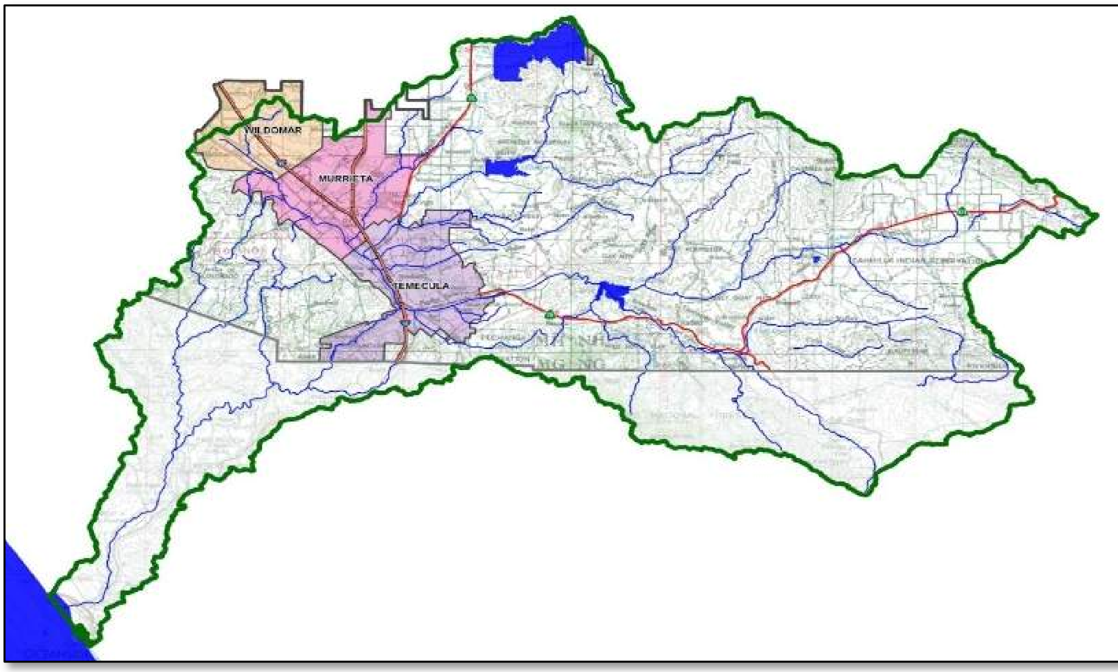
Water Quality Management Plan

*A Template for preparing Project Specific WQMPs for Priority Development Projects located within the **Santa Margarita Region** of **Riverside County**.*

Murrieta Hot Springs Road Widening

Development No: CIP 8079

Design Review/Case No: ________________________



☐ **Preliminary**

☒ **Final**

Original Date Prepared: **5/14/2020**

Revision Date(s):

Prepared for Compliance with Regional Board Order No. **R9-2013-0001** *as amended by Order No.* **R9-2015-0001** *and Order No.* **R9-2015-0100**

Prepared for:

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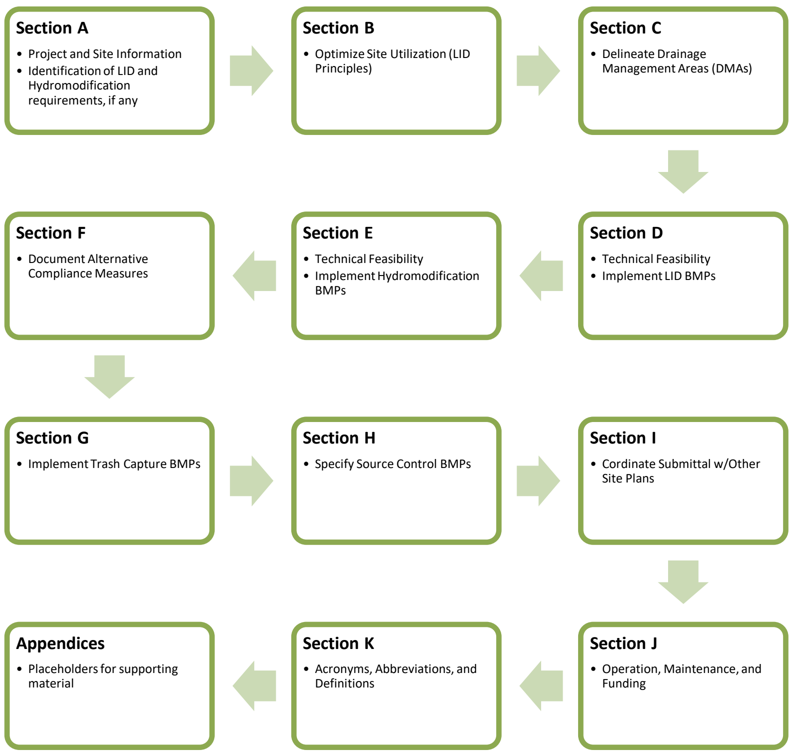
Note: Preparer responses are highlighted in bold and dark blue.

A Brief Introduction

The Regional Municipal Separate Stormwater Sewer System (MS4) Permit[1] requires that a Project-Specific WQMP be prepared for all development projects within the Santa Margarita Region (SMR) that meet the 'Priority Development Project' categories and thresholds listed in the SMR Water Quality Management Plan (WQPM). This Project-Specific WQMP Template for Development Projects in the Santa Margarita Region has been prepared to help document compliance and prepare a WQMP submittal. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



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[1] Order No. R9-2013-0001 as amended by Order Nos. R9-2015-0001 and R9-2015-0100, NPDES No. CAS0109266, National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the MS4s Draining the Watersheds within the San Diego Region, California Regional Water Quality Control Board, May 8, 2013.

OWNER'S CERTIFICATION

This Project-Specific WQMP has been prepared for the **City of Murrieta** by **SB&O, Inc.** for the **Murrieta Hot Springs Road** project.

This WQMP is intended to comply with the requirements of City of Murrieta Stormwater and Runoff Management and Discharge Controls Municipal Code Section 8.36.320, Water Quality Management Plan, which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater Best Management Practices until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Murrieta Stormwater and Runoff Management and Discharge Controls (Municipal Code Section 8.36).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature Date

Owner's Printed Name Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control Best Management Practices in this plan meet the requirements of Regional Water Quality Control Board Order No. **R9-2013-0001** as amended by Order Nos. **R9-2015-0001 and R9-2015-0100**."

5-14-2020

Bradley C Knepp, PE 75281 Date
Project Engineer

REGISTERED PROFESSIONAL ENGINEER
BRADLEY C. KNEPP
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STATE OF CALIFORNIA

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Section A: Project and Site Information

Use the table below to compile and summarize basic site information that will be important for completing subsequent steps. Subsections A.1 through A.4 provide additional detail on documentation of additional project and site information.

PROJECT INFORMATION		
Type of PDP:	**Redevelopment**	
Type of Project:	**Capital Improvement Project**	
Location:	**Murrieta Hot Springs Road from Margarita Road to Winchester Road**	
PROJECT LOCATION		
Latitude & Longitude:	**33.5561°N, 117.1528°W**	
Project Watershed and Sub-Watershed:	**Santa Margarita River & Murrieta Creek, HSA 902.32**	
24-Hour 85th Percentile Storm Depth (inches):	**0.74 inches**	
Is project subject to Hydromodification requirements?	☒ **Y** ☐ N (Select based on Section A.3)	
PROJECT CHARACTERISTICS		
Proposed Land Use		**public street**
Proposed or Potential SIC Code(s)		**n/a**
Existing Impervious Area of Project Footprint		**358,592 sf (8.23 ac)**
Total area of <u>proposed</u> Impervious Surfaces within the Project Limits (SF)/or Replacement		**210,858 sf (4.84 ac)**
Total Project Area (ac)		**609,409 sf (13.99 ac)**
Does the project consist of offsite road improvements?	**Road widening**	☒ **Y** ☐ N
Does the project propose to construct unpaved roads?		☐ Y ☒ **N**
Is the project part of a larger common plan of development (phased project)?		☐ Y ☒ **N**
Is the project exempt from Hydromodification Performance Standards?		☐ Y ☒ **N**
Does the project propose the use of Alternative Compliance to satisfy BMP requirements? (note, alternative compliance is not allowed for coarse sediment performance standards)		☐ Y ☒ **N**
Has preparation of Project-Specific WQMP included coordination with other site plans?		☒ **Y** ☐ N
EXISTING SITE CHARACTERISTICS		
Is the project located within any Multi-Species Habitat Conservation Plan area (MSHCP Criteria Cell?)	**Cell #6182**	☒ **Y** ☐ N
Are there any natural hydrologic features on the project site?		☐ Y ☒ **N**
Is a Geotechnical Report and an Infiltration Testing Report attached?		☒ **Y** ☐ N
List the Natural Resources Conservation Service (NRCS) soils type(s) present on the site (A, B, C and/or D)		**Mostly HSG A, little C; see NRCS Appendix 3.**

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the Project vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Vicinity and location maps
- Source Control BMPs

- Parcel Boundary and Project Footprint
- Existing and Proposed Topography
- Drainage Management Areas (DMAs)
- Proposed Structural Best Management Practices (BMPs)
- Drainage Paths
- Drainage infrastructure, inlets, overflows
- Site Design BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Pervious Surfaces (i.e. Landscaping)
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Copermittee plan reviewer must be able to easily analyze your Project utilizing this template and its associated site plans and maps. Complete the checklists in Appendix 1 to verify that all exhibits and components are included.

A.2 Identify Receiving Waters

Using Table A-1 below, list in order of upstream to downstream, the Receiving Waters to which the Project site is tributary. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated Beneficial Uses, and proximity, if any, to a RARE Beneficial Use. Include a map of the Receiving Waters in Appendix 1. This map should identify the path of the stormwater discharged from the site all the way to the outlet of the Santa Margarita River to the Pacific Ocean. Use the most recent 303(d) list available from the State Water Resources Control Board Website.
(http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/)

Table A-1 Identification of Receiving Waters

Receiving Waters	USEPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity of Reach to RARE Beneficial Use
West portion of project drains to: Warm Springs Creek	**Chlorpyrifos, Iron, Manganese, Nitrogen, Phosphorus**	**MUN, AGR, IND, PROC, REC1, REC2, WARM, WILD**	**4.5 miles to head of SMR (Upper)**
East portion of project drains to: Santa Gertrudis Creek	**Chlorpyrifos, Copper, Iron, Manganese, Nitrogen, Phosphorus**	**MUN, AGR, IND, PROC, GWR, REC1, REC2, WARM, WILD**	**3.5 miles to head of SMR (Upper)**
Murrieta Creek	**Chlorpyrifos, Copper, Indicator Bacteria, Iron, Manganese, Nitrogen, Toxicity**	**MUN, AGR, IND, PROC, GWR, REC1, REC2, WARM, WILD**	**0 miles to head of SMR (Upper)**
Santa Margarita River (Upper)	**Indicator Bacteria, Iron**	**MUN, AGR, IND, REC1, REC2, WARM, COLD, WILD, RARE**	**-**
Santa Margarita River (Lower)	**Benthic Community Effects, Chlorpyrifos, Phosphorus, Toxicity**	**MUN, AGR, IND, PROC, REC1, REC2, WARM, COLD, WILD, RARE**	**-**
Santa Margarita Lagoon	**-**	**REC1, REC2, EST, WILD, RARE, MAR, MIGR, SPWN**	**-**

A.3 Drainage System Susceptibility to Hydromodification

Using Table A-2 below, list in order of the point of discharge at the project site down to the Santa Margarita River[2], each drainage system or receiving water to which the project site is tributary. Continue to fill each row with the

[2] Refer to Exhibit G of the WQMP for a map of exempt and potentially exempt areas. These maps are from the Draft SMR WMAA as of January 5, 2018 and will be replaced upon acceptance of the SMR WMAA.

material of the drainage system, and any exemption (if applicable). Based on the results, summarize the applicable hydromodification performance standards that will be documented in Section E. Exempted categories of receiving waters include:

- Existing storm drains that discharge directly to water storage reservoirs, lakes, or enclosed embayments, or
- Conveyance channels whose bed and bank are concrete lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- Other water bodies identified in an approved WMAA (See Exhibit G to the WQMP)

Include a map exhibiting each drainage system and the associated susceptibility in Appendix 1.

Table A-2 Identification of Susceptibility to Hydromodification

Drainage System	Drainage System Material	Hydromodification Exemption	Hydromodification Exempt
City street/MS4 storm drain	**reinforced concrete pipe**	**closed concrete conduit**	**Yes**
tributary to Warm Springs Creek – adjacent to and south of MHS Rd.	**natural earthen course**	**-**	**No**
Warm Springs Creek **Santa Gertrudis Creek** **Murrieta Creek**	**natural earthen course, engineered earthen bed & bank channel, engineered earthen bed concrete bank channel, concrete culverts**	**-**	**No**
Santa Margarita River	**natural earthen course**	**-**	**No**
Summary of Performance Standards			
☐ **Hydromodification Exempt** – Select if "Y" is selected in the Hydromodification Exempt column above, project is exempt from hydromodification requirements. ☒ **Not Exempt**-Select if "No" is selected in any row of the Hydromodification Exempt column above. Project is subject to hydrologic control requirements and may be subject to sediment supply requirements.			

A.4 Additional Permits/Approvals required for the Project:

Table A-3 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ **N**
State Water Resources Control Board, Clean Water Act Section 401 Water Quality Certification	☐ Y	☒ **N**
US Army Corps of Engineers, Clean Water Act Section 404 Permit	☐ Y	☒ **N**
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ **N**
Statewide Construction General Permit Coverage	☒ **Y**	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ **N**
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ **N**
	☐ Y	☐ N

If yes is answered to any of the questions above, the Copermittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, constraints might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. Opportunities might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for LID Bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your Low Impact Development (LID) design and explain your design decisions to others.

Apply the following LID Principles to the layout of the PDP to the extent they are applicable and feasible. Putting thought upfront about how best to organize the various elements of a site can help to significantly reduce the PDP's potential impact on the environment and reduce the number and size of Structural LID BMPs that must be implemented. Integrate opportunities to accommodate the following LID Principles within the preliminary PDP site layout to maximize implementation of LID Principles.

Site Optimization

Complete checklist below to determine applicable Site Design BMPs for your site.

Project- Specific WQMP Site Design BMP Checklist	
The following questions below are based upon Section 3.2 of the SMR WQMP will help you determine how to best optimize your site and subsequently identify opportunities and/or constraints, and document compliance.	
SITE DESIGN REQUIREMENTS	
Answer the following questions below by indicating "Yes," "No," or "N/A" (Not Applicable). Justify all "No" and "N/A" answers by inserting a narrative at the end of the section. The narrative should include identification and justification of any constraints that would prevent the use of those categories of LID BMPs. Upon identifying Site Design BMP opportunities, include these on your WQMP Site plan in Appendix 1.	
☒ Yes ☐ No ☐ N/A	**Did you identify and preserve existing drainage patterns?** Integrating existing drainage patterns into the site plan helps to maintain the time of concentration and infiltration rates of runoff, decreasing peak flows, and may also help preserve the contribution of Critical Coarse Sediment (i.e., Bed Sediment Supply) from the PDP to the Receiving Water. Preserve existing drainage patterns by: • Minimizing unnecessary site grading that would eliminate small depressions, where appropriate add additional "micro" storage throughout the site landscaping. • Where possible conform the PDP site layout along natural landforms, avoid excessive grading and disturbance of vegetation and soils, preserve or replicate the sites natural drainage features and patterns. • Set back PDP improvements from creeks, wetlands, riparian habitats and any other natural water bodies. • Use existing and proposed site drainage patterns as a natural design element, rather than using expensive impervious conveyance systems. Use depressed landscaped areas, vegetated buffers, and bioretention areas as amenities and focal points within the site and landscape design.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. **Existing drainage patterns are unchanged; street is being widened.**	
☒ **Yes** ☐ No ☐ N/A	**Did you identify and protect existing vegetation?** Identify any areas containing dense native vegetation or well-established trees, and try to avoid disturbing these areas. Soils with thick, undisturbed vegetation have a much higher capacity to store and infiltrate runoff than do disturbed soils. Reestablishment of a mature vegetative community may take decades. Sensitive areas, such as streams and floodplains should also be avoided. • Define the development envelope and protected areas, identifying areas that are most suitable for development and areas that should be left undisturbed. • Establish setbacks and buffer zones surrounding sensitive areas. • Preserve significant trees and other natural vegetation where possible.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. **Existing vegetation will not be removed except where needed for road widening construction. New vegetation will be irrigated using efficient irrigation methods or California native or drought-tolerant.**	

