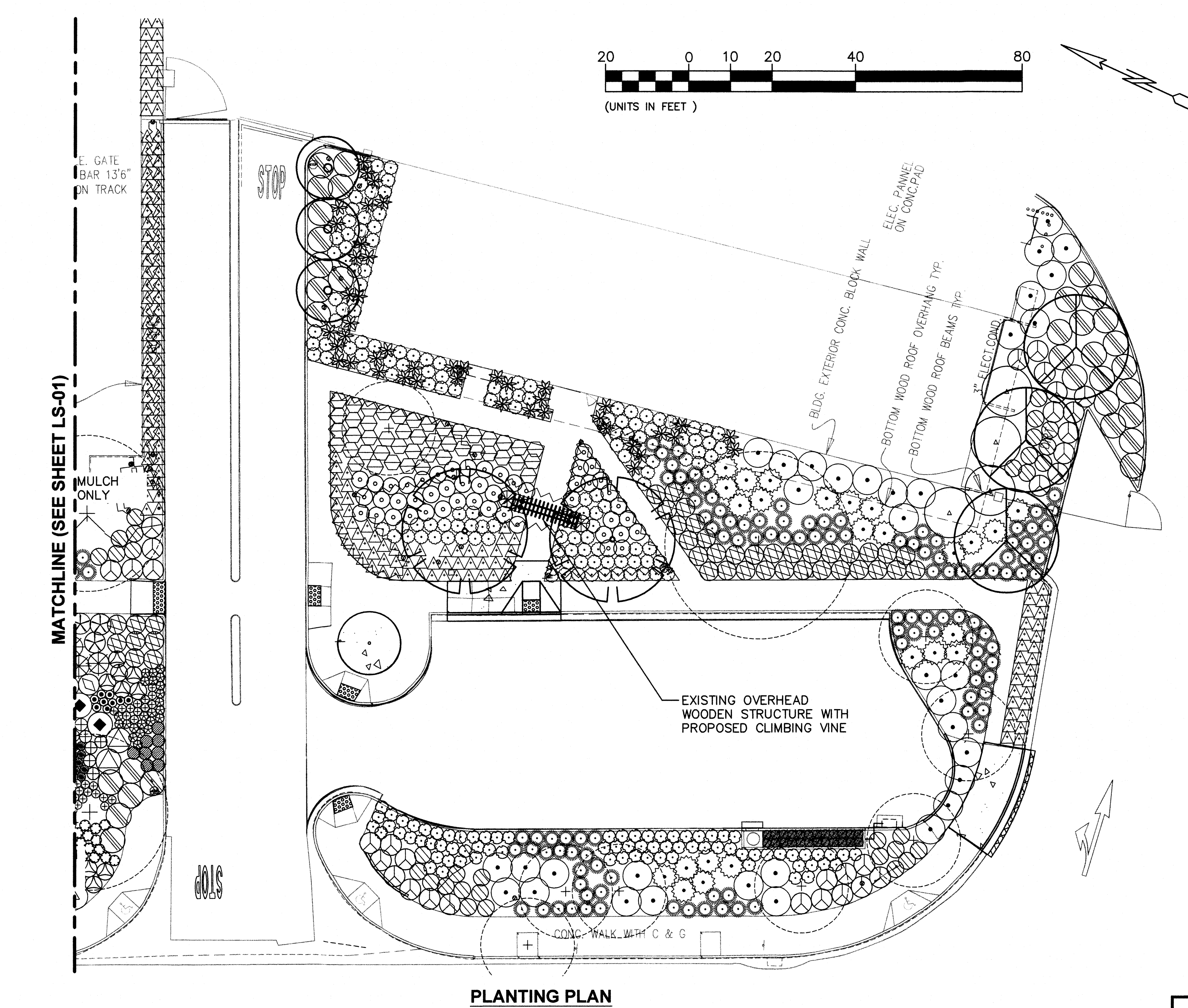
PLANT LIST

SYMBOL	QUANTITY	MEETS BFL DROUGHT TOLERANT REQUIREMENT	BOTANICAL NAME	COMMON NAME	SIZE	CA NATIVE	SPACING	MIN-MAX SPACING	WATER REQ	WATER REQ REFERENCE
TREES										
	3	X	AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE (NATURAL FORM)	15 GAL.	X	AS INDICATED	15'-30'	LOW	WUCOL/SUNSET
	4	X	ARBUTUS 'MARINA'	STRAWBERRY TREE (MULTI-TRUNK)	24" BOX		AS INDICATED	25'-40'	LOW	WUCOL/SUNSET
	2	X	CERCIS OCCIDENTALIS	WESTERN REDBUD (MULTI-TRUNK)	24" BOX	X	AS INDICATED	12'-20'	LOW	WUCOL/SUNSET
	8	X	LAGERSTROEMIA INDICA 'TWLIGHT PURPLE'	PURPLE CRAPE MYRTLE (STANDARD)	24" BOX		AS INDICATED	15'-25'	LOW	WUCOL/SUNSET
	3	X	QUERCUS AGRIFOLIA	COAST LIVE OAK (STANDARD)	24" BOX	X	AS INDICATED	20'-60'	LOW	WUCOL/SUNSET
	2	X	SCHINUS MOLLE	CALIFORNIA PEPPER TREE (STANDARD)	24" BOX		AS INDICATED	25'-40'	LOW	WUCOL/CNP
	4	X	ULMUS PARVIFOLIA 'DRAKE'	DRAKE CHINESE ELM (STANDARD)	24" BOX		AS INDICATED	35'-50'	LOW	WUCOL/CNP
SHRUBS										
	42	X	ARCTOSTAPHYLOS DENSIFLORA 'HOWARD MCMINN'	HOWARD MCMINN MANZANITA	5 GAL.	X	6'	7'-9'	LOW	WUCOL/CNP
	4	X	ARCTOSTAPHYLOS 'SUNSET'	SUNSET MANZANITA	5 GAL.	X	6'	5'-7'	LOW	WUCOL/CNP
	5	X	CEANOTHUS 'JOYCE COULTER'	JOYCE COULTER CEANOTHUS	5 GAL	X	10'	8'-10'	LOW	WUCOL/CNP
	11	X	CEANOTHUS 'VALLEY VIOLET'	VALLEY VIOLET CEANOTHUS	5 GAL.	X	4'	3'-5'	LOW	WUCOL/CNP
	8	X	CISTUS X PURPUREUS	PURPLE ROCK ROSE	5 GAL.		6'	4'-8'	LOW	WUCOL/CNP
	11	X	ERIOGONUM ARBORESCENS	SANTA CRUZ ISLAND BUCKWHEAT	5 GAL.	X	5'	4'-6'	VERY LOW	WUCOL/CNP
	4	X	ERIOGONUM GIGANTEUM	ST. CATHERINE'S LACE	5 GAL.	X	6'	5'-7'	VERY LOW	WUCOL/CNP
	14	X	ERIOGONUM GRANDE RUBESCENS	SAN MIGUEL ISLAND BUCKWHEAT	5 GAL.	X	3'	2'-4'	LOW	WUCOL/CNP
	9	X	ERIOGONUM FASCICULATUM 'WARRINER LYTTLE'	WARRINER LYTTLE BUCKWHEAT	5 GAL.	X	5'	4'-6'	LOW	WUCOL/CNP
	11	X	GALVEZIA SPECIOSA	ISLAND SNAP DRAGON	5 GAL.	X	5'	4'-6'	LOW	WUCOL/CNP
	12	X	HETEROMELES ARBUTIFOLIA	TOYON	15 GAL.	X	12'	8'-15'	LOW	WUCOL/CNP
	74	X	RHAMNUS CALIFORNICA 'EVE CASE'	CALIFORNIA COFFEEBERRY	5 GAL.	X	7'	4'-8'	LOW	WUCOL/CNP
	6	X	RIBES SANGUINEUM 'CLAREMONT'	PINK FLOWERING CURRANT	5 GAL.	X	6'	6'-8'	LOW	WUCOL/CNP
	5	X	RIBES VIBURNIFOLIUM	CATALINA CURRANT	5 GAL.	X	5'	4'-6'	LOW	WUCOL/CNP
	77	X	SALVIA 'BEE'S BLISS'	BEE'S BLISS SAGE	5 GAL.	X	5'	4'-6'	LOW	WUCOL/CNP
	77	X	SALVIA CLEVELANDII 'WINNIFRED GILMAN'	BLUE SAGE	5 GAL.	X	4'	3'-5'	LOW	WUCOL/SUNSET
	12	X	SYMPHORICARPOS ALBUS	SNOWBERRY	5 GAL.	X	3'-6"	3'-4'	LOW	WUCOL/CNP
GRASSES/GROUNDCOVERS/PERENNIALS/VINES										