Project- Specific WQMP Site Design BMP Checklist	
☒ **Yes** ☐ No ☐ N/A	**Did you identify and preserve natural infiltration capacity?** A key component of LID is taking advantage of a site's natural infiltration and storage capacity. A site survey and geotechnical investigation can help define areas with high potential for infiltration and surface storage. • Identify opportunities to locate LID Principles and Structural BMPs in highly pervious areas. Doing so will maximize infiltration and limit the amount of runoff generated. • Concentrate development on portions of the site with less permeable soils, and preserve areas that can promote infiltration.
Discuss how this was included or provide a discussion/justification for “No” or “N/A” answer. **Natural infiltration capacity was identified by testing (see Appendix 3). Soil infiltration capacity should remain unchanged with implementation of this WQMP except where impervious surfaces will cover existing natural ground due to street widening. Pervious driving and walking surfaces are not advised for this roadway due to traffic volume and concomitant maintenance requirements for such pervious surfaces. Many sidewalks are directly tributary to a curb-adjacent irrigated vegetated strip. Some sidewalks are directly tributary to a biofiltration with no infiltration BMP.**	
☒ **Yes** ☐ No ☐ N/A	**Did you minimize impervious area?** Look for opportunities to limit impervious cover through identification of the smallest possible land area that can be practically impacted or disturbed during site development. • Limit overall coverage of paving and roofs. This can be accomplished by designing compact, taller structures, narrower and shorter streets and sidewalks, clustering buildings and sharing driveways, smaller parking lots (fewer stalls, smaller stalls, and more efficient lanes), and indoor or underground parking. • Inventory planned impervious areas on your preliminary site plan. Identify where permeable pavements, or other permeable materials, such as crushed aggregate, turf block, permeable modular blocks, pervious concrete or pervious asphalt could be substituted for impervious concrete or asphalt paving. This will help reduce the amount of Runoff that may need to be addressed through Structural BMPs. • Examine site layout and circulation patterns and identify areas where landscaping can be substituted for pavement, such as for overflow parking. • Consider green roofs. Green roofs are roofing systems that provide a layer of soil/vegetative cover over a waterproofing membrane. A green roof mimics pre-development conditions by filtering, absorbing, and evapotranspiring precipitation to help manage the effects of an otherwise impervious rooftop.
Discuss how this was included or provide a discussion/justification for “No” or “N/A” answer. **Street is being widened to the minimum extent required by City traffic design needs.**	

Project- Specific WQMP Site Design BMP Checklist	
☒ **Yes** ☐ No ☐ N/A	**Did you identify and disperse runoff to adjacent pervious areas or small collection areas?** Look for opportunities to direct runoff from impervious areas to adjacent landscaping, other pervious areas, or small collection areas where such runoff may be retained. This is sometimes referred to as reducing Directly Connected Impervious Areas. • Direct roof runoff into landscaped areas such as medians, parking islands, planter boxes, etc., and/or areas of pervious paving. Instead of having landscaped areas raised above the surrounding impervious areas, design them as depressed areas that can receive Runoff from adjacent impervious pavement. For example, a lawn or garden depressed 3"-4" below surrounding walkways or driveways provides a simple but quite functional landscape design element. • Detain and retain runoff throughout the site. On flatter sites, smaller Structural BMPs may be interspersed in landscaped areas among the buildings and paving. • On hillside sites, drainage from upper areas may be collected in conventional catch basins and piped to landscaped areas and LID BMPs and/or Hydrologic Control BMPs in lower areas. Low retaining walls may also be used to create terraces that can accommodate LID BMPs. Wherever possible, direct drainage from landscaped slopes offsite and not to impervious surfaces like parking lots. • Reduce curb maintenance and provide for allowances for curb cuts. • Design landscaped areas or other pervious areas to receive and infiltrate runoff from nearby impervious areas. • Use Tree Wells to intercept, infiltrate, and evapotranspire precipitation and runoff before it reaches structural BMPs. Tree wells can be used to limit the size of Drainage Management Areas that must be treated by structural BMPs. Guidelines for Tree Wells are included in the Tree Well Fact Sheet in the LID BMP Design Handbook.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. **Most street flows are directed to parkway areas for bio-filtration with no infiltration (BNI) prior to release to MS4 facilities. Areas not tributary to these BMPs are quantified (included in the sizing of the BNI BMPs).**	
☒ **Yes** ☐ No ☐ N/A	**Did you utilize native or drought tolerant species in site landscaping?** Wherever possible, use native or drought tolerant species within site landscaping instead of alternatives. These plants are uniquely suited to local soils and climate and can reduce the overall demands for potable water use associated with irrigation.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. **Irrigation will be required to maintain biological life in the BSM planned for the bio-filtration with no infiltration (BNI) BMPs. See Landscape Plans.**	

<table>
<tr><th colspan="2">Project- Specific WQMP Site Design BMP Checklist</th></tr>
<tr><td>☐ Yes ☒ No ☐ N/A</td><td>Did you implement harvest and use of runoff?
Under the Regional MS4 Permit, Harvest and Use BMPs must be employed to reduce runoff on any site where they are applicable and feasible. However, Harvest and Use BMPs are effective for retention of stormwater runoff only when there is adequate demand for non-potable water during the wet season. If demand for non-potable water is not sufficiently large, the actual retention of stormwater runoff will be diminished during larger storms or during back-to-back storms.
For the purposes of planning level Harvest and Use BMP feasibility screening, Harvest and Use is only considered to be a feasible if the total average wet season demand for non-potable water is sufficiently large to use the entire DCV within 72 hours. If the average wet season demand for non-potable water is not sufficiently large to use the entire DCV within 72 hours, then Harvest and Use is not considered to be feasible and need not be considered further.
The general feasibility and applicability of Harvest and Use BMPs should consider:
• Any downstream impacts related to water rights that could arise from capturing stormwater (not common).
• Conflicts with recycled water used – where the project is conditioned to use recycled water for irrigation, this should be given priority over stormwater capture as it is a year-round supply of water.
• Code Compliance - If a particular use of captured stormwater, and/or available methods for storage of captured stormwater would be contrary to building codes in effect at the time of approval of the preliminary Project-Specific WQMP, then an evaluation of harvesting and use for that use would not be required.
• Wet season demand – the applicant shall demonstrate, to the acceptance of the [Insert Jurisdiction], that there is adequate demand for harvested water during the wet season to drain the system in a reasonable amount of time.</td></tr>
<tr><td colspan="2">Discuss how this was included or provide a discussion/justification for “No” or “N/A” answer. Harvest and use is infeasible and economically prohibitive for this heavily travelled public street.</td></tr>
<tr><td>☐ Yes ☒ No ☐ N/A</td><td>Did you keep the runoff from sediment producing pervious areas hydrologically separate from developed areas that require treatment?
Pervious areas that qualify as self-treating areas or off-site open space should be kept separate from drainage to structural BMPs whenever possible. This helps limit the required size of structural BMPs, helps avoid impacts to sediment supply, and helps reduce clogging risk to BMPs.</td></tr>
<tr><td colspan="2">Discuss how this was included or provide a discussion/justification for “No” or “N/A” answer. This is not cost-effective in this public street right-of-way without significant prohibitive additional expense.</td></tr>
</table>

Section C: Delineate Drainage Management Areas (DMAs)

This section provides streamlined guidance and documentation of the DMA delineation and categorization process, for additional information refer to the procedure in Section 3.3 of the SMR WQMP which discusses the methods of delineating and mapping your project site into individual DMAs. Complete Steps 1 to 4 to successfully delineate and categorize DMAs.

Step 1: Identify Surface Types and Drainage Pathways

Carefully delineate pervious areas and impervious areas (including roofs) throughout site and identify overland flow paths and above ground and below ground conveyances. Also identify common points (such as BMPs) that these areas drain to.

Step 2: DMA Delineation

Use the information in Step 1 to divide the entire PDP site into individual, discrete DMAs. Typically, lines delineating DMAs follow grade breaks and roof ridge lines. Where possible, establish separate DMAs for each surface type (e.g., landscaping, pervious paving, or roofs). Assign each DMA a unique name and determine its size in square feet. The total area of your site should total the sum of all of your DMAs (unless water from outside the project limits comingles with water from inside the project limits, i.e. run-on). Complete Table C-1.

Table C-1 DMA Identification

DMA Name	Surface Type(s)[1]	Effective Proposed Disturbed Area (Sq. Ft.)
NW	**Mixed**	**91796**
SW	**Mixed**	**69160**
NE	**Mixed**	**29624**
SE	**Mixed**	**36754**
SE2	**Mixed**	**18150**
SE3	**Mixed**	**16157**
	Total:	**261641**

NOTE: The "total area for your site" underlined in the above paragraph, in the case of this redevelopment PDP, is considered the Effective Proposed Disturbed Area ("Area" renamed to "Effective Proposed Disturbed Area" in Table C-1 at left). This is because the 50% rule applies (see *2018 WQMP for the SMR of RC*, Section 1.1.1.b, p.15), which states, "Where redevelopment results in the creation or replacement of impervious surface [this project: 210,858 sf] in an amount of less than fifty percent [this project: 45.3%] of the surface area of the previously existing development [this project: 464,995 sf], then the requirements associated with a Project-Specific WQMP applies only to the creation or replacement of impervious surfaces [this project: 210,858 sf], and not to the entire development." Therefore the DCV and detention requirements of this Project-Specific WQMP apply only to new & replaced impervious pavements and not to the entire impervious area (which would also include the non-disturbed existing impervious surface). The above application of the 50% rule means that the Effective Proposed Disturbed Area (for purposes of DCV calculations) includes the new and replaced impervious areas and new and replaced pervious areas (shown at left), and effective imperviousness for DCV calculations is taken as the new and replaced impervious area divided by the Effective Proposed Disturbed Area.

Step 3: DMA Classification

Determine how drainage from each DMA will be handled by using information from Steps 1 and 2 and by completing Steps 3.A to 3.C. Each DMA will be classified as one of the following four types:

- Type 'A': Self-Treating Areas:
- Type 'B': Self-Retaining Areas
- Type 'C': Areas Draining to Self-Retaining Areas
- Type 'D': Areas Draining to BMPs

Step 3.A – Identify Type 'A' Self-Treating Area

Indicate if the DMAs meet the following criteria by answering "Yes" or "No".

☒ **Yes** ☐ No — Area is undisturbed from their natural condition OR restored with Native and/or California Friendly vegetative covers.

☒ **Yes** ☐ No — Area is irrigated, if at all, with appropriate low water use irrigation systems to prevent irrigation runoff.

☐ Yes ☒ **No** — Runoff from the area will not comingle with runoff from the developed portion of the site, or across other landscaped areas that do not meet the above criteria.

If all answers indicate "Yes," complete Table C-2 to document the DMAs that are classified as Self-Treating Areas.

Table C-2 Type 'A', Self-Treating Areas

DMA Name	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
No DMA qualifies as Type 'A'			

Step 3.B – Identify Type 'B' Self-Retaining Area and Type 'C' Areas Draining to Self-Retaining Areas

Type 'B' Self-Retaining Area: A Self-Retaining Area is shallowly depressed 'micro infiltration' areas designed to retain the Design Storm rainfall that reaches the area, without producing any Runoff.

Indicate if the DMAs meet the following criteria by answering "Yes," "No," or "N/A".

☐ Yes ☒ **No** ☐ N/A — Slopes will be graded toward the center of the pervious area.

☒ **Yes** ☐ No ☐ N/A — Soils will be freely draining not to create vector or nuisance conditions.

☐ Yes ☒ **No** ☐ N/A — Inlet elevations of area/overflow drains, if any, should be clearly specified to be three inches or more above the low point to promote ponding.

☐ Yes ☐ No ☒ **N/A** — Pervious pavements (e.g., crushed stone, porous asphalt, pervious concrete, or permeable pavers) can be self-retaining when constructed with a gravel base course four or more inches deep below any underdrain discharge elevation.

If all answers indicate "Yes," DMAs may be categorized as Type 'B', proceed to identify Type 'C' Areas Draining to Self-Retaining Areas.

Type 'C' Areas Draining to Self-Retaining Areas: Runoff from impervious or partially pervious areas can be managed by routing it to Self-Retaining Areas consistent with the LID Principle discussed in SMR WQMP Section 3.2.5 for 'Dispersing Runoff to Adjacent Pervious Areas'.
Indicate if the DMAs meet the following criteria by answering "Yes" or "No".

☐ Yes ☒ **No** — The drainage from the tributary area must be directed to and dispersed within the Self-Retaining Area.

☐ Yes ☒ **No** — Area must be designed to retain the entire Design Storm runoff without flowing offsite.

If all answers indicate "Yes," DMAs may be categorized as Type 'C'.

Complete Table C-3 and Table C-4 to identify Type 'B' Self-Retaining Areas and Type 'C' Areas Draining to Self-Retaining Areas.

Table C-3 Type 'B', Self-Retaining Areas

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C-4= [C]	Required Retention Depth (inches) $[D] = [B] + \frac{[B]\cdot[C]}{[A]}$
None qualify as Type 'B'						

Table C-4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet) [A]	Post-project surface type	Runoff factor [B]	Product [C] = [A] x [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]
None qualify as Type 'C'							

<u>Note:</u> (See Section 3.3 of SMR WQMP) Ensure that partially pervious areas draining to a Self-Retaining area do not exceed the following ratio:

$$\left(\frac{2}{\textit{Impervious Fraction}}\right) : 1$$

(Tributary Area: Self-Retaining Area)

Step 3.C – Identify Type 'D' Areas Draining to BMPs

Areas draining to BMPs are those that could not be fully managed through LID Principles (DMA Types A through C) and will instead drain to a LID BMP and/or a Conventional Treatment BMP designed to manage water quality impacts from that area, and Hydromodification where necessary.

Complete Table C-5 to document which DMAs are classified as Areas Draining to BMPs

Table C-5 Type 'D', Areas Draining to BMPs

DMA Name	BMP Name Receiving Runoff from DMA
NW	**NW BNI (Biofiltration with No Infiltration)**
SW	**SW BNI**
NE	**NE BNI**
SE	**SE BNI**
SE2	**SE2 BNI**
SE3	**SE3 BNI**

<u>Note</u>: More than one DMA may drain to a single LID BMP; however, one DMA may not drain to more than one BMP.

Section D: Implement LID BMPs

The Regional MS4 Permit requires the use of LID BMPs to provide retention or treatment of the DCV and includes a BMP hierarchy which requires Full Retention BMPs (Priority 1) to be considered before Biofiltration BMPs (Priority 2) and Flow-Through Treatment BMPs and Alternative Compliance BMPs (Priority 3). LID BMP selection must be based on technical feasibility and should be considered early in the site planning and design process. Use this section to document the selection of LID BMPs for each DMA. Note that feasibility is based on the DMA scale and may vary between DMAs based on site conditions.

D.1 Full Infiltration Applicability

An assessment of the feasibility of utilizing full infiltration BMPs is required for all projects, *except where it can be shown that site design LID principals fully retain the DCV (i.e., all DMAs are Type A, B, or C), or where Harvest and Use BMPs fully retain the DCV. Check the following box if applicable:*

☐ Site design LID principals fully retain the DCV (i.e., all DMAs are Type A, B, or C), (Proceed to Section E).

If the above box remains unchecked, perform a site-specific evaluation of the feasibility of Infiltration BMPs using each of the applicable criteria identified in Chapter 2.3.3 of the SMR WQMP and complete the remainder of Section D.1.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Copermittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the SMR WQMP. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Infiltration Feasibility

Table D-1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the SMR WQMP in Chapter 2.3.3. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D-1 Infiltration Feasibility

Downstream Impacts (SMR WQMP Section 2.3.3.a)		
Does the project site…	**YES**	**NO**
…have any DMAs where infiltration would negatively impact downstream water rights or other Beneficial Uses[3]?		X
If Yes, list affected DMAs:		
Groundwater Protection (SMR WQMP Section 2.3.3.b)		
Does the project site…	**YES**	**NO**
…have any DMAs with industrial, and other land uses that pose a high threat to water quality, which cannot be treated by Bioretention BMPs? Or have DMAs with active industrial process areas?		X
If Yes, list affected DMAs:		
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet horizontally of a water supply well? **none reported**		X
If Yes, list affected DMAs:		
…have any DMAs that would restrict BMP locations to within a 2:1 (horizontal:vertical) influence line extending from any septic leach line? **none reported**		X
If Yes, list affected DMAs:		
…have any DMAs been evaluated by a licensed Geotechnical Engineer, Hydrogeologist, or Environmental Engineer, who has concluded that the soils do not have adequate physical and chemical characteristics for the protection of groundwater, and has treatment provided by amended media layers in Bioretention BMPs been considered in evaluating this factor? **none reported**		X
If Yes, list affected DMAs:		
Public Safety and Offsite Improvements (SMR WQMP Section 2.3.3.c)		
Does the project site…	**YES**	**NO**
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact? **none reported**		X
If Yes, list affected DMAs:		
Infiltration Characteristics For LID BMPs (SMR WQMP Section 2.3.3.d)		
Does the project site…	**YES**	**NO**
…have factored infiltration rates of less than 0.8 inches / hour? (Note: on a case-by-case basis, the Local Jurisdiction may allow a factor of safety as low as 1.0 to support selection of full infiltration BMPs. Therefore, measured infiltration rates could be as low as 0.8 in/hr to support full infiltration. A higher factor of safety would be required for design in accordance with the LID BMP Deign Handbook). **7 infiltration tests done: measured average 0.16 in/hr; max measured 0.36 in/hr.**	X	
If Yes, list affected DMAs: **All DMAs**		
Cut/Fill Conditions (SMR WQMP Section 2.3.3.e)		
Does the project site…	**YES**	**NO**
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
Other Site-Specific Factors (SMR WQMP Section 2.3.3.f)		
Does the project site…	**YES**	**NO**
…have DMAs where the geotechnical investigation discovered other site-specific factors that would preclude effective and/or safe infiltration?		X
Describe here:		

If you answered “Yes” to any of the questions above for any DMA, Infiltration BMPs that rely solely on infiltration should not be used for those DMAs and you should proceed to the assessment for

[3] Such a condition must be substantiated by sufficient modeling to demonstrate an impact and would be subject to City of Murrieta discretion. There is not a standardized method for assessing this criterion. Water rights evaluations should be site-specific.