	66	X	AGAVE ATTENUATA	BLUE FOX TAIL AGAVE	5 GAL.		4'	2.5'-5'	LOW	WUCOL/CNP
	104	X	ARCTOSTAPHYLOS 'PACIFIC MIST'	PACIFIC MIST MANZANITA	5 GAL.	X	4'-6"	4'-5'	LOW	WUCOL/CNP
	94	X	ARCTOSTAPHYLOS 'POINT REYES"	POINT REYES MANZANITA	5 GAL.	X	4'	4'-8'	LOW	WUCOL/CNP
	42	X	BACCHARIS PILULARIS 'PIGEON POINT'	DWARF COYOTE BRUSH	5 GAL.	X	6'	5'-7'	LOW	WUCOL/CNP
	2	X	BOUGAINVILLEA 'SAN DIEGO RED'	SAN DIEGO RED BOUGAINVILLEA	5 GAL.		N/A	N/A	LOW	WUCOL/CNP
	46	X	CALAMAGROSTIS FOLIOSA	MENDOCINO REED GRASS	1 GAL.	X	2'	1.5'-2.5'	MOD	WUCOL/CNP
	45	X	CHONDROPETALUM TECTORUM	CAPE RUSH	1 GAL.		4'	4'-6'	LOW	WUCOL/CNP
	227	X	DIETES GRANDIFLORA 'VARIEGATA'	STRIPED FORTNIGHT LILY	1 GAL.		3'	2'-3'	LOW	WUCOL/CNP
	34	X	EPILOBIUM SEPTENTRIONALIS 'SELECT MATTOLE'	SELECT MATTOLE CALIFORNIA FUCSHIA	1 GAL.	X	2'	1'-3'	LOW	WUCOL/CNP
	43	X	ERIGERON GLAUCUS	SEASIDE DAISY	1 GAL.	X	2'	1'-3'	LOW	WUCOL/CNP
	22	X	FESTUCA CALIFORNIA	CALIFORNIA FESCUE	1 GAL.	X	3'	2'-3'	LOW	WUCOL/CNP
	50	X	FRAGARIA CHILOENSIS	BEACH STRAWBERRY	1 GAL.	X	2'	2'-3'	LOW	WUCOL/CNP
	21	X	GRINDELIA STRICTA	COASTAL GUM PLANT	1 GAL.	X	3'	2'-3'	LOW	WUCOL/CNP
	72	X	HEUCHERA MAXIMA	ISLAND ALUM ROOT	1 GAL.	X	2'	2'-3'	MOD	WUCOL/CNP
	36	X	IRIS DOUGLASIANA 'CANYON SNOW'	DOUGLAS IRIS	1 GAL.	X	2'-6"	2'-3'	LOW	WUCOL/CNP
	282	X	JUNCUS PATENS 'ELK BLUE'	ELK BLUE CALIFORNIA GRAY RUSH	1 GAL.	X	2'	1.5'-2.5'	LOW	WUCOL/CNP
	7	X	LESSINGIA FILAGINIFOLIA 'SILVER CARPET'	SILVER CARPET BEACH ASTER	1 GAL.	X	6'	5'-7'	LOW	WUCOL/CNP
	277	X	LOMANDRA LONGIFOLIA 'BREEZE'	BASKET GRASS	1 GAL.		3'	2.5'-3'	LOW	WUCOL/SUNSET
	42	X	MIMULUS BIFIDUS	APRICOT MONKEY FLOWER	1 GAL.	X	2'-6"	2'-3'	LOW	WUCOL/CNP
	59	X	MIMULUS 'BURST BERRY'	BURST BERRY MONKEY FLOWER	1 GAL.	X	2'	1'-2'	LOW	WUCOL/CNP
	22	X	MONARDELLA VILLOSA	COYOTE MINT	1 GAL.	X	2'	1'-3'	LOW	WUCOL/CNP
	226	X	MUHLENBERGIA RIGENS	DEER GRASS	1 GAL.	X	4'	3'-6'	LOW	WUCOL/CNP
	38	X	PENSTEMON 'MARGARITA BOP'	MARGARITA BOP PENSTEMON	1 GAL.	X	2'	1'-3'	LOW	WUCOL/CNP
	97	X	PHORMIUM 'BRONZE BABY'	NEW ZEALAND FLAX	1 GAL.		4'	3'-5'	LOW	WUCOL/CNP
	22	X	SALVIA SPATHACEA	HUMMINGBIRD SAGE	1 GAL.	X	3'	2'-4'	LOW	WUCOL/CNP
	158	X	SISYRINCHIUM BELLUM 'DEVON SKIES'	BLUE-EYED GRASS	1 GAL.	X	2'	.5'-2'	LOW	WUCOL/CNP
	260	X	WESTRINGIA FRUTICOSA 'WYNYABBIE GEM'	WYNYABBIE COAST ROSEMARY	1 GAL.		3'	2'-3'	LOW	WUCOL/CNP
	257 SF	X	VARIOUS, SEE SPECS	NATIVE MOW FREE	SOD	X	N/A	N/A	LOW	WUCOL/CNP
TOTAL PLANTS	2793									
PERCENT OF DROUGHT TOLERANT PLANTS*			*TOTAL MUST BE 75% MINIMUM DROUGHT TOLERANT ACCORDING TO BFL GUIDELINES							

THIRD PARTY REFERENCES FOR WATER USE CLASSIFICATIONS THAT MEETS THE BAY FRIENDLY LANDSCAPE CLASSIFICATION FOR DROUGHT TOLERANT PLANTS:
CNP: "CALIFORNIA NATIVE PLANTS FOR THE GARDEN" BY BORNSTEIN, FROSS & O'BRIEN – OCCASIONAL OR INFREQUENT OR DROUGHT TOLERANT
EBMUD: "PLANTS AND LANDSCAPES FOR SUMMER-DRY CLIMATES OF THE SAN FRANCISCO BAY REGION" BY EBMUD – INFREQUENT OR OCCASIONAL OR NO SUMMER WATER, PLANTS THAT ARE OCCASIONAL TO MODERATE WATER MAY QUALIFY IF THEY ARE IN THE APPROPRIATE CLIMATE AND EXPOSURE.
SUNSET: "SUNSET WESTERN GARDEN BOOK" – LITTLE OR NO WATER
WUCOLS: WATER USE CLASSIFICATION OF LANDSCAPE SPECIES – LOW OR VERY LOW WATER

THIRD PARTY REFERENCES FOR SPREAD OF PLANTS:
CNP: "CALIFORNIA NATIVE PLANTS FOR THE GARDEN" BY BORNSTEIN, FROSS & O'BRIEN
EBMUD: PLANTS AND LANDSCAPES FOR SUMMER-DRY CLIMATES OF THE SAN FRANCISCO BAY REGION BY EBMUD.
DIG DOG: DIGGING DOG NURSERY, WWW.DIGGINGDOG.COM
MONT: MONTERREY BAY NURSERY, HTTP://MONTEREYBAYNSY.COM
SUNSET: "SUNSET WESTERN GARDEN BOOK"



PLANTING PLAN
SCALE: 1" = 20'

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD

REVIEWED BY: / DATE: — SURVEY, TRAFFIC, ENVIRONMENTAL
REVIEWED BY: / DATE: — CONSTRUCTION, MAINTENANCE, REAL ESTATE

LICENSED LANDSCAPE ARCHITECT — STATE OF CALIFORNIA — MAY 31, 2018

PGAdesign
LANDSCAPE ARCHITECTS
tel 510.465.1284 PGAdesign.com
444 17th Street, Oakland, CA 94612

DESIGNED: CHRIS KENT / DANIEL COLLAZOS
DRAWN: DANIEL COLLAZOS
CHECKED: CHRIS KENT
APPROVED: CHRIS KENT

REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED:

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

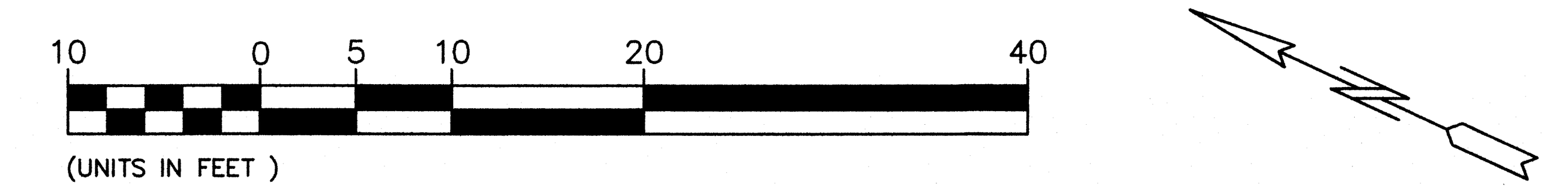
PLANTING LIST

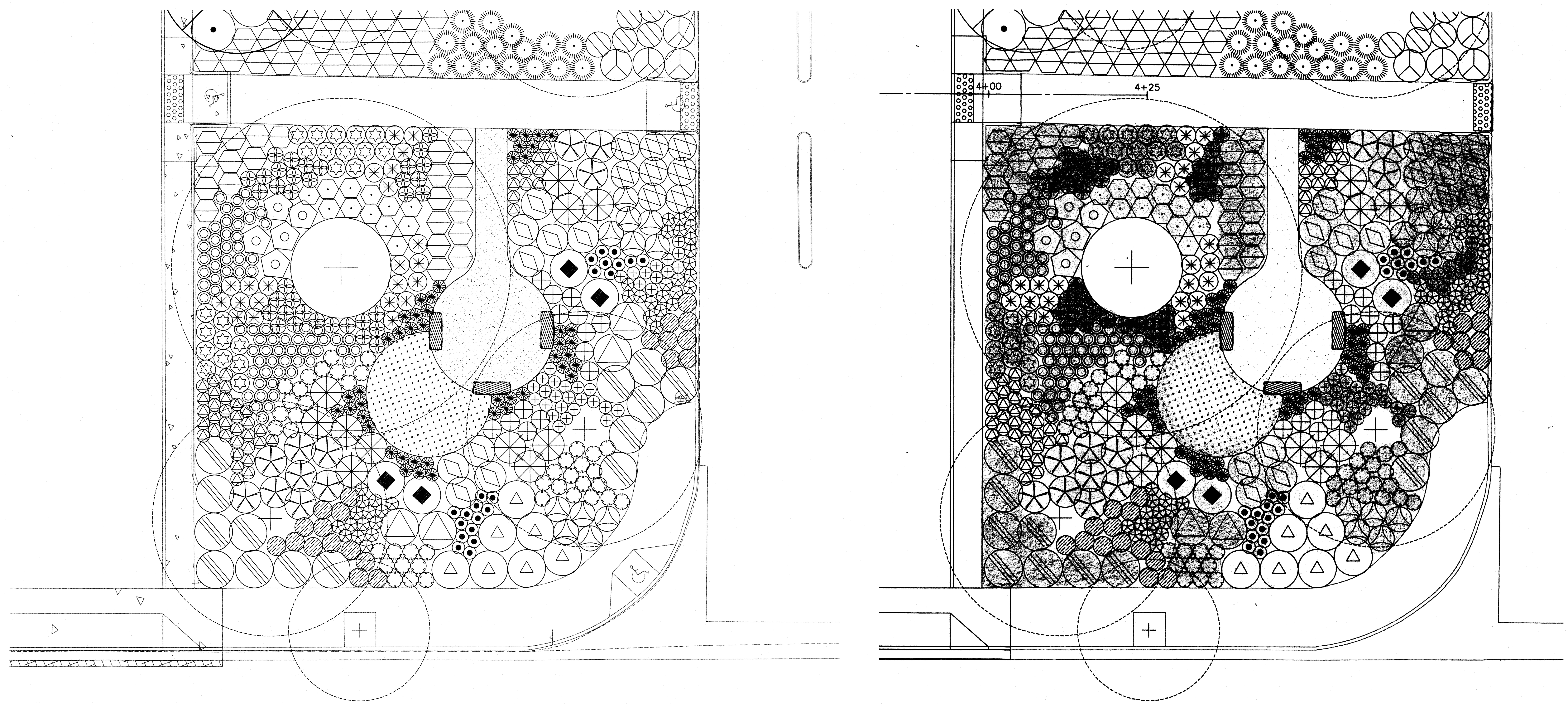
DATE: NOV 2017 | SCALE: AS SHOWN
WORK ORDER NO.: F86020/R86020
SPECIFICATION NO.: FC 3A-138
SHEET NO.: 49 OF 57
FILE NO.: CB-955