Biofiltration BMPs below. Biofiltration BMPs that provide partial infiltration may still be feasible and should be assessed in Section D.2. Summarize concerns identified in the Geotechnical Report, if any, that resulted in a "YES" response above in the table below.

Table D-2 Geotechnical Concerns for Onsite Infiltration

Type of Geotechnical Concern	DMAs Feasible (By Name)	DMAs Infeasible (By Name)
Collapsible Soil	**-**	**None**
Expansive Soil	**All (very low expansion, Leighton, 2010, p. 4)**	**None**
Slopes	**All (slopes, yes, but none at BMP locations)**	**None**
Liquefaction Potential	**All (very low liq. potential, Leighton, 2010, p.5)**	**None**
Other **– Measured Infiltration**	**None**	**All DMAs**

D.2 Biofiltration Applicability

This section should document the applicability of biofiltration BMPs for Type D DMAs that are not feasible for full infiltration BMPs. The key decisions to be documented in this section include:

1. Are biofiltration BMPs with partial infiltration feasible? **No, factored infiltration rates, assuming a Factor of Safety of 4, are less than 0.1 inches per hour for all DMAs.**

    a. Biofiltration BMPs must be designed to maximize incidental infiltration via a partial infiltration design unless it is demonstrated that this design is not feasible.

    b. These designs can be used at sites with low infiltration rates where other feasibility factors do not preclude incidental infiltration.

   Document summary in Table D-3.

2. If not, what are the factors that require the use of biofiltration with no infiltration? This may include:

    a. Geotechnical hazards

    b. Water rights issues

    c. Water balance issues

    d. Soil contamination or groundwater quality issues

    e. Very low infiltration rates (factored rates < 0.1 in/hr) **Yes, see 1., above.**

    f. Other factors, demonstrated to the acceptance of the City of Murrieta

   If this applies to any DMAs, then rationale must be documented in Table D-3.

3. Are biofiltration BMPs infeasible? **No, Biofiltration with No Infiltration (BNI) is feasible.**

    a. If yes, then provide a site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee with jurisdiction over the Project site to discuss this option. Proceed to Section F to document your alternative compliance measures.

Table D-3 Evaluation of Biofiltration BMP Feasibility

DMA ID	Is Partial/ Incidental Infiltration Allowable? (Y/N)	Basis for Infeasibility of Partial Infiltration (provide summary and include supporting basis if partial infiltration not feasible)
All DMAs	**Partial/incidental infiltration is not feasible. Factored infiltration rates, assuming a FS of 4, are less than 0.1 inches per hour for all DMAs. See 10/9/2019, *Results of Onsite Percolation/Infiltration Testing,* Leighton, page 3 (copy in Appendix 3). Biofiltration without infiltration is feasible.**	

Proprietary Biofiltration BMP Approval Criteria

If the project will use proprietary BMPs as biofiltration BMPs, then this section is completed to document that the proprietary BMPs are selected in accordance with Section 2.3.7 of the SMR WQMP. Proprietary Biofiltration BMPs must meet both of the following approval criteria:

1. Approval Criteria for All Proprietary BMPs, and
2. Acceptance Criteria for Proprietary Biofiltration BMPs.

When the use of proprietary biofiltration BMPs is proposed to meet the Pollutant Control performance standards, use Table D-4 to document that appropriate approval criteria have been met for the proposed BMPs. Add additional rows to document approval criteria are met for each type of BMP proposed.

Table D-4 Proprietary BMP Approval Requirement Summary

Proposed Proprietary Biofiltration BMP	Approval Criteria	Notes/Comments
N/A	☐ Proposed BMP has an active TAPE GULD Certification for the project pollutants of concern[4] or equivalent 3rd party demonstrated performance.	Insert text here
	☐ The BMP is used in a manner consistent with manufacturer guidelines and conditions of its third-party certification.	Insert text here
	☐ The BMP includes biological features including vegetation supported by engineered or other growing media.	Describe features here.
	☐ The BMP is designed to maximize infiltration, or supplemental infiltration is provided to achieve retention equivalent to Biofiltration with Partial Infiltration BMPs if factored infiltration rate is between 0.1 and 0.8 inches/hour.	Describe supplemental retention practices if applicable.
	☐ The BMP is sized using one of two Biofiltration LID sizing options in Section 2.3.2 of the SRM WQMP.	List sizing method used, resulting size (i.e. volume or flow), and provided size (for proposed unit)

[4] Use Table F-1 and F-2 to identify and document the pollutants of concern and include these tables in Appendix 5.

D.3 Feasibility Assessment Summaries

From the Infiltration, Biofiltration with Partial Infiltration and Biofiltration with No Infiltration Sections above, complete Table D-5 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D-5 LID Prioritization Summary Matrix

DMA Name	LID BMP Hierarchy			No LID (Alternative Compliance)
	1. Infiltration	2. Biofiltration with Partial Infiltration	3. Biofiltration with No Infiltration	
All DMAs (1-6)	☐	☐	☒	☐

For those DMAs where LID BMPs are not feasible, provide a narrative in Table D-6 below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section F below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

This is based on the clarification letter titled "San Diego Water Board's Expectations of Documentation to Support a Determination of Priority Development Project Infiltration Infeasibility" (April 28, 2017, Via email from San Diego Regional Water Quality Control Board to San Diego County Municipal Storm Water Copermittees[5]).

Table D-6 Summary of Infeasibility Documentation

Question	Narrative Summary (include reference to applicable appendix/attachment/report, as applicable)
a) When in the entitlement process did a geotechnical engineer analyze the site for infiltration feasibility?	**N/A – LID BMPs feasible**
b) When in the entitlement process were other investigations conducted (e.g., groundwater quality, water rights) to evaluate infiltration feasibility?	
c) What was the scope and results of testing, if conducted, or rationale for why testing was not needed to reach findings?	
d) What public health and safety requirements affected infiltration locations?	
e) What were the conclusions and recommendations of the geotechnical engineer and/or other professional responsible for other investigations?	
f) What was the history of design discussions between the permittee and applicant for the proposed project, resulting in the final design determination related locations feasible for infiltration?	

[5] http://www.projectcleanwater.org/download/pdp-infiltration-infeasibility/

g) What site design alternatives were considered to achieve infiltration or partial infiltration on site?	
h) What physical impairments (i.e., fire road egress, public safety considerations, utilities) and public safety concerns influenced site layout and infiltration feasibility?	
i) What LID Principles (site design BMPs) were included in the project site design?	

D.4 LID BMP Sizing

Each LID BMP must be designed to ensure that the DCV will be captured by the selected BMPs with no discharge to the storm drain or surface waters during the DCV size storm. Infiltration BMPs must at minimum be sized to capture the DCV to achieve pollutant control requirements.

Biofiltration BMPs must at a minimum be sized to:

- Treat 1.5 times the DCV not reliably retained on site using a volume-base or flow-based sizing method, or
- Include static storage volume, including pore spaces and pre-filter detention volume, at least 0.75 times the portion of the DCV not reliably retained on site.

First**,** calculate the DCV for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using the methods included in Section 3 of the LID BMP Design Handbook. Utilize the worksheets found in the LID BMP Design Handbook or consult with the Copermittee to assist you in correctly sizing your LID BMPs. Use Table D-7 below to document the DCV each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D-7 DCV Calculations for LID BMPs

DMA Name	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	**PLEASE SEE TEMPLATE-REQUIRED SPREADSHEETS IN APPENDIX 6.**		
	[A]		[B]	[C]	[A] x [C]			
						Design Storm Depth (in)	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	AT = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]

[B], [C] is obtained as described in Section 2.6.1.b of the SMR WQMP
[E] is obtained from Exhibit A in the SMR WQMP
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6.

Complete Table D-8 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. You can add rows to the table as needed. Alternatively, the Santa Margarita Hydrology Model (SMRHM) can be used to size LID BMPs to address the DCV and, if applicable, to size Hydrologic Control BMPs to meet the Hydrologic Performance Standard described in the SMR WQMP, as identified in Section E.

Table D-8 LID BMP Sizing

BMP Name / Description	DMA Name	Design Capture Volume (ft^3)	**75% of DCV (ft^3)***	Proposed Volume (ft^3)
NW BNI	**NW**	**3901**	**2926**	**3110**
SW BNI	**SW**	**2825**	**2119**	**2291**
NE BNI	**NE**	**1234**	**926**	**1012**
SE BNI	**SE**	**1011**	**758**	**1059**
SE2 BNI	**SE2**	**454**	**341**	**511**
SE3 BNI	**SE3**	**593**	**445**	**550**

If bioretention will include a capped underdrain, then include sizing calculations demonstrating that the BMP will meet infiltration sizing requirements with the underdrain capped and also meet biofiltration sizing requirements if the underdrain is uncapped.

***Since LID BMP prioritization for all 6 of this project's DMAs requires use of Biofiltration with No Infiltration (BNI, a Priority 2 BMP) due to the infeasibility of infiltration, the project's 6 LID BMPs are sized using the static storage volume methodology for Priority 2 Biofiltration BMPs. Each biofiltration BMP is sized such that the static storage volume ("Proposed Volume" above, including surface storage and sub-surface pore space) is greater than 75% of the DCV. The "75% of DCV" column is added above for convenience of comparison.**

Section E: Implement Hydrologic Control BMPs and Sediment Supply BMPs

If a completed Table A.2 demonstrates that the project is exempt from Hydromodification Performance Standards, specify N/A and proceed to Section G.

☐ N/A Project is Exempt from Hydromodification Performance Standards.

If a PDP is not exempt from hydromodification requirements than the PDP must satisfy the requirements of the performance standards for hydrologic control BMPs and Sediment Supply BMPs. The PDP may choose to satisfy hydrologic control requirements using onsite BMPs or offsite BMPs, i.e. Alternative Compliance. Sediment supply requirements cannot be met via alternative compliance. If N/A is not selected above, select one of the two options below and complete the applicable sections.

☒ Project is Not Hydromodification Exempt and chooses to implement Hydrologic Control and Sediment Supply BMPs Onsite (complete Section E).

☐ Project is Not Hydromodification Exempt and chooses to implement Hydrologic Control Requirements using Alternative Compliance (complete Section F). Selection of this option must be approved by the Copermittee.

E.1 Hydrologic Control BMP Selection

Capture of the DCV and achievement of the Hydrologic Performance Standard may be met by combined and/or separate structural BMPs. The user should consider the full suite of Hydrologic Control BMPs to manage runoff from the post-development condition and meet the Hydrologic Performance Standard identified in this section.

The Hydrologic Performance Standard consists of matching or reducing the flow duration curve of post-development conditions to that of pre-existing, naturally occurring conditions, for the range of geomorphically significant flows (10% of the 2-year runoff event up to the 10-year runoff event). Select each of the hydrologic control BMP types that are applied to meet the above performance standard on the site.

☒ LID principles as defined in Section 3.2 of the SMR WQMP.

☐ Structural LID BMPs that may be modified or enlarged, if necessary, beyond the DCV.

☐ Structural Hydrologic Control BMPs that are distinct from the LID BMPs above. The LID BMP Design Handbook provides information not only on Hydrologic Control BMP design, but also on BMP design to meet the combined LID requirement and Hydrologic Performance Standard. The Handbook specifies the type of BMPs that can be used to meet the Hydrologic Performance Standard.

E.2 Hydrologic Control BMP Sizing

Hydrologic Control BMPs must be designed to ensure that the flow duration curve of the post-development DMA will not exceed that of the pre-existing, naturally occurring, DMA for the range of geomorphically significant flows. Using SMRHM (or another acceptable continuous simulation model if approved by the Copermittee) the applicant shall demonstrate that the performance of the Hydrologic Control BMPs complies with the Hydrologic Performance Standard. Complete Table E-1 below and identify, for each DMA, the type of Hydrologic Control BMP, if the SMRHM model confirmed the management (Identified as “passed” in SMRHM), the total volume capacity of the Hydrologic Control BMP, the Hydrologic Control BMP footprint, and the drawdown time of the Hydrologic Control BMP. SMRHM summary reports should be documented in Appendix 7. Refer to the SMRHM Guidance Document for additional information on SMRHM. You can add rows to the table as needed.

Table E-1 Hydrologic Control BMP Sizing

BMP Name	DMA Name	Description	**B. Cho, v.4**, Passed*	BMP Volume (ft^3)	BMP Footprint (ft^2)	Drawdown time (hr)**
NW BNI	**NW**	**Biofiltration w/ No Infiltration**	☒	**3110**	**1777**	**8.4**
SW BNI	**SW**	**Biofiltration w/ No Infiltration**	☒	**2291**	**1309**	**8.4**
NE BNI	**NE**	**Biofiltration w/ No Infiltration**	☒	**1012**	**578**	**8.4**
SE BNI	**SE**	**Biofiltration w/ No Infiltration**	☒	**1059**	**605**	**8.4**
SE2 BNI	**SE2**	**Biofiltration w/ No Infiltration**	☒	**511**	**292**	**8.4**
SE3 BNI	**SE3**	**Biofiltration w/ No Infiltration**	☒	**550**	**314**	**8.4**

***Per Murrieta 2018 WQMP SMR, Section 3.6.3 (p. 100), and per permission of City staff, the SMRHR was not used and County-approved B. Cho, ver. 4, was used to calculate and meet Hydrologic Performance Standard requirements.**
****Drawdown calculation assumes a controlling factored (design) Flow Rate through the BSM of 2.5 inches per hour. Drawdown time = (Volume-cf x 12-in/ft) / (Area-sf x Flow Rate-in/hr).**

If a bioretention BMP with capped underdrain is used and hydromodification requirements apply, then sizing calculations must demonstrate that the BMP meets flow duration control criteria with the underdrain capped and uncapped. Both calculations must be included.

E.3 Implement Sediment Supply BMPs

The sediment supply performance standard applies to PDPs for which hydromodification applied that have the potential to impact Potential Critical Coarse Sediment Yield Areas. Refer to Exhibit G of the WQMP to determine if there are onsite Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas. Select one of the two options below and include the Potential Critical Coarse Sediment Yield Area Exhibit showing your project location in Appendix 7.

☒ There are no mapped Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas on the site. The Sediment Supply Performance Standard is met with no further action.

☐ There are mapped Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas on the site, the Sediment Supply Performance Standard will be met through Option 1 or Option 2 below.

The applicant may refer to Section 3.6.4 of the SMR WQMP for a description of the methodology to meet the Sediment Supply Performance Standard. Select the applicable compliance pathway and complete the appropriate sections to demonstrate compliance with the Sediment Supply Performance Standard if the second box is selected above:

☐ Avoid impacts related to any PDP activities to Potential Critical Coarse Sediment Yield Areas. Proceed to Section E.3.1.

☐ Complete a Site-Specific Critical Coarse Sediment Analysis. Proceed to Section E.3.2.

E.3.1 Option 1: Avoid Potential Critical Coarse Sediment Yield Areas and Potential Sediment Source Areas

The simplest approach for complying with the Sediment Supply Performance Standard is to avoid impacts to areas identified as Potential Critical Coarse Sediment Yield Areas or Potential Sediment Supply Areas. If a portion of PDP is identified as a Potential Critical Coarse Sediment Yield Area or a Potential Sediment Source Area, that PDP may still achieve compliance with the Sediment Supply Performance Standards if Potential Critical Coarse Sediment Yield Areas and Potential Sediment Supply Areas are avoided, i.e. areas are not developed and thereby delivery of Critical Coarse Sediment to the receiving waters is not impeded by site developments.

Provide a narrative describing how the PDP has avoided impacts to Potential Critical Coarse Sediment Yield Areas and/or Potential Sediment Source Areas below.

n/a

If it is not feasible to avoid these areas, proceed to Option 2 to complete a Site-Specific Critical Coarse Sediment Analysis.

E.3.2 Option 2: Site-Specific Critical Coarse Sediment Analysis

Perform a stepwise assessment to ensure the maintenance of the pre-project source(s) of Critical Coarse Sediment (i.e., Bed Sediment Supply):

1. Determine whether the site or a portion of the site is a Significant Source of Bed Sediment Supply to the Receiving Channel (i.e., an actual verified Critical Coarse Sediment Yield Area);
2. Avoid areas identified as actual verified Critical Coarse Sediment Yield Areas in the PDP design and maintain pathways for discharge of Bed Sediment Supply from these areas to receiving waters.