LS-02

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

N:\C3D\FLOOD\F86020_Turner_Court_LID\Sheets-WRECO\48-52 Planting Plan & Details.dwg 10-30-17 12:56:52 PM danielc





PLANTING PLAN
SCALE: 1" = 10'

RENDERED PLANTING PLAN
SCALE: 1" = 10'

NOTES:

1. VERIFY LOCATION OF SUBSURFACE UTILITIES, PIPES AND STRUCTURES. SHOULD UTILITIES OR OTHER WORK NOT SHOWN ON THE PLANS BE FOUND DURING EXCAVATIONS, PROMPTLY NOTIFY OWNER'S REPRESENTATIVE, FAILURE TO DO SO WILL MAKE CONTRACTOR LIABLE FOR DAMAGE ARISING FROM HIS OPERATIONS SUBSEQUENT TO DISCOVERY OF UTILITIES NOT SHOWN ON PLANS.
2. LANDSCAPE CONTRACTOR TO RECEIVE SITE GRADED TO PLUS OR MINUS 0.10 FT PRIOR TO PROJECT EXECUTION.
3. NO PLANT SPECIES SUBSTITUTIONS WILL BE ACCEPTED. CONTRACT GROW PLANTS AS REQUIRED. CONTRACT GROWN PLANTS MUST MEET INDUSTRY STANDARDS FOR SIZE IN ORDER TO BE ACCEPTED.
4. ALL PLANTS AND LAYOUT TO BE APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO EXCAVATION OF PLANTING HOLES.
5. NOTIFY OWNER'S REPRESENTATIVE 36 HOURS PRIOR TO COMMENCEMENT OF WORK TO COORDINATE PROJECT OBSERVATION MEETINGS.
6. CLEAR AND GRUB ALL AREAS TO RECEIVE NEW PLANTING AND PREPARE SOIL PER SPECIFICATION. SLOPE SOIL AWAY FROM BUILDING AT 2% MINIMUM.
7. SPACE GROUND COVERS TRIANGULARLY IN PLANTING AREAS. GROUND COVER KEY INDICATIONS ARE SHOWN IN LEGEND. HOLD GROUND COVER BACK 18 IN. FROM THE EDGE OF NEW SHRUB PLANTS UNLESS NOTED OTHERWISE. PLANT GROUND COVER WHERE SHRUBS ARE PLANTED 2 1/2 FT. APART OR MORE.
8. REPAIR EXISTING PLANTING AND IRRIGATION DAMAGED BY CONSTRUCTION.
9. ALL PLANTING BEDS TO RECEIVE 3" OF WOOD MULCH INCLUDING AREAS OF BEDS WITHOUT NEW PLANTING.
10. PRESERVE AND PROTECT SALVAGED BOULDERS IN PLACE.

REVIEWED BY:	DATE:	REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY	
MAINTENANCE		TRAFFIC	
REAL ESTATE		ENVIRONMENTAL	

N:\C30\FLOOD\F86020_Turner_Court_LID\Sheets-WRECO\48-52 Planting Plan & Details.dwg 10-17-17 11:47:04 AM Ilene

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD
1				
2				
3				
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LICENSED LANDSCAPE ARCHITECT CHRISTOPHER W. KENT Signature MAY 31, 2018 Renewal Date Date STATE OF CALIFORNIA

PGAdesign
LANDSCAPE ARCHITECTS
tel 510.465.1284 PGAdesign.com
444 17th Street, Oakland, CA 94612

DRAWN: DANIEL COLLAZOS
CHECKED: CHRIS KENT
DESIGNED: CHRIS KENT/DANIEL COLLAZOS
APPROVED: CHRIS KENT

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

REVIEWED: ILENE MACINTIRE
REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED: HANK ACKERMAN

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

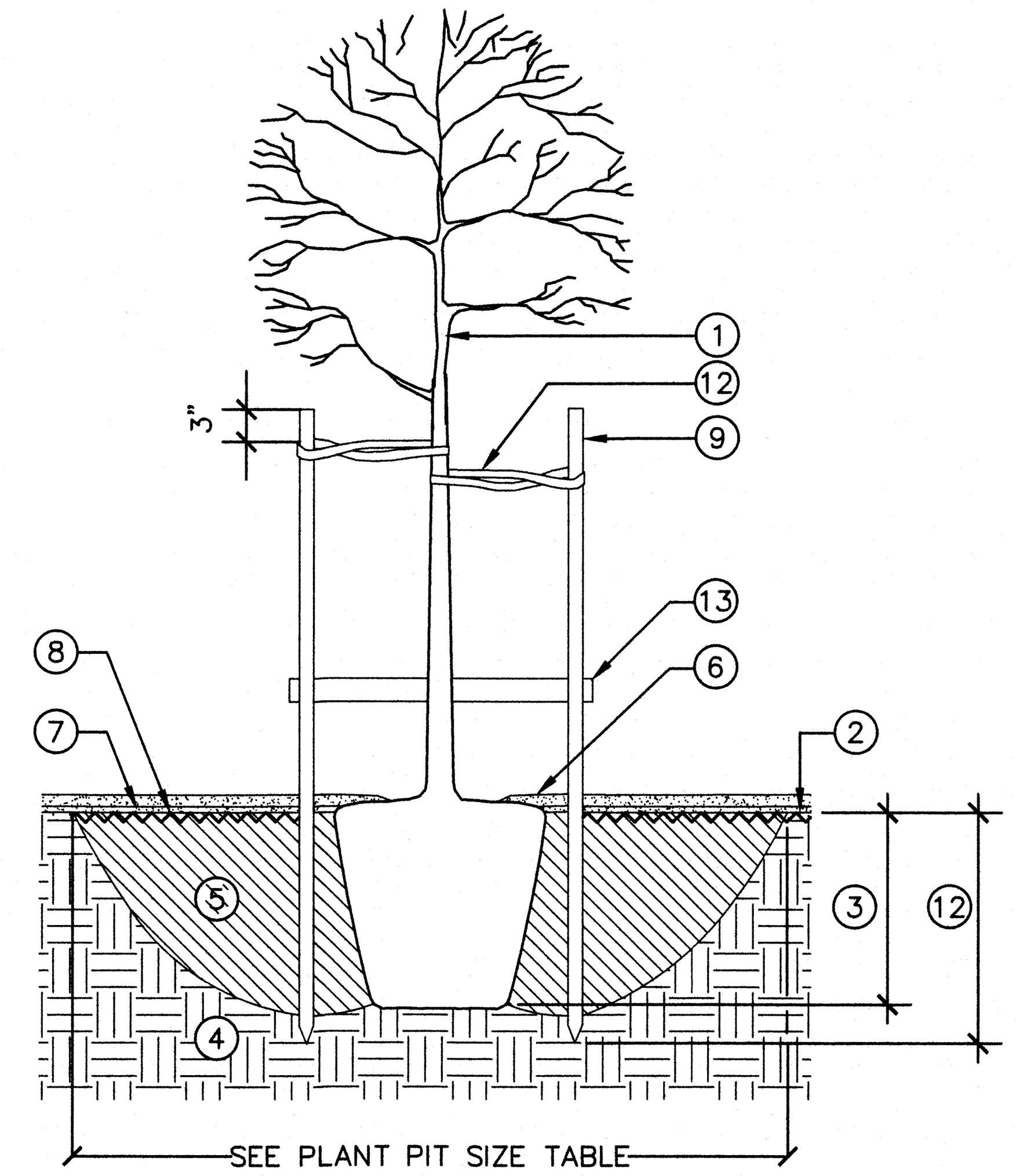
PLANTING PLAN

DATE: NOV 2017
SCALE: AS SHOWN
WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 50 OF 57
LS-03
FILE NO. CB-955

FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES
0 1 2 3

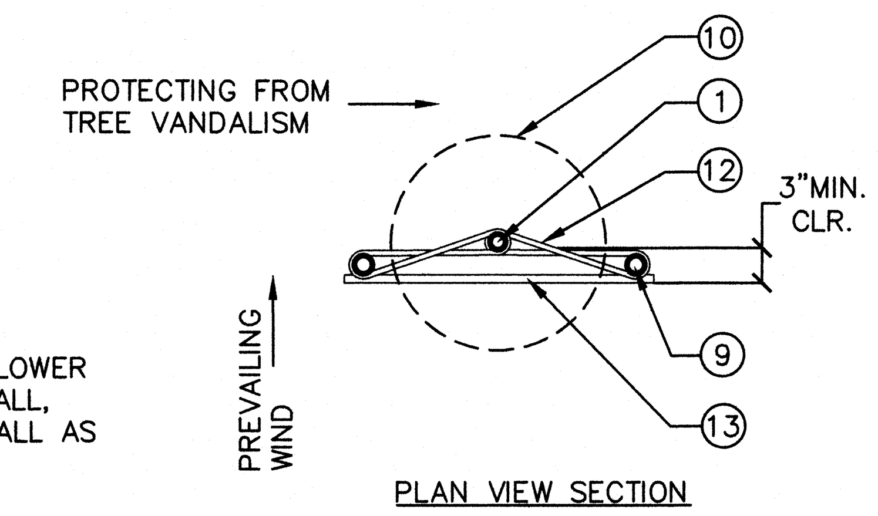
CONTAINER SIZE	PLANT PIT DIAMETER
1 GAL. PLANT	18" MINIMUM
5 GAL. PLANT	30" MINIMUM
24" BOX PLANT	5' MINIMUM

PLANT PIT SIZE TABLE 1
NTS



TREE PLANTING:

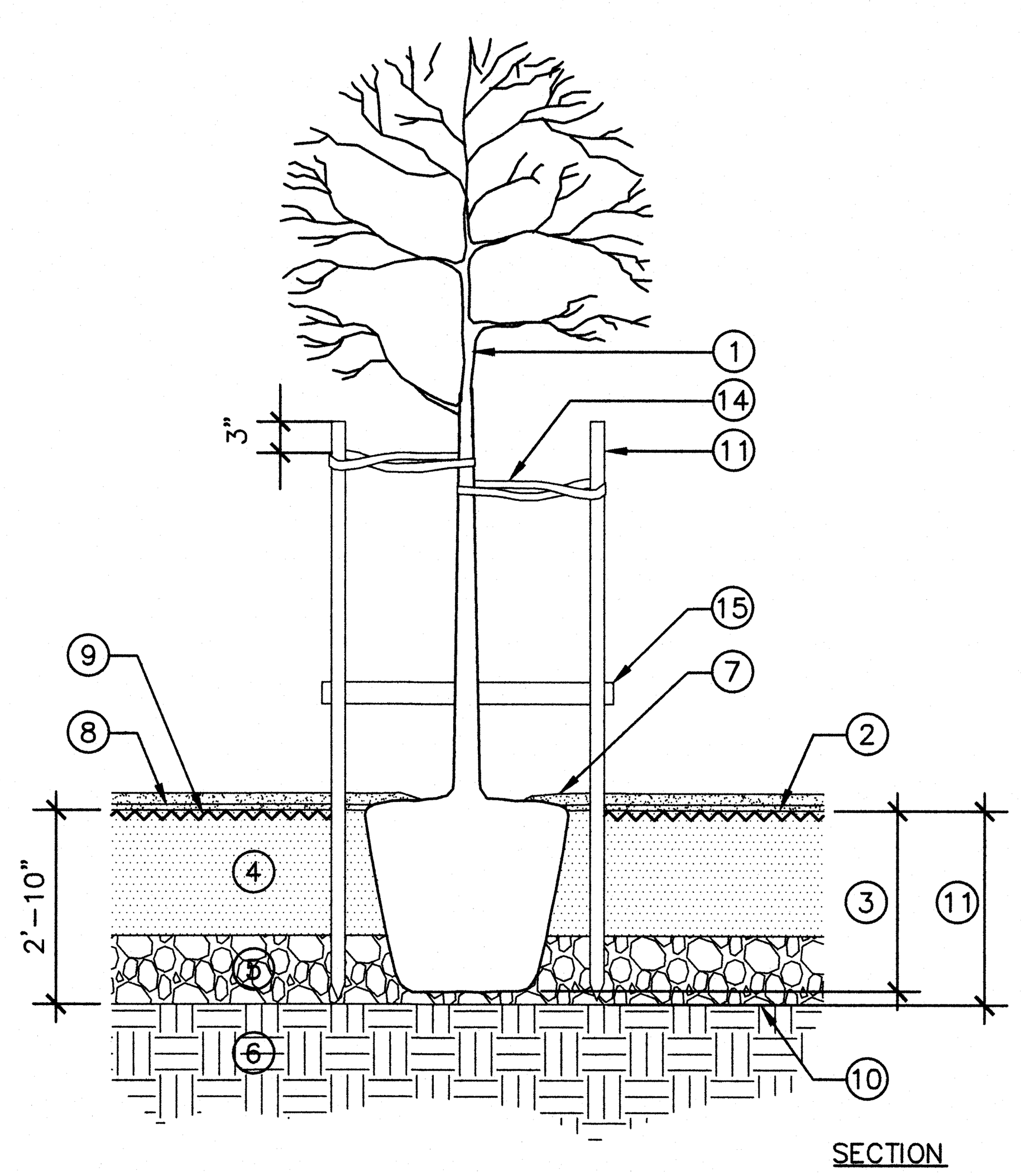
1. TREE, SET PLUMB
2. FINISH GRADE
3. DIG PLANT PIT 1" SHALLOWER THAN DEPTH OF ROOTBALL, DEEPER BEYOND ROOTBALL AS SHOWN.
4. SUBGRADE - SCARIFY SURFACE OF PLANTING PIT
5. BACKFILL WITH ADDED FERTILIZER PER SOIL TEST, SEE SPECS
6. 2" THICK MULCH, HOLD 2" FROM TRUNK
7. 1" THICK ORGANIC COMPOST BELOW MULCH, KEEP CLEAR OF ROOTCROWN
8. 2 LAYERS OF CARDBOARD BENEATH COMPOST LAYER, AS SPECIFIED, KEEP CARDBOARD CLEAR OF ROOTCROWN