Step 1: Identify if the site is an actual verified Critical Coarse Sediment Yield Area supplying Bed Sediment Supply to the receiving channel

☐ **Step 1.A** – Is the Bed Sediment of onsite streams similar to that of receiving streams?

Rate the similarity: ☐ High

☐ Medium

☐ Low

Results from the geotechnical and sieve analysis to be performed both onsite and in the receiving channel should be documented in Appendix 7. Of particular interest, the results of the sieve analysis, the soil erodibility factor, a description of the topographic relief of the project area, and the lithology of onsite soils should be reported in Appendix 7.

☐ **Step 1.B** – Are onsite streams capable of delivering Bed Sediment Supply from the site, if any, to the receiving channel?

Rate the potential: ☐ High
☐ Medium
☐ Low

Results from the analyses of the sediment delivery potential to the receiving channel should be documented in Appendix 7 and identify, at a minimum, the Sediment Source, the distance to the receiving channel, the onsite channel density, the project watershed area, the slope, length, land use, and rainfall intensity.

☐ **Step 1.C** – Will the receiving channel adversely respond to a change in Bed Sediment Load?

Rate the need for bed sediment supply:

☐ High
☐ Medium
☐ Low

Results from the in-stream analysis to be performed both onsite should be documented in Appendix 7. The analysis should, at a minimum, quantify the bank stability and the degree of incision, provide a gradation of the Bed Sediment within the receiving channel, and identify if the channel is sediment supply-limited.

☐ **Step 1.D** – Summary of Step 1

Summarize in Table E.3 the findings of Step 1 and associate a score (in parenthesis) to each step. The sum of the three individual scores determines if a stream is a significant contributor to the receiving stream.

- Sum is equal to or greater than eight - Site is a significant source of sediment bed material – all on-site streams must be preserved or by-passed within the site plan. The applicant shall proceed to Step 2 for all onsite streams.
- Sum is greater than five but lower than eight. Site is a source of sediment bed material – some of the on-site streams must be preserved (with identified streams noted). The applicant shall proceed to Step 2 for the identified streams only.
- Sum is equal to or lower than five. Site is not a significant source of sediment bed material. The applicant may advance to Section F.

Table E-2 Triad Assessment Summary

Step	Rating			Total Score
1.A	☐ High (3)	☐ Medium (2)	☐ Low (1)	**n/a**
1.B	☐ High (3)	☐ Medium (2)	☐ Low (1)	
1.C	☐ High (3)	☐ Medium (2)	☐ Low (1)	
Significant Source Rating of Bed Sediment to the receiving channel(s)				

Step 2: Avoid Development of Critical Coarse Sediment Yield Areas, Potential Sediment Sources Areas, and Preserve Pathways for Transport of Bed Sediment Supply to Receiving Waters

Onsite streams identified as a actual verified Critical Coarse Sediment Yield Areas should be avoided in the site design and transport pathways for Critical Coarse Sediment should be preserved

Check those that apply:

☐ The site design does avoid all onsite channels identified as actual verified Critical Coarse Sediment Yield Areas

AND

☐ The drainage design bypasses flow and sediment from onsite upstream drainages identified as actual verified Critical Coarse Sediment Yield Areas to maintain Critical Coarse Sediment supply to receiving waters

(If both are yes, the applicant may disregard subsequent steps of Section E.3 and directly advance directly to Section G).

\- *Or* -

☐ The site design **does NOT avoid** all onsite channels identified as actual verified Critical Coarse Sediment Yield Areas

OR

☐ The project impacts transport pathways of Critical Coarse Sediment from onsite upstream drainages.

(If either of these are the case, the applicant may proceed with the subsequent steps of Section E.3).

Provide in Appendix 7 a site map that identifies all onsite channels and highlights those onsite channels that were identified as a Significant Source of Bed Sediment. The site map shall demonstrate, if feasible, that the site design avoids those onsite channels identified as a Significant Source of Bed Sediment. In addition, the applicant shall describe the characteristics of each onsite channel identified as a Significant Source of Bed Sediment. If the design plan cannot avoid the onsite channels, please provide a rationale for each channel individually.

The site map shall demonstrate that the drainage design bypasses those onsite channels that supply Critical Coarse Sediment to the receiving channel(s). In addition, the applicant shall describe the characteristics of each onsite channel identified as an actual verified Critical Coarse Sediment Yield Area.

n/a

Identified Channel #2 - Insert narrative description here

Identified Channel #3 - Insert narrative description here

E.3.3 Sediment Supply BMPs to Result in No Net Impact to Downstream Receiving Waters

If impacts to Critical Coarse Sediment Yield Areas cannot be avoided, sediment supply BMPs must be implemented such there is no net impact to receiving waters. Sediment supply BMPs may consist of approaches that permit flux of bed sediment supply from Critical Coarse Sediment Yield Areas within the project boundary. This approach is subject to acceptance by the [Insert Jurisdiction]. It may require extensive documentation and analysis by qualified professionals to support this demonstration.

Appendix H of the San Diego Model BMP Design Manual provides additional information on site-specific investigation of Critical Coarse Sediment Supply areas.

http://www.projectcleanwater.org/download/2018-model-bmp-design-manual/

n/a

Documentation of sediment supply BMPs should be detailed in Appendix 7.

Section F: Alternative Compliance N/A

Alternative Compliance may be used to achieve compliance with pollutant control and/or hydromodification requirements for a given PDP. Alternative Compliance may be used under two scenarios, check the applicable box if the PDP is proposing to use Alternative Compliance to satisfy all or a portion of the Pollutant Control and/or Hydrologic Control requirements (but not sediment supply requirements)

☐ If it is not feasible to fully implement Infiltration or Biofiltration BMPs at a PDP site, Flow-Through Treatment Control BMPs may be used to treat pollutants contained in the portion of DCV not reliably retained on site and Alternative Compliance measures must also be implemented to mitigate for those pollutants in the DCV that are not retained or removed on site prior to discharging to a receiving water.

☐ Alternative Compliance is selected to comply with either pollutant control or hydromodification flow control requirements even if complying with these requirements is potentially feasible on-site. If such voluntary Alternative Compliance is implemented, Flow-Through Treatment Control BMPs must still be used to treat those pollutants in the portion of the DCV not reliably retained on site prior to discharging to a receiving water.

Refer to Section 2.7 of the SMR WQMP and consult the Local Jurisdiction for currently available Alternative Compliance pathways. Coordinate with the Copermittee if electing to participate in Alternative Compliance and complete the sections below to document implementation of the Flow-Through BMP component of the program.

F.1 Identify Pollutants of Concern

The purpose of this section is to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs and to document compliance and.

Utilize Table A-1 from Section A, which noted your project's Receiving Waters, to identify impairments for Receiving Waters (including downstream receiving waters) by completing Table F-1. Table F-1 includes the watersheds identified as impaired in the Approved 2010 303(d) list; check box corresponding with the PDP's receiving water. The most recent 303(d) lists are available from the State Water Resources Control Board website: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml).https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

Table F-1 Summary of Approved 2010 303(d) listed waterbodies and associated pollutants of concern for the Riverside County SMR Region and downstream waterbodies.

	Water Body	Nutrients[1]	Metals[2]	Toxicity	Bacteria and Pathogens	Pesticides and Herbicides	Sulfate	Total Dissolved Solids
☐	De Luz Creek	X	X				X	
☐	Long Canyon Creek		X		X	X		
☒	Murrieta Creek	X	X	X		X		
☐	Redhawk Channel	X	X		X	X		X
☒	Santa Gertrudis Creek	X	X		X	X		
☒	Santa Margarita Lagoon	X						
☒	Santa Margarita River (Lower)	X			X			
☒	Santa Margarita River (Upper)	X		X				
☐	Temecula Creek	X	X	X		X		X
☒	Warm Springs Creek	X	X		X	X		

[1] Nutrients include nitrogen, phosphorus and eutrophic conditions caused by excess nutrients.

[2] Metals includes copper, iron, and manganese.

Use Table F-2 to identify the pollutants identified with the project site. Indicate the applicable PDP Categories and/or Project Features by checking the boxes that apply. If the identified General Pollutant Categories are the same as those listed for your Receiving Waters, then these will be your Pollutants of Concern; check the appropriate box or boxes in the last row.

Tables F-1 (above) and F-2 (below) are not applicable for this WQMP; however some Copermittees require they be completed even though alternative compliance is not applicable.

Table F-2 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)		General Pollutant Categories									
		Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease	Total Dissolved Solids	Sulfate
☐	Detached Residential Development	P	N	P	P	N	P	P	P	N	N
☐	Attached Residential Development	P	N	P	P	N	P	P	P(2)	N	N
☐	Commercial/Industrial Development	P(3)	P(7)	P(1)	P(1)	P	P(1)	P	P	N	N
☐	Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P	N	N
☐	Restaurants (>5,000 ft^2)	P	N	N	P(1)	N	N	P	P	N	N
☐	Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P	N	N
☐	Parking Lots (>5,000 ft^2)	P(6)	P(7)	P(1)	P(1)	P(4)	P	P	P	N	N
☒	Streets, Highways, and Freeways	P(6)	P(7)	P(1)	P(1)	P(4)	P	P	P	N	N
☐	Retail Gasoline Outlets	N	P(7)	N	N	P(4)	N	P	P	N	N
Project Priority Pollutant(s) of Concern		☒	☒	☐	☐	☒	☒	☒	☒	☐	☐

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste products; otherwise not expected

(4) Including petroleum hydrocarbons

(5) Including solvents

(6) Bacterial indicators are routinely detected in pavement runoff

(7) A potential source of metals, primarily copper and zinc. Iron, magnesium, and aluminum are commonly found in the environment and are commonly associated with soils, but are not primarily of anthropogenic stormwater origin in the municipal environment.

F.2 Treatment Control BMP Selection **N/A**

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential Pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must be selected to address the Project Priority Pollutants of Concern (identified above) and meet the acceptance criteria described in Section 2.3.7 of the SMR WQMP. Documentation of acceptance criteria must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table F-3 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Copermittee Approved Study and provided in Appendix 6.

F.3 Sizing Criteria **N/A**

Utilize Table F-4 below to appropriately size flow-through BMPs to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.1 of the SMR WQMP for further information.

Table F-4 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*	
	[A]		[B]	[C]	[A] x [C]		
						Design Storm (in)	*Design Flow Rate (cfs)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{[G]}$

[B], [C] is obtained as described in Section 2.6.1.b from the SMR WQMP
[E] either 0.2 inches or 2 times the 85th percentile hourly rainfall intensity
[G] = 43,560,.

F.4 Hydrologic Performance Standard – Alternative Compliance Approach N/A

Alternative compliance options are only available if the governing Copermittee has acknowledged the infeasibility of onsite Hydrologic Control BMPs and approved an alternative compliance approach. See Section 3.5 and 3.6 of the SMR WQMP.

Select the pursued alternative and describe the specifics of the alternative:

☐ Offsite Hydrologic Control Management within the same channel system

Insert narrative description here

☐ In-Stream Restoration Project

Insert narrative description here

For Offsite Hydrologic Control BMP Option

Each Hydrologic Control BMP must be designed to ensure that the flow duration curve of the post-development DMA will not exceed that of the pre-existing, naturally occurring, DMA by more than ten percent over a one-year period. Using SMRHM, the applicant shall demonstrate that the performance of each designed Hydrologic Control BMP is equivalent with the Hydrologic Performance Standard for onsite conditions. Complete Table F-5 below and identify, for each Hydrologic Control BMP, the equivalent DMA the Hydrologic Control BMP mitigates, that the SMRHM model passed, the total volume capacity of the BMP, the BMP footprint at top floor elevation, and the drawdown time of the BMP. SMRHM summary reports for the alternative approach should be documented in Appendix 7. Refer to the SMRHM Guidance Document for additional information on SMRHM. You can add rows to the table as needed.

Table F-5 Offsite Hydrologic Control BMP Sizing

BMP Name / Type	Equivalent DMA (ac)	SMRHM Passed	BMP Volume (ac-ft)	BMP Footprint (ac)	Drawdown time (hr)
n/a		☐			
		☐			
		☐			
		☐			

For Instream Restoration Option

Attach to Appendix 7 the technical report detailing the condition of the receiving channel subject to the proposed hydrologic and sediment regimes. Provide the full design plans for the in-stream restoration project that have been approved by the Copermittee. Utilize the San Diego Regional Water Quality Equivalency Guidance Document.

Section G: Implement Trash Capture BMPs

The Local Jurisdiction may require full trash capture BMPs to be installed as part of the project. Consult with the Local Jurisdiction to determine applicability.

Trash Capture BMPs may be applicable to Type 'D' DMAs, as defined in Section 2.3.4 of the SMR WQMP. Trash Capture BMPs are designed to treat QTRASH, the runoff flow rate generated during the 1-year 1-hour precipitation depth. Utilize Table G-1 to size Trash Capture BMP. Refer to

Table G-2 to determine the Trash Capture Design Storm Intensity [D].

Table G-1 Sizing Trash Capture BMPs

DMA Name	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor, C	Design Storm Intensity (in/hr)	Trash Capture Design Flow (cfs)
	[A]		[B]	[C]	[D]	[A]x[C]x[D] /43560
NW	**91796**	**Mixed**	**0.87**	**0.69**	**0.47 (Murrieta)**	**0.68**
SW	**69160**	**Mixed**	**0.85**	**0.66**		**0.49**
NE	**29624**	**Mixed**	**0.86**	**0.67**		**0.22**
SE	**36754**	**Mixed**	**0.65**	**0.45**		**0.18**
SE2	**18150**	**Mixed**	**0.60**	**0.41**		**0.08**
SE3	**16157**	**Mixed**	**0.80**	**0.60**		**0.10**

[B], [C] is obtained as described in Section 2.6.1.b from the SMR WQMP

Table G-2 Approximate precipitation depth/intensity values for calculation of Trash Capture Design Storm

City	1-year 1-hour Precipitation Depth/Intensity (inches/hr)
Murrieta	**0.47**

Use Table G-3 to summarize and document the selection and sizing of Trash Capture BMPs.

Table G-3 Trash Capture BMPs

BMP Name (and Description)	DMA Name	Required Trash Capture Flowrate (cfs)	Provided Trash Capture Flowrate (cfs)*
NW Biofiltration Trench	**NW**	**0.68**	**1.14 cfs – overflow weir capacity**
SW Biofiltration Trench	**SW**	**0.49**	**1.14 cfs – overflow weir capacity**
NE Biofiltration Trench	**NE**	**0.22**	**0.52 cfs – overflow weir capacity**
SE Biofiltration Trench	**SE**	**0.18**	**0.52 cfs – overflow weir capacity**
SE2 Biofiltration Trench	**SE2**	**0.08**	**0.13 cfs – overflow weir capacity**
SE3 Biofiltration Trench	**SE3**	**0.10**	**0.30 cfs – overflow weir capacity**

***Provided Trash Capture Flowrates are the peak flow capacities of the surface overflow raised inlets at the downstream end of each BMP as included in the Stage-Storage-Discharge table in the B. Cho hydromodification control design calculation spreadsheet for each BMP while flowing at peak stage.**

Section H: Source Control BMPs

Source Control BMPs include permanent, structural features that may be required in your Project plans, such as roofs over and berms around trash and recycling areas, and Operational BMPs, such as regular sweeping and "housekeeping," that must be implemented by the site's occupant or user. The Maximum Extent Practicable (MEP) standard typically requires both types of BMPs. In general, Operational Source Control BMPs cannot be substituted for a feasible and effective Structural Source Control BMP. Complete checklist below to determine applicable Source Control BMPs for your site.

Project-Specific WQMP Source Control BMP Checklist

All development projects must implement Source Control BMPs. Source Control BMPs are used to minimize pollutants that may discharge to the MS4. Refer to Chapter 3 (Section 3.8) of the SMR WQMP for additional information. Complete Steps 1 and 2 below to identify Source Control BMPs for the project site.

STEP 1: IDENTIFY POLLUTANT SOURCES

Review project site plans and identify the applicable pollutant sources. "Yes" indicates that the pollutant source is applicable to project site. "No" indicates that the pollutant source is not applicable to project site.

☒ Yes ☐ No	Storm Drain Inlets	☐ Yes ☒ No	Outdoor storage areas
☐ Yes ☒ No	Floor Drains	☐ Yes ☒ No	Material storage areas
☐ Yes ☒ No	Sump Pumps	☐ Yes ☒ No	Fueling areas
☒ Yes ☐ No	Pest Control/Herbicide Application	☐ Yes ☒ No	Loading Docks
☐ Yes ☒ No	Food Service Areas	☐ Yes ☒ No	Fire Sprinkler Test/Maintenance water
☐ Yes ☒ No	Trash Storage Areas	☒ Yes ☐ No	Plazas, Sidewalks and Parking Lots
☐ Yes ☒ No	Industrial Processes	☐ Yes ☒ No	Pools, Spas, Fountains and other water features
☐ Yes ☒ No	Vehicle and Equipment Cleaning and Maintenance/Repair Areas		

STEP 2: REQUIRED SOURCE CONTROL BMPS

List each Pollutant source identified above in column 1 and fill in the corresponding Structural Source Control BMPs and Operational Control BMPs by referring to the Stormwater Pollutant Sources/Source Control Checklist included in Appendix 8. The resulting list of structural and operational source control BMPs must be implemented as long as the associated sources are present on the project site. Add additional rows as needed.

Pollutant Source	Structural Source Control BMP	Operational Source Control BMP
Storm Drain Inlets	• Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the City or from Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	• Maintain and periodically repaint or replace inlet markings. • Provide stormwater pollution prevention information to operators. • See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.
Street & Sidewalks		• Sweep sidewalks, and street regularly to prevent accumulation of litter and debris.
Landscape / Outdoor Pesticide Use	• Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. • Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. • Consider using pest-resistant plants, especially adjacent to hardscape. To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	• Maintain landscaping using minimum or no pesticides. • See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at: http://www.rcwatershed.org/about/materials-library/#1450469138395-bb76dd39-d810 • Provide IPM (Integrated Pest Management) information to operators.

Section I: Coordinate Submittal with Other Site Plans

Populate Table I-1 below to assist the plan checker in an expeditious review of your project. During construction and at completion, **City of Murrieta** inspectors will verify the installation of BMPs against the approved plans. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table I-1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
NW BNI	**Northwest Biofiltration with No Infiltration trench**	**5-6, 16-17**
SW BNI	**Southwest Biofiltration with No Infiltration trench**	**5, 16-17**
NE BNI	**Northeast Biofiltration with No Infiltration trench**	**9, 16-17**
SE BNI	**Southeast Biofiltration with No Infiltration trench**	**9, 16-17**
SE2 BNI	**Southeast 2 Biofiltration with No Infiltration trench**	**9, 16-17**
SE3 BNI	**Southeast 3 Biofiltration with No Infiltration trench**	**10, 16-17**

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. The Copermittee with jurisdiction over the Project site can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Use Table I-2 to identify other applicable permits that may impact design of the site. If yes is answered to any of the items below, the Copermittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Table I-2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ **N**
State Water Resources Control Board, Clean Water Act Section 401 Water Quality Certification	☐ Y	☒ **N**
US Army Corps of Engineers, Clean Water Act Section 404 Permit	☐ Y	☒ **N**
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ **N**
Statewide Construction General Permit Coverage	☒ **Y**	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ **N**
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ **N**
Other *(please list in the space below as required)*	☐ Y	☐ N

Section J: Operation, Maintenance and Funding

The Copermittee with jurisdiction over the Project site will periodically verify that BMPs on your Project are maintained and continue to operate as designed. To make this possible, the Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement maintenance of BMPs in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized Operations and Maintenance or inspections but will require typical landscape maintenance as noted in Chapter 5, in the SMR WQMP. Include a brief description of typical landscape maintenance for these areas.

The Copermittee with jurisdiction over the Project site will also require that you prepare and submit a detailed BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a BMP Operation and Maintenance Plan are in Chapter 5 of the SMR WQMP.

Maintenance Mechanism: **Owned, operated and maintained by City of Murrieta**

Will the proposed BMPs be maintained by a Homeowners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ **N**

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Section K: Acronyms, Abbreviations and Definitions

Regional MS4 Permit	Order No. R9-2013-0001 as amended by Order No. R9-2015-0001 and Order No. R9-2015-0100 an NPDES Permit issued by the San Diego Regional Water Quality Control Board.
Applicant	Public or private entity seeking the discretionary approval of new or replaced improvements from the Copermittee with jurisdiction over the project site. The Applicant has overall responsibility for the implementation and the approval of a Priority Development Project. The WQMP uses consistently the term "user" to refer to the applicant such as developer or project proponent. The WQMP employs also the designation "user" to identify the Registered Professional Civil Engineer responsible for submitting the Project-Specific WQMP, and designing the required BMPs.
Best Management Practice (BMP)	Defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In the case of municipal storm water permits, BMPs are typically used in place of numeric effluent limits.
BMP Fact Sheets	BMP Fact Sheets are available in the LID BMP Design Handbook. Individual BMP Fact Sheets include sitting considerations, and design and sizing guidelines for seven types of structural BMPs (infiltration basin, infiltration trench, permeable pavement, harvest-and-use, bioretention, extended detention basin, and sand filter).
California Stormwater Quality Association (CASQA)	Publisher of the California Stormwater Best Management Practices Handbooks, available at www.cabmphandbooks.com.
Conventional Treatment Control BMP	A type of BMP that provides treatment of stormwater runoff. Conventional treatment control BMPs, while designed to treat particular Pollutants, typically do not provide the same level of volume reduction as LID BMPs, and commonly require more specialized maintenance than LID BMPs. As such, the Regional MS4 Permit and this WQMP require the use of LID BMPs wherever feasible, before Conventional Treatment BMPs can be considered or implemented.
Copermittees	The Regional MS4 Permit identifies the Cities of Murrieta, Temecula, and Wildomar, the County, and the District, as Copermittees for the SMR.
County	The abbreviation refers to the County of Riverside in this document.

CEQA	California Environmental Quality Act - a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.
CIMIS	California Irrigation Management Information System - an integrated network of 118 automated active weather stations all over California managed by the California Department of Water Resources.
CWA	Clean Water Act - is the primary federal law governing water pollution. Passed in 1972, the CWA established the goals of eliminating releases of high amounts of toxic substances into water, eliminating additional water pollution by 1985, and ensuring that surface waters would meet standards necessary for human sports and recreation by 1983. CWA Section 402(p) is the federal statute requiring NPDES permits for discharges from MS4s.
CWA Section 303(d) Waterbody	Impaired water in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology based pollution controls required by the CWA. The discharge of urban runoff to these water bodies by the Copermittees is significant because these discharges can cause or contribute to violations of applicable water quality standards.
Design Storm	The Regional MS4 Permit has established the 85th percentile, 24-hour storm event as the "Design Storm". The applicant may refer to Exhibit A to identify the applicable Design Storm Depth (D85) to the project.
DCV	Design Capture Volume (DCV) is the volume of runoff produced from the Design Storm to be mitigated through LID Retention BMPs, Other LID BMPs and Volume Based Conventional Treatment BMPs, as appropriate.
Design Flow Rate	The design flow rate represents the minimum flow rate capacity that flow-based conventional treatment control BMPs should treat to the MEP, when considered.
DCIA	Directly Connected Impervious Areas - those impervious areas that are hydraulically connected to the MS4 (i.e. street curbs, catch basins, storm drains, etc.) and thence to the structural BMP without flowing over pervious areas.
Discretionary Approval	A decision in which a Copermittee uses its judgment in deciding whether and how to carry out or approve a project.
District	Riverside County Flood Control and Water Conservation District.
DMA	A Drainage Management Area - a delineated portion of a project site that is hydraulically connected to a common structural BMP or conveyance point. The Applicant may refer to Section 3.3 for further guidelines on how to delineate DMAs.

Drawdown Time	Refers to the amount of time the design volume takes to pass through the BMP. The specified or incorporated drawdown times are to ensure that adequate contact or detention time has occurred for treatment, while not creating vector or other nuisance issues. It is important to abide by the drawdown time requirements stated in the fact sheet for each specific BMP.
Effective Area	Area which 1) is suitable for a BMP (for example, if infiltration is potentially feasible for the site based on infeasibility criteria, infiltration must be allowed over this area) and 2) receives runoff from impervious areas.
ESA	An Environmental Sensitive Area (ESA) designates an area "in which plants or animals life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments". (Reference: California Public Resources Code § 30107.5).
ET	Evapotranspiration (ET) is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is also an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity
FAR	The Floor Area Ratio (FAR) is the total square feet of a building divided by the total square feet of the lot the building is located on.
Flow-Based BMP	Flow-based BMPs are conventional treatment control BMPs that are sized to treat the design flow rate.
FPPP	Facility Pollution Prevention Plan
HCOC	Hydrologic Condition of Concern - Exists when the alteration of a site's hydrologic regime caused by development would cause significant impacts on downstream channels and aquatic habitats, alone or in conjunction with impacts of other projects.
HMP	Hydromodification Management Plan – Plan defining Performance Standards for PDPs to manage increases in runoff discharge rates and durations.
Hydrologic Control BMP	BMP to mitigate the increases in runoff discharge rates and durations and meet the Performance Standards set forth in the HMP.
HSG	Hydrologic Soil Groups – soil classification to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSGs are A (very low runoff potential/high infiltration rate), B, C, and D (high runoff potential/very low infiltration rate)

Hydromodification	The Regional MS4 Permit identifies that increased volume, velocity, frequency and discharge duration of storm water runoff from developed areas has the potential to greatly accelerate downstream erosion, impair stream habitat in natural drainages, and negatively impact beneficial uses.
JRMP	A separate Jurisdictional Runoff Management Plan (JRMP) has been developed by each Copermittee and identifies the local programs and activities that the Copermittee is implementing to meet the Regional MS4 Permit requirements.
LID	Low Impact Development (LID) is a site design strategy with a goal of maintaining or replicating the pre-development hydrologic regime through the use of design techniques. LID site design BMPs help preserve and restore the natural hydrologic cycle of the site, allowing for filtration and infiltration which can greatly reduce the volume, peak flow rate, velocity, and pollutant loads of storm water runoff.
LID BMP	A type of stormwater BMP that is based upon Low Impact Development concepts. LID BMPs not only provide highly effective treatment of stormwater runoff, but also yield potentially significant reductions in runoff volume – helping to mimic the pre-project hydrologic regime, and also require less ongoing maintenance than Treatment Control BMPs. The applicant may refer to Chapter 2.
LID BMP Design Handbook	The LID BMP Design Handbook was developed by the Copermittees to provide guidance for the planning, design and maintenance of LID BMPs which may be used to mitigate the water quality impacts of PDPs within the County.
LID Bioretention BMP	LID Bioretention BMPs are bioretention areas are vegetated (i.e., landscaped) shallow depressions that provide storage, infiltration, and evapotranspiration, and provide for pollutant removal (e.g., filtration, adsorption, nutrient uptake) by filtering stormwater through the vegetation and soils. In bioretention areas, pore spaces and organic material in the soils help to retain water in the form of soil moisture and to promote the adsorption of pollutants (e.g., dissolved metals and petroleum hydrocarbons) into the soil matrix. Plants use soil moisture and promote the drying of the soil through transpiration. The Regional MS4 Permit defines "retain" as to keep or hold in a particular place, condition, or position without discharge to surface waters.
LID Biofiltration BMP	BMPs that reduce stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration, and other biological and chemical processes. As stormwater passes down through the planting soil, pollutants are filtered, adsorbed, biodegraded, and sequestered by the soil and plants, and collected through an underdrain.

LID Harvest and Reuse BMP	BMPs used to facilitate capturing Stormwater Runoff for later use without negatively impacting downstream water rights or other Beneficial Uses.
LID Infiltration BMP	BMPs to reduce stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Typical LID Infiltration BMPs include infiltration basins, infiltration trenches and pervious pavements.
LID Retention BMP	BMPs to ensure full onsite retention without runoff of the DCV such as infiltration basins, bioretention, chambers, trenches, permeable pavement and pavers, harvest and reuse.
LID Principles	Site design concepts that prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime.
MEP	Maximum Extent Practicable - standard established by the 1987 amendments to the CWA for the reduction of Pollutant discharges from MS4s. Refer to Attachment C of the Regional MS4 Permit for a complete definition of MEP.
MF	Multi-family – zoning classification for parcels having 2 or more living residential units.
MS4	Municipal Separate Storm Sewer System (MS4) is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.26.
New Development Project	Defined by the Regional MS4 Permit as 'Priority Development Projects' if the project, or a component of the project meets the categories and thresholds described in Section 1.1.1.
NPDES	National Pollution Discharge Elimination System - Federal program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the CWA.
NRCS	Natural Resources Conservation Service

PDP	Priority Development Project - Includes New Development and Redevelopment project categories listed in Provision E.3.b of the Regional MS4 Permit.
Priority Pollutants of Concern	Pollutants expected to be present on the project site and for which a downstream water body is also listed as Impaired under the CWA Section 303(d) list or by a TMDL.
Project-Specific WQMP	A plan specifying and documenting permanent LID Principles and Stormwater BMPs to control post-construction Pollutants and stormwater runoff for the life of the PDP, and the plans for operation and maintenance of those BMPs for the life of the project.
Receiving Waters	Waters of the United States.
Redevelopment Project	The creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing existing roadways; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair. Project that meets the criteria described in Section 1.
Runoff Fund	Runoff Funds have not been established by the Copermittees and are not available to the Applicant. If established, a Runoff Fund will develop regional mitigation projects where PDPs will be able to buy mitigation credits if it is determined that implementing onsite controls is infeasible.
San Diego Regional Board	San Diego Regional Water Quality Control Board - The term "Regional Board", as defined in Water Code section 13050(b), is intended to refer to the California Regional Water Quality Control Board for the San Diego Region as specified in Water Code Section 13200. State agency responsible for managing and regulating water quality in the SMR.
SCCWRP	Southern California Coastal Water Research Project
Site Design BMP	Site design BMPs prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime.
SF	Parcels with a zoning classification for a single residential unit.
SMC	Southern California Stormwater Monitoring Coalition
SMR	The Santa Margarita Region (SMR) represents the portion of the Santa Margarita Watershed that is included within the County of Riverside.

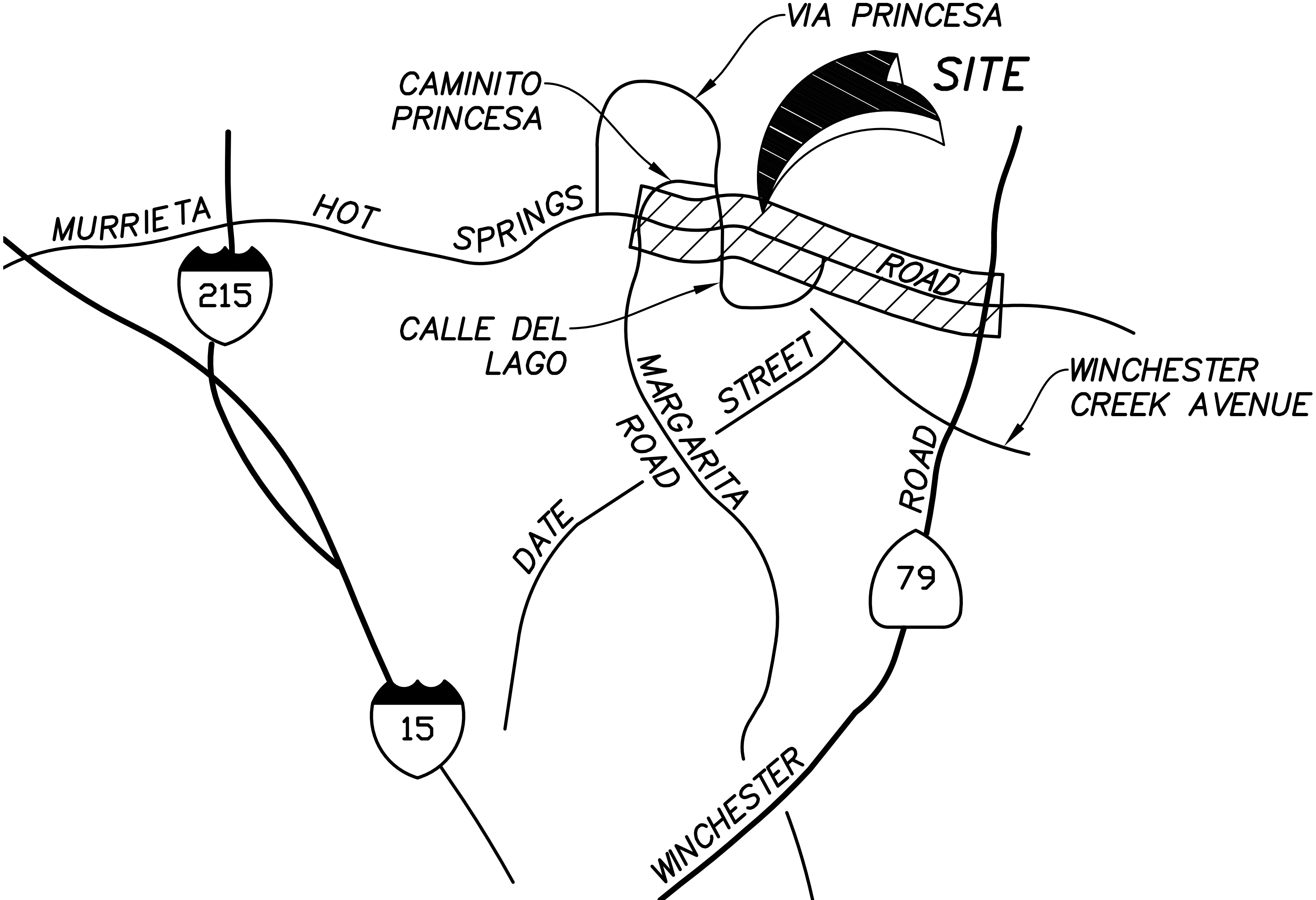
Source Control BMP	Source Control BMPs land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between Pollutants and runoff.
Structural BMP	Structures designed to remove pollutants from stormwater runoff and mitigate hydromodification impacts.
SWPPP	Storm Water Pollution Prevention Plan
Tentative Tract Map	Tentative Tract Maps are required for all subdivision creating five (5) or more parcels, five (5) or more condominiums as defined in Section 783 of the California Civil Code, a community apartment project containing five (5) or more parcels, or for the conversion of a dwelling to a stock cooperative containing five (5) or more dwelling units.
TMDL	Total Maximum Daily Load - the maximum amount of a Pollutant that can be discharged into a waterbody from all sources (point and non-point) and still maintain Water Quality Standards. Under CWA Section 303(d), TMDLs must be developed for all waterbodies that do not meet Water Quality Standards after application of technology-based controls.
USEPA	United States Environmental Protection Agency
Volume-Based BMP	Volume-Based BMPs applies to BMPs where the primary mode of pollutant removal depends upon the volumetric capacity such as detention, retention, and infiltration systems.
WQMP	Water Quality Management Plan
Wet Season	The Regional MS4 Permit defines the wet season from October 1 through April 30.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

Complete the checklist below to verify all exhibits and components are included in the Project-Specific WQMP. Refer Section 4 of the SMR WQMP and Section D of this Template.