TREE STAKING:

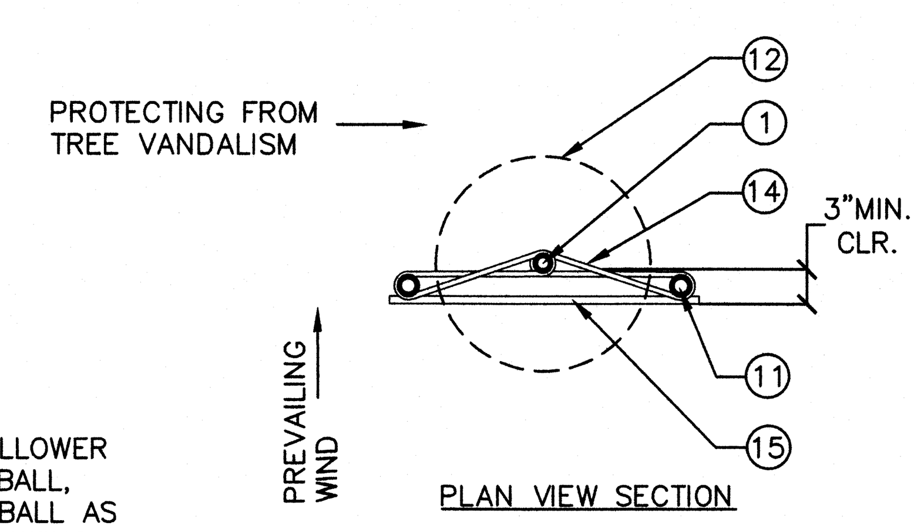
9. TREE STAKES ONLY AS REQUIRED. HEIGHT AS REQUIRED TO SUPPORT TREE. SET VERTICAL, DO NOT PENETRATE ROOTBALL.
10. OUTLINE OF ROOTBALL
11. STAKE DEPTH AS REQUIRED TO SUPPORT TREE
12. TREE TIES, (2) LOOP IN FIGURE 8 AROUND TREE & STAKES AS SHOWN. SCREW TO STAKES - 2 SCREWS PER STAKE
13. 1" X 3" CROSSTIE

TREE PLANTING AND STAKING 2
NTS



TREE PLANTING:

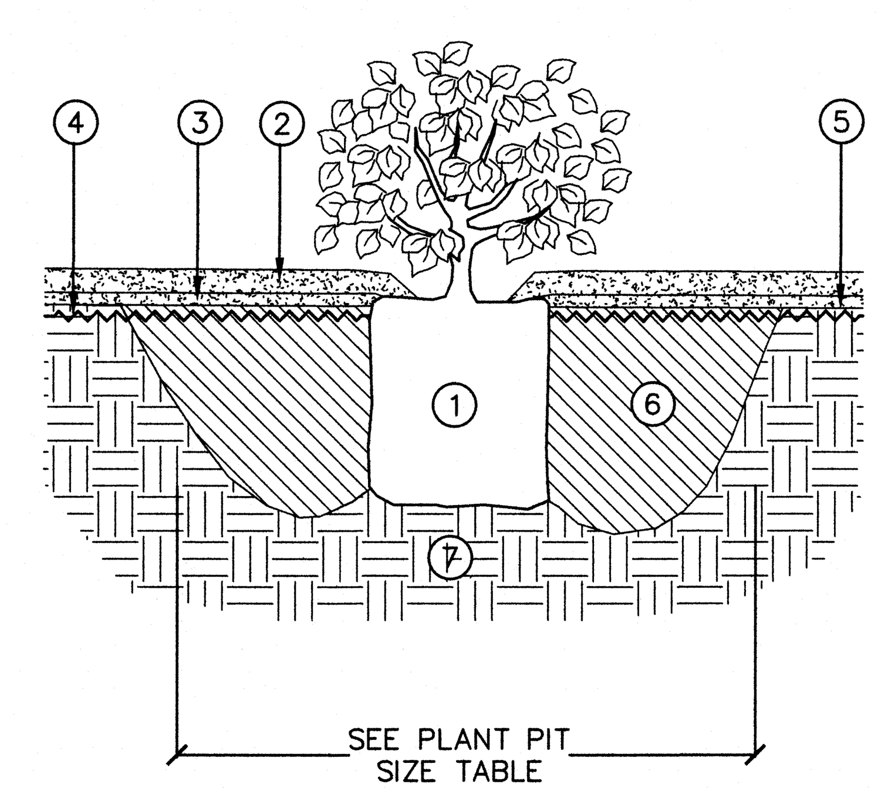
1. TREE, SET PLUMB
2. FINISH GRADE
3. DIG PLANT PIT 1" SHALLOWER THAN DEPTH OF ROOTBALL, DEEPER BEYOND ROOTBALL AS SHOWN IN SECTION DRAWING.
4. BIORETENTION SOIL
5. CLASS 2 PERMEABLE MATERIAL
6. SUBGRADE COMPACTED TO 95%
7. 2" THICK MULCH, HOLD 2" FROM TRUNK
8. 1" THICK ORGANIC COMPOST BELOW MULCH, KEEP CLEAR OF ROOTCROWN
9. 2 OR 4 LAYERS OF CARDBOARD BENEATH COMPOST LAYER, AS SPECIFIED, KEEP CARDBOARD CLEAR OF ROOTCROWN



TREE STAKING:

10. GEOMEMBRANE LINER
11. TREE STAKES ONLY AS REQUIRED. HEIGHT AS REQUIRED TO SUPPORT TREE. SET VERTICAL, DO NOT PENETRATE ROOTBALL.
12. OUTLINE OF ROOTBALL
13. STAKE DEPTH NO DEEPER THAN 32" TO AVOID PUNCTURING THE GEOMEMBRANE LINER
14. TREE TIES, (2) LOOP IN FIGURE 8 AROUND TREE & STAKES AS SHOWN. SCREW TO STAKES - 2 SCREWS PER STAKE
15. 1" X 3" CROSSTIE

SILVA CELL TREE PLANTING AND STAKING 3
NTS



1. ROOTBALL-SET 1" ABOVE FINISH GRADE
2. 2" THICK MULCH
3. 1" THICK COMPOST BELOW MULCH
4. 2 LAYERS OF CARDBOARD BENEATH COMPOST
5. FINISH GRADE
6. BACKFILL WITH ADDED FERTILIZER PER SOIL TEST, SEE SPECS
7. SUBGRADE, SCARIFY SURFACE OF PLANTING PIT TO 6" DEEP

NOTES:
1. INSTALL DRIP IRRIGATION ABOVE CARDBOARD.
2. OVERLAP CARDBOARD PIECES - 12" MINIMUM.