Map and Site Plan Checklist
Indicate all Maps and Site Plans are included in your Project-Specific WQMP by checking the boxes below.
☒ Vicinity and Location Map
☒ Existing Site Map
☒ WQMP Site Plan
☒ Parcel Boundary and Project Footprint
☒ Existing and Proposed Topography
☒ Drainage Management Areas (DMAs)
☒ Proposed Structural Best Management Practices (BMPs)
☒ Drainage Paths
☒ Drainage infrastructure, inlets, overflows
☒ Source Control BMPs
☒ Site Design BMPs
☒ Buildings, Roof Lines, Downspouts
☒ Impervious Surfaces
☒ Pervious Surfaces (i.e. Landscaping)
☒ Standard Labeling



VICINITY MAP

NOT TO SCALE
RIV. CO. THOMAS GUIDE 2005
PG. 928

2018 Santa Margarita Region WQMP – Exhibit D

Checklist for Identifying Development Project Type and Submittal Requirements within the Santa Margarita Region

SECTION A: PROJECT INFORMATION		
Project File No.: CIP 8079		
Project Name: Murrieta Hot Springs Road Widening		
Project Location: Murrieta Hot Springs Road between Via Princessa and Winchester		
Project Description: Road Widening		
SECTION B: PROJECT TYPE IDENTIFICATION		
Proposed Project Consists of or Includes:	Yes	No
New Development. The creation of 10,000 square feet or more of impervious surfaces (collectively over the entire project site) including commercial, industrial, residential, mixed-use, and public projects. New Development Projects include projects that are on public or private land which fall under the planning and building authority of the [Insert Jurisdiction].	☒	☐
Redevelopment. The creation, addition or replacement of 5,000 square feet or more of impervious surfaces (collectively over the entire project site) on sites with at least 10,000 square feet of existing impervious surfaces, including commercial, industrial, residential, mixed-use, and public development projects on public or private land.	☒	☐
Automotive repair shops. The creation, addition, or replacement of 5,000 square feet or more of impervious surfaces that support automotive repair shops that are categorized in any one of the following Standard Industrial Classification (SIC) Codes 5013–Motor vehicle supplies or parts, 5014–Tires & Tubes, 5541–Gasoline Service Stations, 7532–Top, Body & Upholstery Repair Shops and Paint Shops, 7533–Automotive Exhaust System Repair Shops, 7534–Tire Retreading and Repair Shops, 7536–Automotive Glass Replacement Shops, 7537–Automotive Transmission Repair Shops, 7538–General Automotive Repair Shops, 7539–Automotive Repair Shops, not elsewhere classified).	☐	☒
Restaurants. The creation, addition, or replacement of 5,000 square feet or more of impervious surfaces (collectively over the entire project site) at sites and support the selling of prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812).	☐	☒
All Hillside developments. The creation, addition, or replacement of 5,000 square feet or more of impervious surfaces (collectively over the entire project site) and support development on any natural slope that is 25% or greater.	☐	☒
Environmentally Sensitive Areas (ESAs). Developments or Redevelopments discharging directly to an ESA that add or replace 2,500 square feet or more of impervious surfaces collectively over the entire project site. "Discharging directly to" includes flow that is conveyed 200 feet or less from the project to the ESA, or conveyed in a pipe of channel any distance as an isolated flow from the project to the ESA.	☐	☒
Parking lots. The creation, addition, or replacement of 5,000 square feet or more of impervious surfaces (collectively over the entire project site) and supports land area or a facility for the temporary parking or storage of motor vehicles used personally for business or commerce.	☐	☒
Streets, roads, highways, and freeways. The creation, addition, or replacement of 5,000 square feet or more of impervious surfaces (collectively over the entire project site) and supports paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.	☒	☐
Retail Gasoline Outlets (RGOs). The creation, addition, or replacement of 5,000 square feet or more of impervious surfaces that in support Retail Gasoline Outlets that are either 5,000 square feet or more or have a project average daily traffic of 100 or more vehicles.	☐	☒
Pollutant Generating projects disturbing over 1 acre. Developments or Redevelopments that disturb over one acre of land and are expected to generate pollutants post construction.	☒	☐
If one or more boxes are checked "Yes" in Section B, project is a Priority Development Project (PDP). Check box below and proceed to Section C. ☒ PDP subject to Site Design, Source Control, Pollutant Control, and Hydromodification Management Requirements. If all boxes are checked "No" in Section B, project is not a PDP. Check box below. ☐ Non-PDP subject to SD and SC requirements. Project requires "Other Development Project" Water Quality Checklist Submittal or local equivalent documentation method.		
SECTION C: POTENTIAL GREEN STREET EXEMPTION		
☒ PDP does not qualify for (or elect to pursue) the 'Green Streets Exemption' and must submit a Project-Specific WQMP ☐ PDP qualifies for, and elects to pursue, the 'Green Streets Exemption', consult with Copermittee for submittal requirements. This exemption requires that the project be designed a manner consistent with the USEPA Green Streets Manual to the maximum extent practicable. Acceptance of this pathway is contingent on Copermittee approval. See Section 1.1.2 of the WQMP.		

* Descriptions of SIC codes can be found at http://www.osha.gov/pls/imis/sicsearch.html.

Where a Project feature, such as a parking lot, falls into a PDP Category above and exceeds the applicable area threshold for that PDP category, the entire project footprint is subject to WQMP requirements. However, the feature, such as a parking lot or road, would need to exceed the individual area threshold for that category to trigger PDP designation.

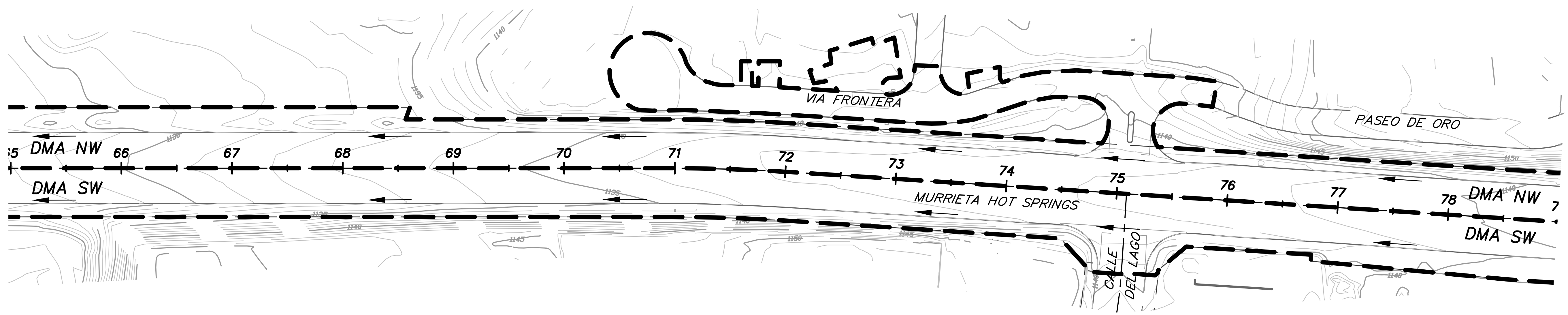
Example 1: A new development project that includes a 3,000 sq-ft building and a 4,000 sq-ft parking lot. This would not trigger a PDP because the total impervious cover is less than 10,000 sq-ft and the impervious cover of the parking lot is less than 5,000 sq-ft.

Example 2: A new development project that includes a 2,000 sq-ft building and a 5,500 sq-ft driveway. This would trigger a PDP because the driveway area is greater than 5,000 sq-ft. The PDP applies to the entire project even though the total impervious total impervious cover is still less than 10,000 sq-ft.

EX DMA NAME	(1) TOTAL EX AREA (sf)	(1) TOTAL EX AREA (ac)	EX PERVIOUS AREA (sf)	EX IMPERV AREA (sf)	EX IMPERV FRACTION (dec)
NW	145647	3.344	36412	109235	0.75
SW	127032	2.916	30488	96544	0.76
NE	94625	2.172	21764	72861	0.77
SE	31305	0.719	10018	21287	0.68
SE2	17218	0.395	3788	13430	0.78
SE3	49168	1.129	3933	45235	0.92
ALL:	464995	10.67	106403	358592	0.77

THIS SHEET (NW, SW)

SEE SHEET 2 (NE, SE, SE2, SE3)



SCALE: 1" = 100'

100' 0 100'

LEGEND

- STREET CENTERLINE
- EXISTING RIGHT OF WAY LINE
- DMA BOUNDARY
- SURFACE FLOW DIRECTION

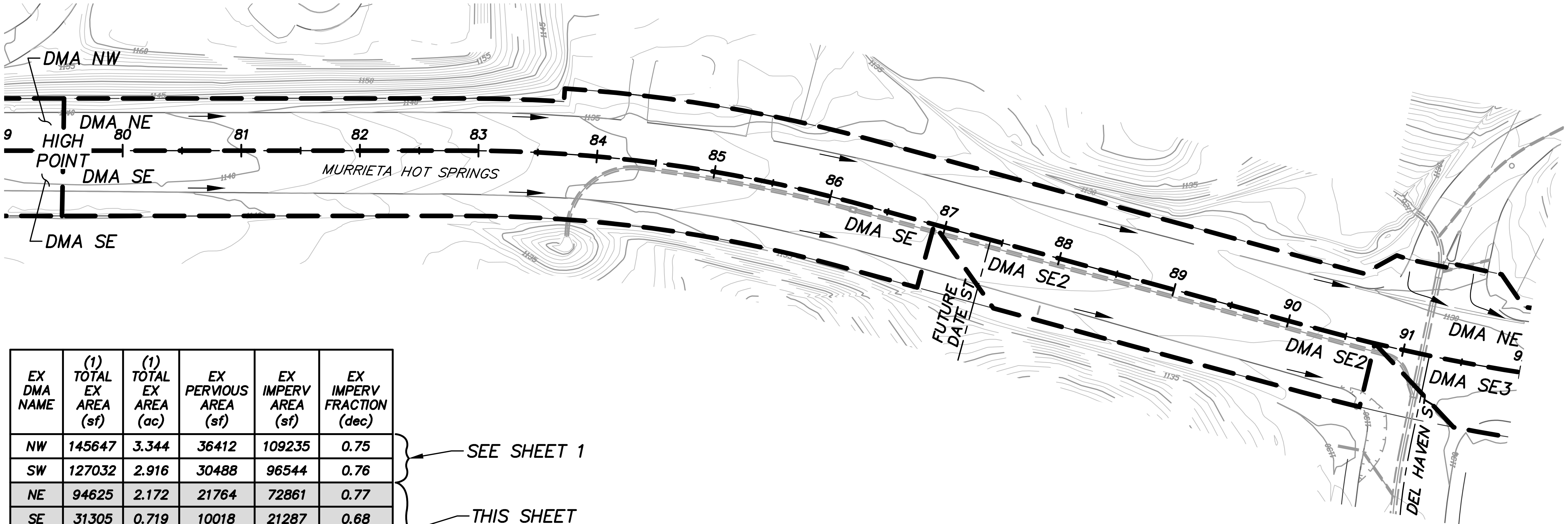
SHEET 1

CITY OF MURRIETA
ENGINEERING DEPARTMENT

SHEETS 4

EXISTING WATER QUALITY SITE MAP
MURRIETA HOT SPRINGS ROAD
DMAs NW & SW

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax



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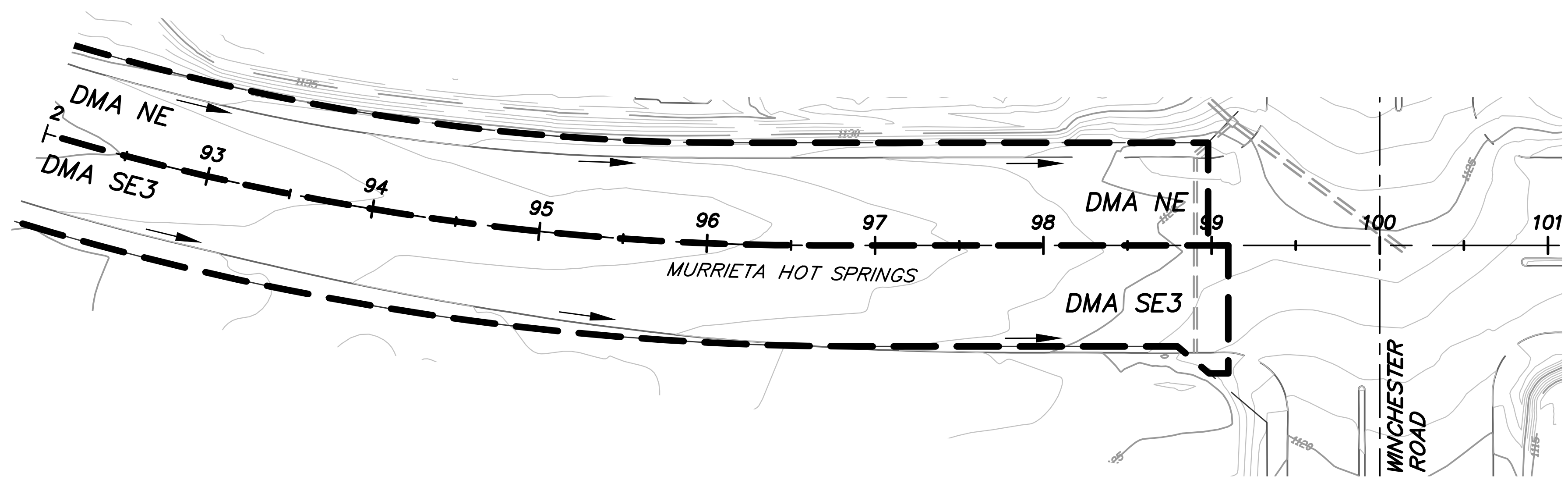
NW, SW: SEE SHEET 1

NE, SE, SE2, SE3: THIS SHEET



SCALE: 1" = 100'

100' 0 100'

LEGEND

- STREET CENTERLINE
- EXISTING RIGHT OF WAY LINE
- DMA BOUNDARY
- SURFACE FLOW DIRECTION

SHEET 2 — SHEETS 4

CITY OF MURRIETA
ENGINEERING DEPARTMENT

EXISTING WATER QUALITY SITE MAP
MURRIETA HOT SPRINGS ROAD
DMAs NE, SE & SE2

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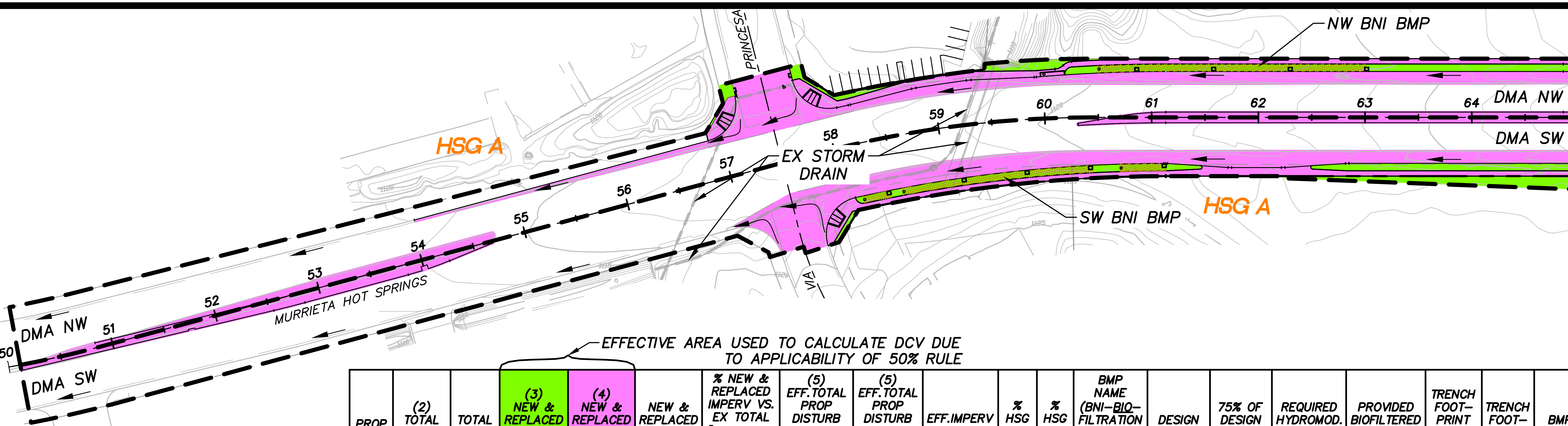
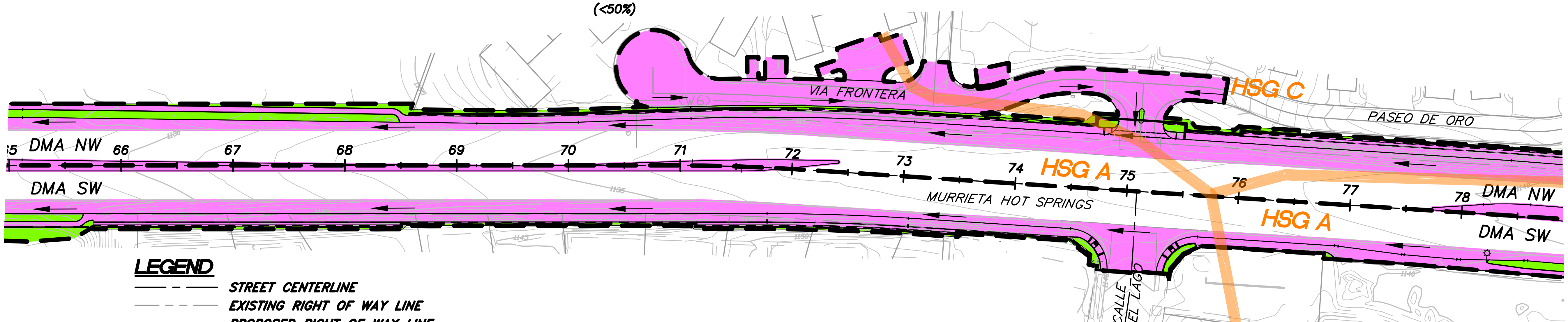


EFFECTIVE AREA USED TO CALCULATE DCV DUE TO APPLICABILITY OF 50% RULE

	PROP DMA NAME	(2) TOTAL PROP AREA (sf)	TOTAL PROP AREA (ac)	(3) NEW & REPLACED PERVIOUS AREA (sf)	(4) NEW & REPLACED IMPERV AREA (sf)	NEW & REPLACED IMPERV AREA (ac)	% NEW & REPLACED IMPERV VS. EX TOTAL [50% RULE: (4)/(1)] (%)	(5) EFF. TOTAL PROP DISTURB AREA [(3)+(4)] (sf)	(5) EFF. TOTAL PROP DISTURB AREA [(3)+(4)] (ac)	EFF. IMPERV FRACTION [(4)/(5)] (dec)	% HSG "A" SOIL (%)	% HSG "C" SOIL (%)	BMP NAME (BNI–BIO–FILTRATION WITH NO INFILTRA–TION)	DESIGN CAPTURE VOLUME (cf)	75% OF DESIGN CAPTURE VOLUME (cf)	REQUIRED HYDROMOD. CONTROL VOLUME (cf)	PROVIDED BIOFILTERED STATIC VOLUME (cf)	TRENCH FOOT–PRINT AREA BMP (sf)	TRENCH FOOT–PRINT WIDTH (ft)	BMP STA LENGTH (LF)	OUTLET ORIFICE DIAM. (in)
THIS SHEET	NW	184181	4.228	12296	79500	1.825	–	91796	2.107	0.87	84.1	15.9	NW BNI	3901	2926	3012	3110	1777	5.5	323	6
	SW	165704	3.804	10676	58484	1.343	–	69160	1.588	0.85	100	0	SW BNI	2825	2119	2219	2291	1309	5.5	238	6
SEE SHEET 4	NE	112761	2.589	4290	25334	0.582	–	29624	0.680	0.86	77.2	22.8	NE BNI	1234	926	970	1012	578	5.5	105	4
	SE	56698	1.302	12947	23807	0.547	–	36754	0.844	0.65	100	0	SE BNI	1011	758	1024	1059	605	5.5	110	4
	SE2	32146	0.738	7280	10870	0.250	–	18150	0.417	0.60	100	0	SE2 BNI	454	341	486	511	292	5.5	53	2
	SE3	57919	1.330	3294	12863	0.295	–	16157	0.371	0.80	51.9	48.1	SE3 BNI	593	445	525	550	314	5.5	57	3
	ALL:	609409	13.99	50783	210858	4.84	45.3% (<50%)	261641	6.01	0.81				10018	7515	8236	8533	4875		886	



SCALE: 1" = 100'

100' 0 100'

LEGEND

- STREET CENTERLINE
- EXISTING RIGHT OF WAY LINE
- PROPOSED RIGHT OF WAY LINE
- DMA BOUNDARY
- SURFACE FLOW DIRECTION
- NRCS EXIST HYDROLOGIC SOIL GROUP BOUNDARY
- PROP DISTURBED AREAS:
- PROP IMPERVIOUS AREA HATCH
- PROP PERVIOUS AREA HATCH
- PROP UNDISTURBED AREA (NO HATCH)

SHEET 3 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 4

PROPOSED WATER QUALITY SITE MAP
MURRIETA HOT SPRINGS ROAD
DMAs NW & SW

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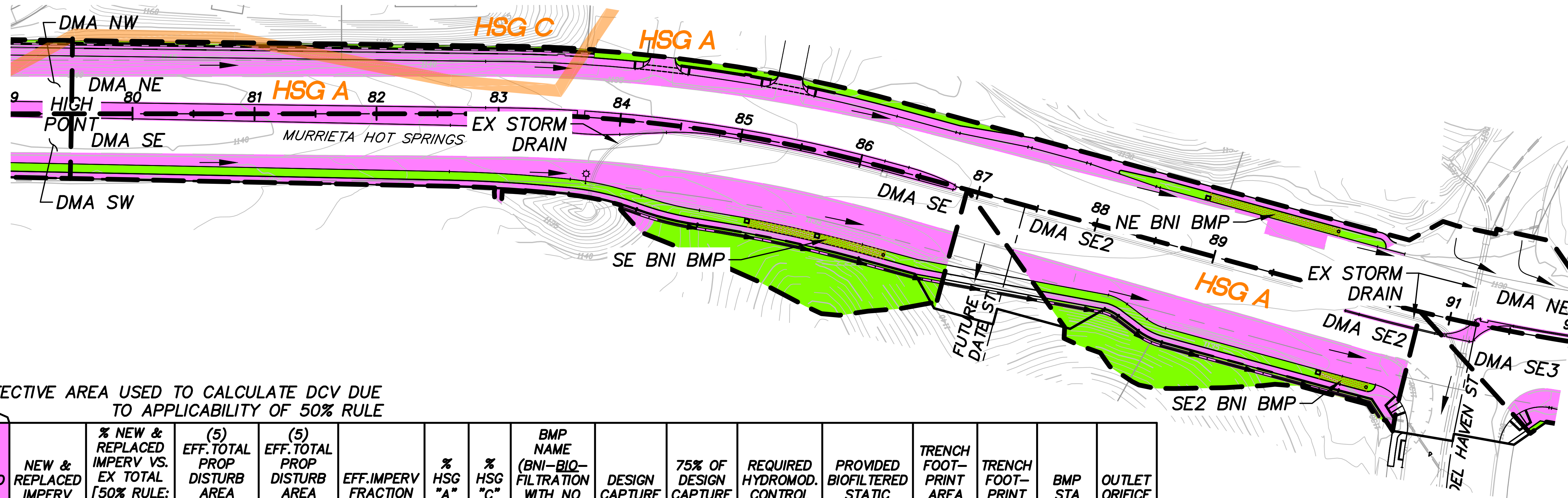

EFFECTIVE AREA USED TO CALCULATE DCV DUE TO APPLICABILITY OF 50% RULE

PROP DMA NAME	(2) TOTAL PROP AREA (sf)	TOTAL PROP AREA (ac)	(3) NEW & REPLACED PERVIOUS AREA (sf)	(4) NEW & REPLACED IMPERV AREA (sf)	NEW & REPLACED IMPERV AREA (ac)	% NEW & REPLACED IMPERV VS. EX TOTAL [50% RULE: (4)/(1)] (%)	(5) EFF.TOTAL PROP DISTURB AREA [(3)+(4)] (sf)	(5) EFF.TOTAL PROP DISTURB AREA [(3)+(4)] (ac)	EFF.IMPERV FRACTION [(4)/(5)] (dec)	% HSG "A" SOIL (%)	% HSG "C" SOIL (%)	BMP NAME (BNI–BIO–FILTRATION WITH NO INFILTRATION)	DESIGN CAPTURE VOLUME (cf)	75% OF DESIGN CAPTURE VOLUME (cf)	REQUIRED HYDROMOD. CONTROL VOLUME (cf)	PROVIDED BIOFILTERED STATIC VOLUME (cf)	TRENCH FOOT–PRINT AREA BMP (sf)	TRENCH FOOT–PRINT WIDTH (ft)	BMP STA LENGTH (LF)	OUTLET ORIFICE DIAM. (in)
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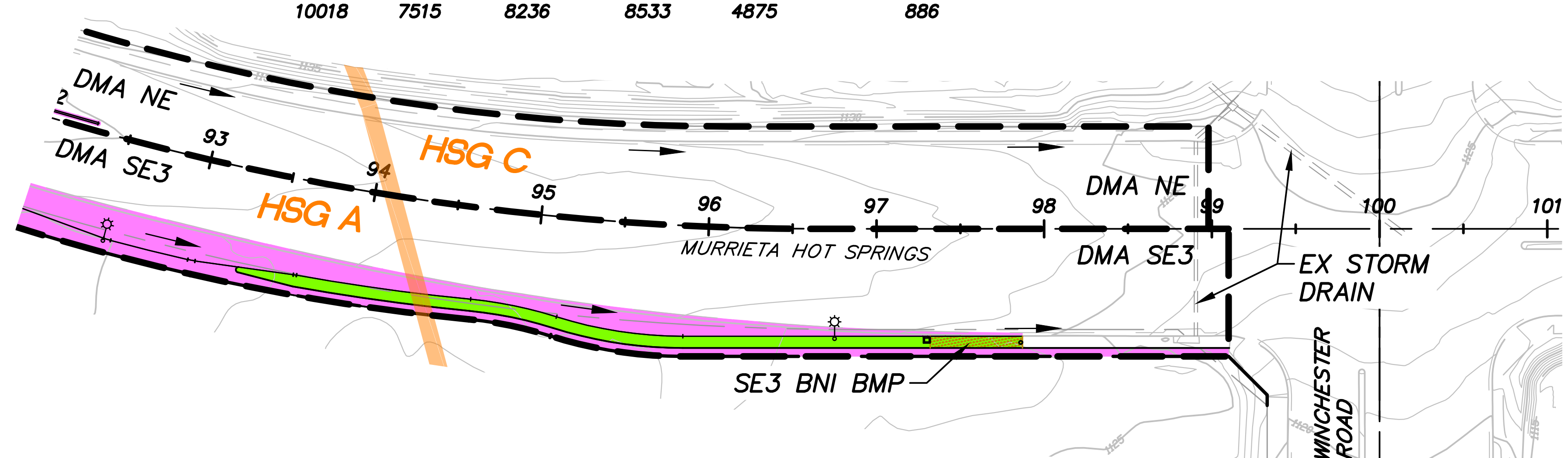
NW, SW: SEE SHEET 3

NE, SE, SE2, SE3: THIS SHEET



SCALE: 1" = 100'

100' 0 100'

LEGEND

- STREET CENTERLINE
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SHEET 4 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 4

PROPOSED WATER QUALITY SITE MAP
MURRIETA HOT SPRINGS ROAD
DMAs NE, SE, SE2 & SE3

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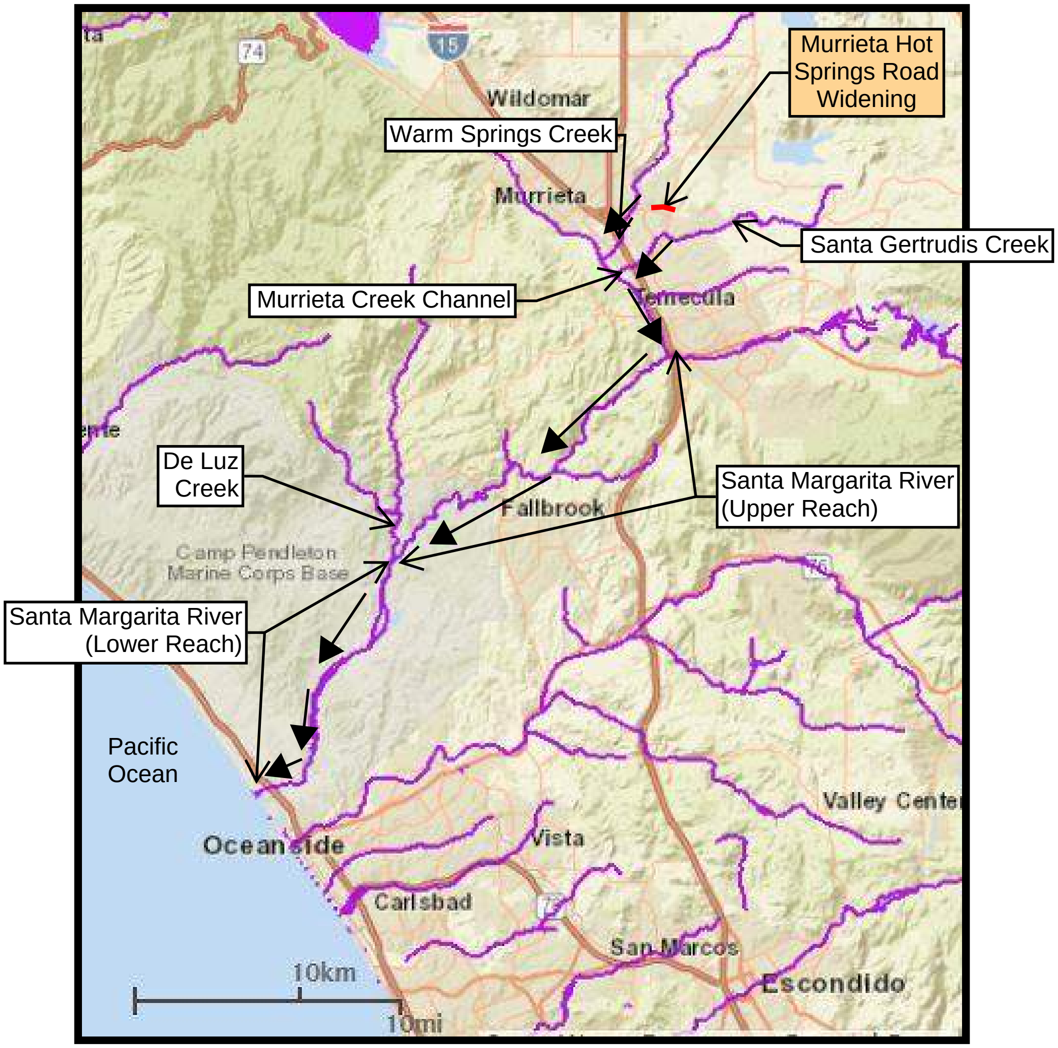
Receiving Waters Map