SHRUB PLANTING 4
SCALE 3/4" = 1'-0"

REVIEWED BY: | DATE: | CONSTRUCTION | MAINTENANCE | REAL ESTATE
REVIEWED BY: | DATE: | SURVEY | TRAFFIC | ENVIRONMENTAL

REVISIONS — NO. | DESCRIPTION | BY | DATE | APPV'D

PGAdesign LANDSCAPE ARCHITECTS
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444 17th Street, Oakland, CA 94612

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

LID IMPROVEMENTS AT 951 TURNER CT PARKING LOTS HAYWARD, CA

PLANTING DETAILS

DATE: NOV 2017 | SCALE: AS SHOWN
WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 51 OF 57
FILE NO. CB-955
LS-04

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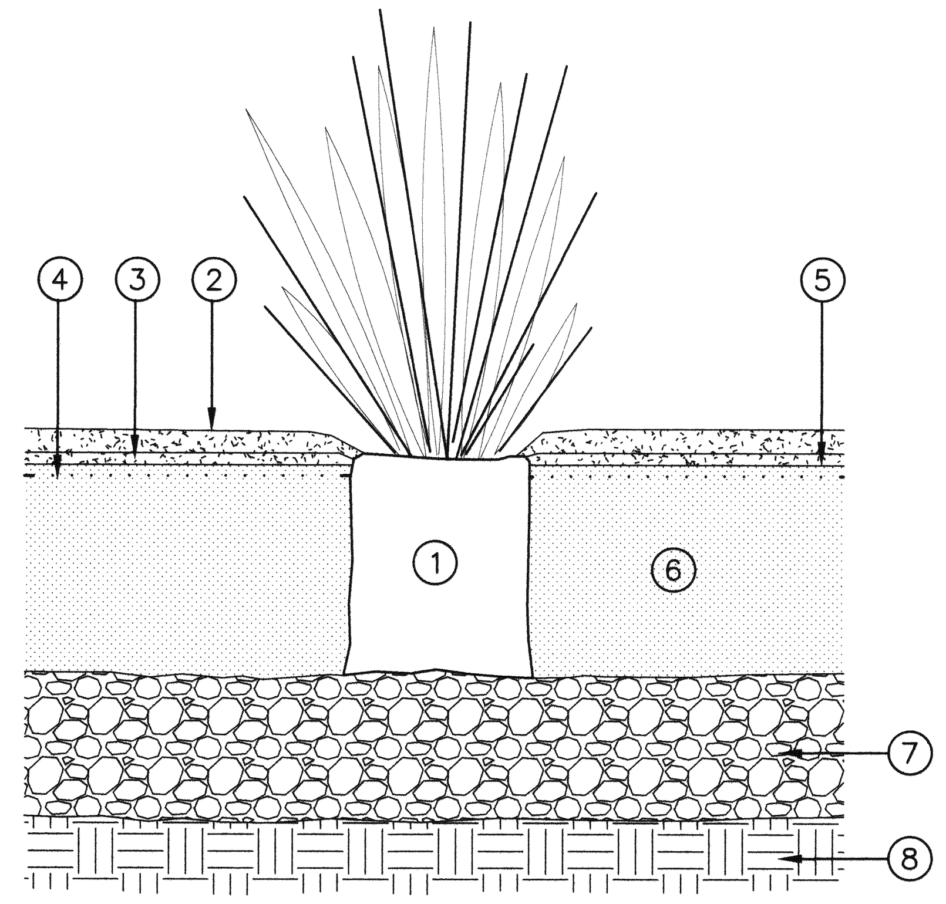
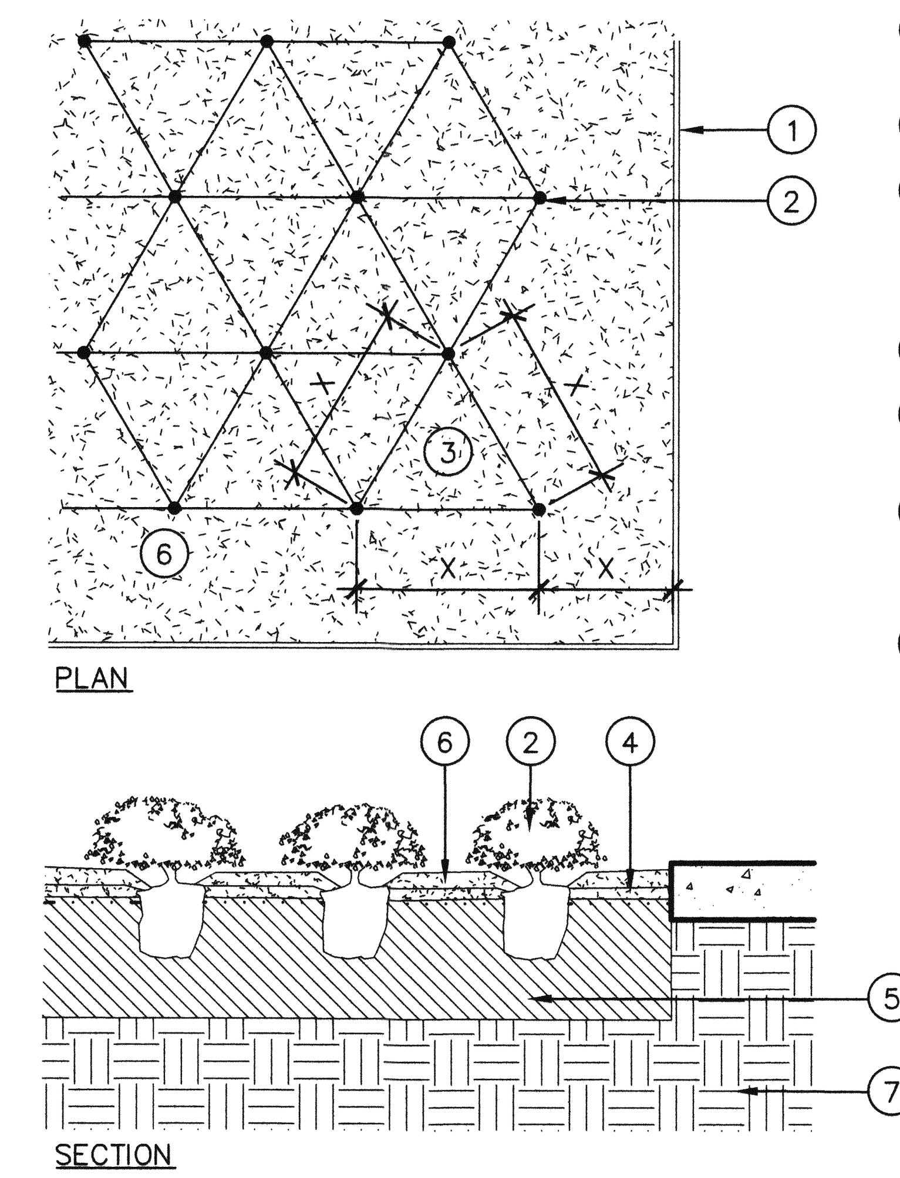
FOR REDUCED ENGLISH PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3



1. ROOTBALL–SET 1" ABOVE FINISH GRADE
2. 2" THICK MULCH
3. 1" THICK COMPOST BELOW MULCH
4. 2 LAYERS OF CARDBOARD BENEATH COMPOST
5. FINISH GRADE
6. BIOFILTRATION MIX, S.C.D.
7. PERMEABLE ROCK
8. NATIVE SOIL

NOTES:
1. INSTALL DRIP IRRIGATION ABOVE CARDBOARD.
2. OVERLAP CARDBOARD PIECES – 12" MINIMUM.

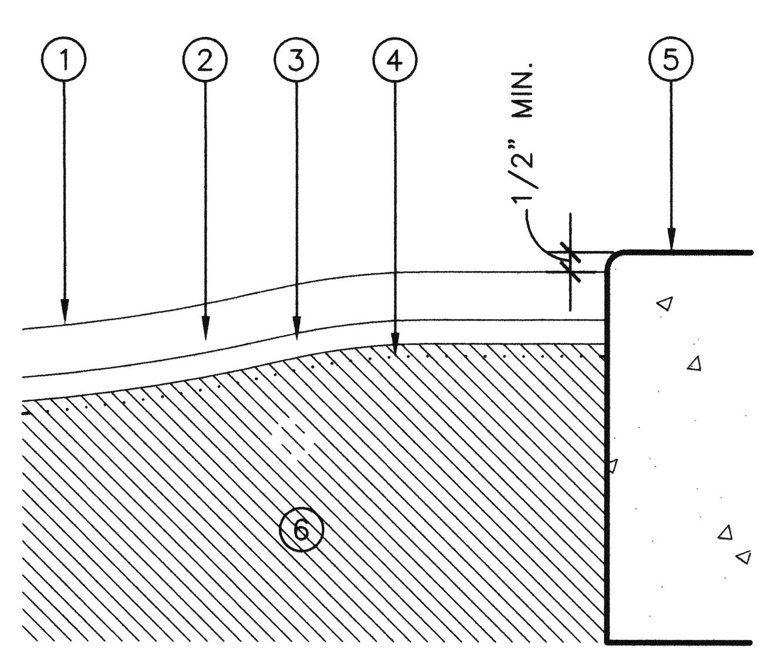
BIOTREATMENT PLANTING 1 / -
SCALE 3/4" = 1'-0"



1. EDGE OF GROUND COVER AREA
2. PLANT, TYP.
3. TRIANGULAR SPACING: X = TYPICAL PLANT SPACING, SEE PLANT LEGEND.
4. FINISH GRADE
5. BACKFILL WITH ADDED FERTILIZER PER SOIL TEST
6. 2" THICK MULCH OVER 1' THICK COMPOST OVER 2 LAYERS OF CARDBOARD
7. SUBGRADE SURFACE

NOTES:
1. FOR PLANTS SPACED 2' O.C. OR LESS.
2. INSTALL DRIP IRRIGATION ABOVE CARDBOARD.
3. OVERLAP CARDBOARD PIECES – 12" MINIMUM.

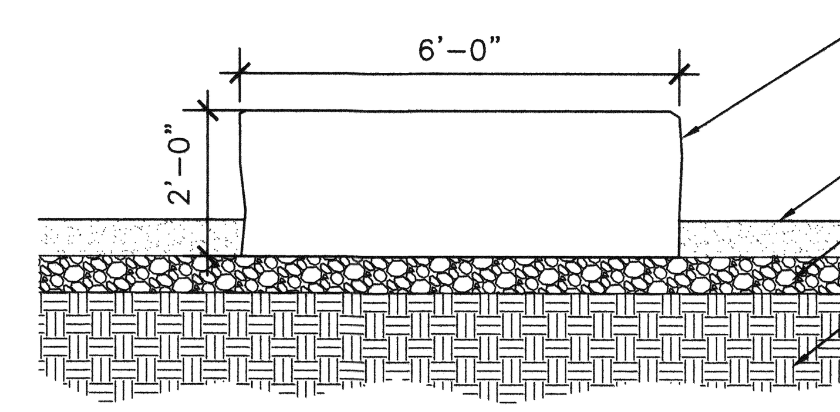
GROUND COVER PLANTING 2 / -
SCALE 3/4" = 1'-0"



1. SLOPE FINISH GRADE
2. 2' THICK MULCH
3. 1" THICK COMPOST BENEATH MULCH
4. 2 LAYERS OF CARDBOARD BENEATH COMPOST
5. FINISH GRADE OF ADJACENT PAVING
6. PLANTING AREA

NOTES:
1. INSTALL DRIP IRRIGATION ABOVE CARDBOARD.
2. OVERLAP CARDBOARD PIECES – 12" MINIMUM.

MULCH AT PLANTING AREA EDGE 3 / -
NTS



NOTES:
1. PLACE STONE ATOP COMPACTED AGGREGATE BASE.
2. LANDSCAPE ARCHITECT TO APPROVE LAYOUT OF STONES PRIOR TO PLACING DG.
3. PRODUCT: SANDSTONE BENCH
4. MANUFACTURER: SOUTHWEST BOULDER & STONE, www.southwestboulder.com, 1-877-792-7625

SANDSTONE BENCH 4 / -
NTS

REVIEWED BY:		DATE:	REVIEWED BY:		DATE:
CONSTRUCTION			SURVEY		
MAINTENANCE			TRAFFIC		
REAL ESTATE			ENVIRONMENTAL		

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REVISIONS

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COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY
REVIEWED:
REVIEWED: MOSES TSANG
APPROVAL RECOMMENDED: HANK ACKERMAN

LID IMPROVEMENTS AT
951 TURNER CT PARKING LOTS
HAYWARD, CA

PLANTING DETAILS

DATE	SCALE
NOV 2017	AS SHOWN

WORK ORDER NO. F86020/R86020
SPECIFICATION NO. FC 3A-138
SHEET NO. 52 OF 57
FILE NO. CB-955

LS-05

FOR REDUCED ENGLISH PLANS
ORIGINAL SCALE IS IN INCHES
0 1 2 3