Riverside County SWCT²
Stormwater & Water Conservation Tracking Tool

WQMP Project Report

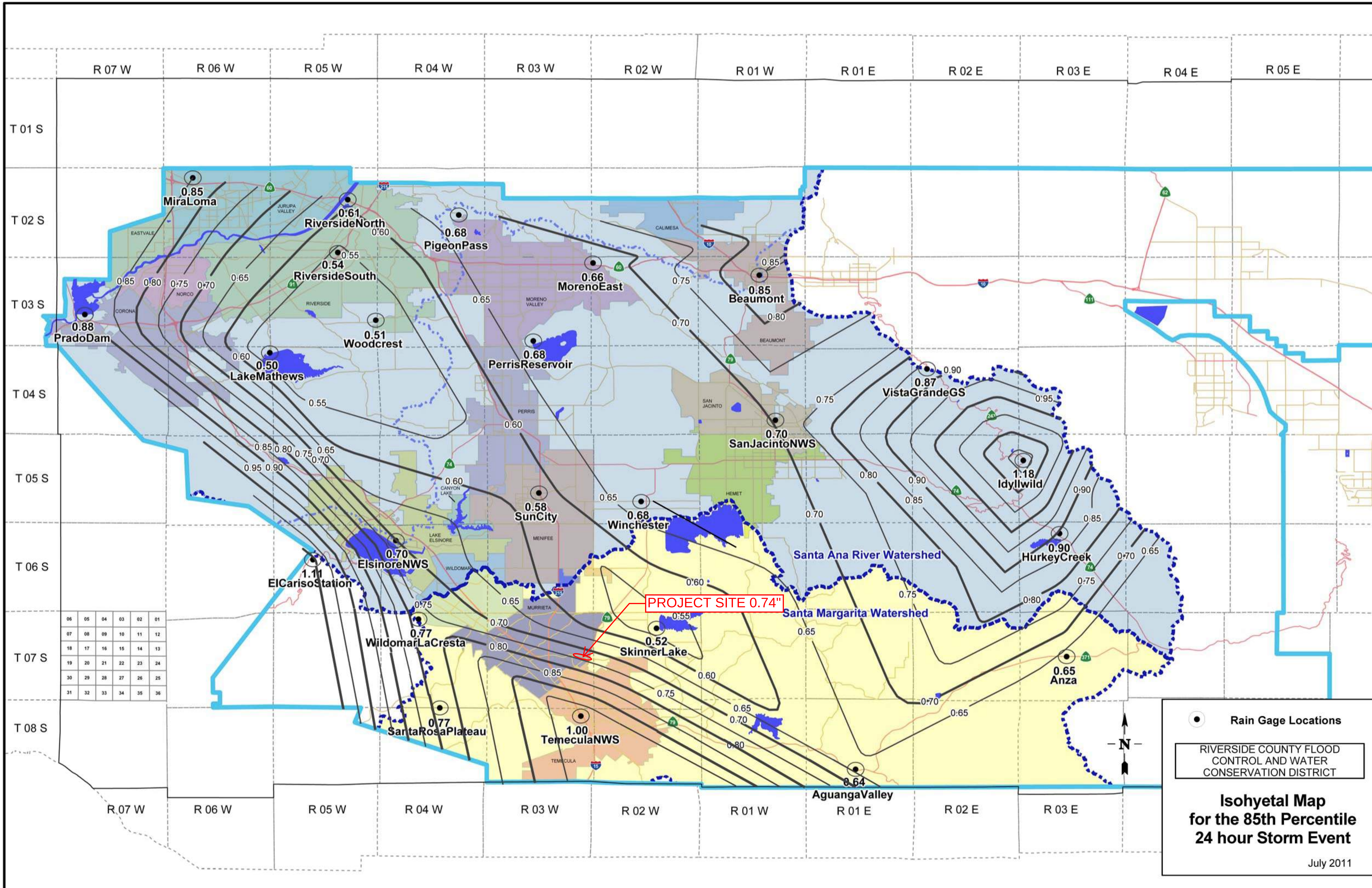
County of Riverside Stormwater Program

Santa Ana River Watershed Geodatabase

Monday, August 13, 2018

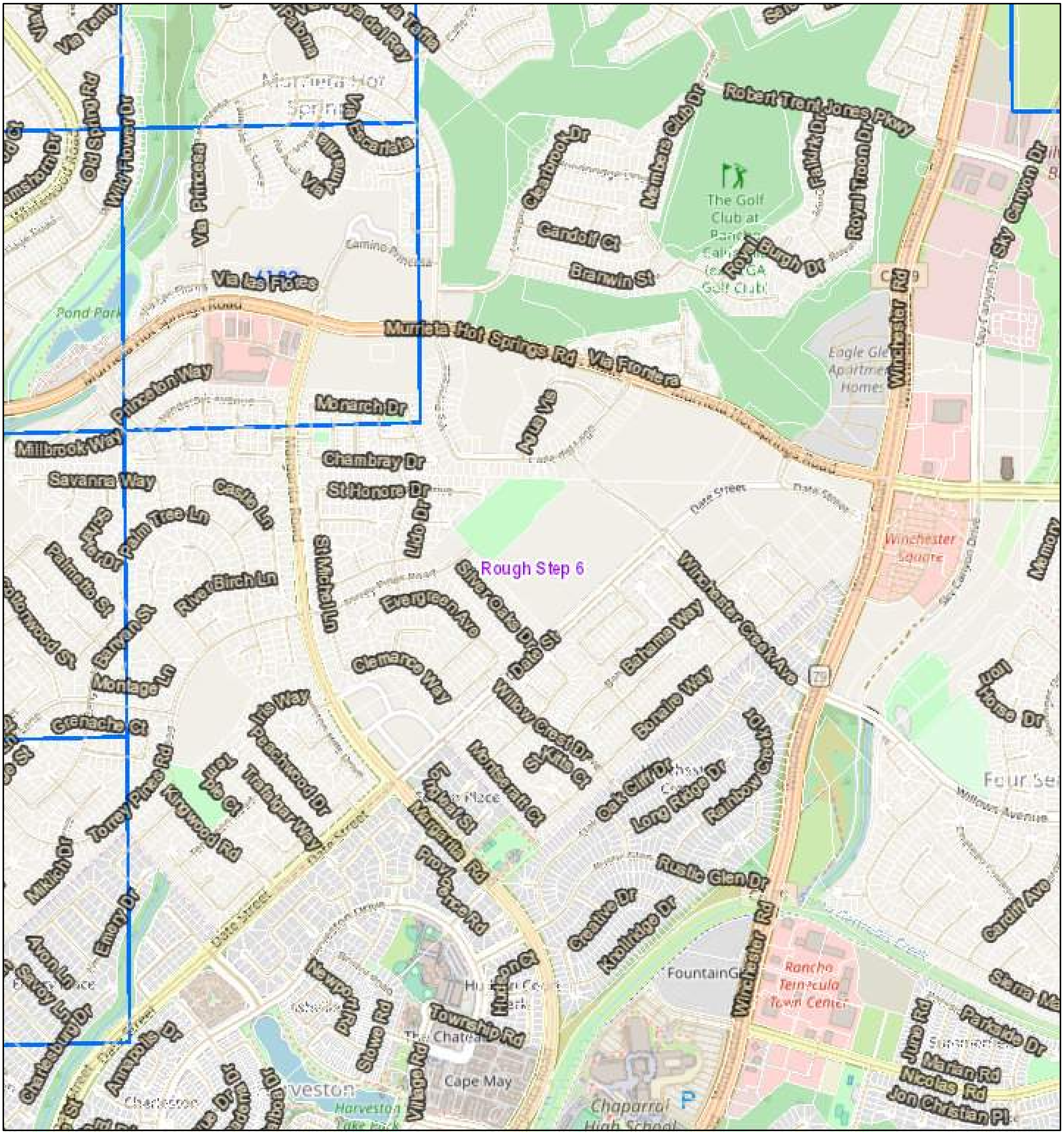
Note: The information provided in this report and on the Stormwater Geodatabase for the County of Riverside Stormwater Program is intended to provide basic guidance in the preparation of the applicant's Water Quality Management Plan (WQMP) and should not be relied upon without independent verification.

Project Site Parcel Number(s):	913160066, 913180085, 913172013, 913180001, 913191023, 913350010, 913350014, 908360015, 913180040, 913160040, 913150017, 913193001, 913350015, 913191009, 908360016, 913180041, 913150016, 913191017, 908360006, 913180039, 913191010, 913180086, 913191026
Latitude/Longitude:	33.5552, -117.1483
Thomas Brothers Page:	928
Project Site Acreage:	20.47
Watershed(s):	SANTA MARGARITA
This Project Site Resides in the following Hydrologic Unit (s) (HUC):	**HUC Name** - HUC Number **Warm Springs Creek** - 180703020401 **Lower Tucalota Creek** - 180703020405
The HUCs Contribute stormwater to the following 303d listed water bodies and TMDLs which may include drainage from your proposed Project Site:	**WBID Name** - WBID Number **Santa Margarita River (Lower)** - CAR9021100019980911161346 **Santa Margarita River (Upper)** - CAR9022200020011001141050 **Murrieta Creek** - CAR9023200020010924152136 **Warm Springs Creek (Riverside County)** - CAR9023300020080825005933
These 303d listed Water bodies and TMDLs have the following Pollutants of Concern (POC):	**Bacterial Indicators** - Enterococcus, Escherichia coli (E. coli), Fecal Coliform **Metals/Metalloids** - Copper, Iron, Manganese **Nutrients** - Nitrogen, Phosphorus, Total Nitrogen as N **Pesticides** - Chlorpyrifos **Toxicity** - Toxicity
Limitations on Infiltration:	**Project Site Onsite Soils Group(s)** - A, C **Known Groundwater Contamination Plumes within 1000'** - No **Adjacent Water Supply Wells(s)** - Applicant needs to contact the local groundwater authority (Water Master, Water District) to determine if their site requires any additional restrictions from infiltration. Your local contact agency is EASTERN MUNICIPAL W.D., RANCHO CALIFORNIA W.D.. Your local wholesaler contact agency is METROPOLITAN WATER DISTRICT.
Environmentally Sensitive Areas within 200'(Fish and Wildlife Habitat/Species):	None
Environmentally Sensitive Areas within 200'(CVMSHCP):	None
Environmentally Sensitive Areas within 200'(WRMSHCP):	Burrowing Owl Survey Required Area,Steven's Kangaroo Rat
Groundwater elevation from Mean Sea Level:	No Data
85th Percentile Design Storm Depth (in):	0.742
Groundwater Basin:	TEMECULA VALLEY
MSHCP/CVMSHCP Criteria Cell(s):	Click here for detailed MSHCP report
Retention Ordinance Information:	No Data
Studies and Reports Related to Project Site:	IBI Scores - Southern Cal bulletin118_4-sc water_fact_3_7.11 Murrieta Creek Santa Margarita River Watershed Annual Watermaster Murrieta Creek/Murrieta Valley ADP Map 1 Murrieta Creek/Murrieta Valley ADP Map 2 Murrieta Creek/Murrieta Valley ADP Report SMR Annual Report 2009-10



PROJECT SITE 0.74"
Santa Ana River Watershed
Santa Margarita Watershed
0.85 MiraLoma
0.61 RiversideNorth
0.68 PigeonPass
0.54 RiversideSouth
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.68 PerrisReservoir
0.50 LakeMathews
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley
Rain Gage Locations
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
Isohyetal Map for the 85th Percentile 24 hour Storm Event
July 2011
N

MSHCP Information



8/21/2018, 3:47:05 PM

1:18,056

0 | 0.15 | 0.3 | 0.6 mi

0 | 0.25 | 0.5 | 1 km

MSHCP Boundary

Rough Step Units

Criteria Cells

Parcels

Public Quasi-Public Conserved Lands

MSHCP Conserved Lands

MSHCP Conservation Easements

Esri, HERE, Garmin, © OpenStreetMap contributors
WRCRCA
Map data © OpenStreetMap contributors, CC-BY-SA

Web AppBuilder for ArcGIS
WRCRCA

Appendix 2: Construction Plans

Grading and Drainage Plans

Examples of material to provide in Appendix 2 may include but are not limited to the following:

- Site grading plans from the Project's Civil Plan Set,
- Drainage plans showing the exiting condition and proposed drainage system from the project's drainage report,
- Other plan sheets containing elements that impact site grading and drainage.

Refer to Section 4 of the SMR WQMP and Section I of this Template.

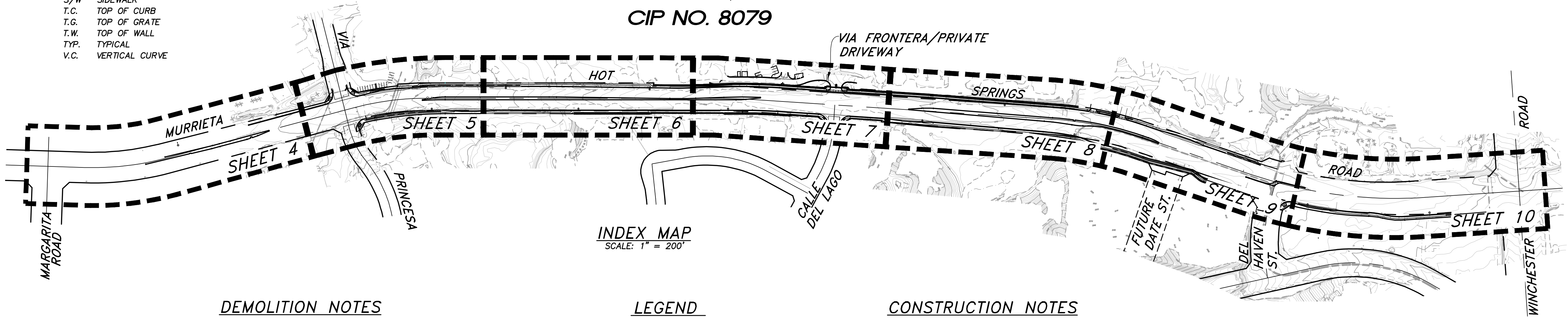
STREET IMPROVEMENT PLANS FOR MURRIETA HOT SPRINGS ROAD

MURRIETA, CA.

CIP NO. 8079

LIST OF ABBREVIATIONS

A.C.	ASPHALT CONCRETE
B.C.	BEGIN CURVE
B.C.R.	BEGIN CURB RETURN
B.V.C.	BEGIN VERTICAL CURVE
C.B.	CATCH BASIN
C.F.	CURB FACE
CL	CENTERLINE
C.O.M.	CITY OF MURRIETA
CONC.	CONCRETE
DWY.	DRIVEWAY
E.C.	END CURVE
E.C.R.	END CURB RETURN
E.P.	EDGE OF PAVEMENT
ESMT.	EASEMENT
E.V.C.	END VERTICAL CURVE
EXIST.	EXISTING
FG	FINISH GRADE
FL	FLOWLINE
F.S.	FINISH SURFACE
G.B.	GRADE BREAK
GTR	GUTTER
G.U.E.	GENERAL UTILITY EASEMENT
INV.	INVERT
LT.	LEFT
MIN.	MINIMUM
M.H.	MANHOLE
M.H.S.	MURRIETA HOT SPRINGS
N'LY	NORTHERLY
P.C.C.	PORTLAND CEMENT CONCRETE
P.L.	PROPERTY LINE
P.R.C.	POINT OF REVERSE CURVE
RT.	RIGHT
S.D.	STORM DRAIN
S.F.	SQUARE FOOT
SL'Y	SOUTHERLY
S.M.H.	SEWER MANHOLE
SPPWC	STANDARD PLANS PER PUBLIC WORKS CONSTRUCTION
STA.	STREET STATION
STD.	STANDARD
S/W	SIDEWALK
T.C.	TOP OF CURB
T.G.	TOP OF GRATE
T.W.	TOP OF WALL
TYP.	TYPICAL
V.C.	VERTICAL CURVE



INDEX MAP
SCALE: 1" = 200'

GENERAL NOTES

1. CONTRACTOR SHALL APPLY TO THE CITY OF MURRIETA, ENGINEERING DEPARTMENT FOR AN ENCROACHMENT PERMIT FOR ALL WORK WITHIN OFFERS OF DEDICATION FOR PUBLIC USE. WORK MAY NOT START UNTIL PERMITS HAVE BEEN OBTAINED.
2. ALL PAVEMENT SECTIONS ARE AT MINIMUM REQUIREMENTS. ADDITIONAL SOIL TEST SHALL BE TAKEN UNDER THE DIRECTION OF A QUALIFIED SOILS ENGINEER AFTER ROUGH GRADING TO DETERMINE THE EXACT STRUCTURAL SECTION REQUIREMENTS.
3. NEITHER THE CITY, NOR THE ENGINEER OF WORK WILL ENFORCE SAFETY MEASURES OR REGULATIONS. THE CONTRACTOR SHALL DESIGN, CONSTRUCT, AND MAINTAIN ALL SAFETY DEVICES, INCLUDING SHORING, AND BRACING, AND SHALL BE SOLELY RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE, AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS, AND REGULATIONS.
4. CONTRACTOR AGREES THAT IT SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOBSITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING: SAFETY OF ALL PERSONS AND PROPERTY, AND THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE CITY AND ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE CITY OR ENGINEER.
5. THE CONTRACTOR SHALL BE RESPONSIBLE TO INSURE THAT ALL SLOPES, STREETS, AND STORM DRAINS ARE BUILT IN ACCORDANCE WITH THESE PLANS.
6. THE CONTRACTOR SHALL TAKE THE NECESSARY STEPS TO PROTECT THE PROJECT AND ADJACENT PROPERTY FROM ANY EROSION AND SILTATION THAT RESULT FROM ITS OPERATIONS BY APPROPRIATE MEANS (SAND BAGS, HAY BALES, TEMPORARY DESILTING BASINS, DIKES, SHORING, ETC.) UNTIL SUCH TIME THAT THE PROJECT IS COMPLETED AND ACCEPTED FOR MAINTENANCE BY THE CITY.
7. THE CONTRACTOR SHALL TAKE PRECAUTIONARY MEASURES TO PROTECT EXISTING UTILITIES OR STRUCTURES LOCATED AT THE WORK SITE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE FOLLOWING OWNERS OF UTILITIES OR STRUCTURES PRIOR TO ANY EXCAVATION FOR VERIFICATION AND LOCATION OF UTILITIES AND NOTIFICATION OF COMMENCEMENT OF WORK:

CITY OF MURRIETA	(951) 304-CITY
UNDERGROUND SERVICE ALERT	(811)
EASTERN MUNICIPAL WATER DISTRICT	(951) 928-3777
RANCHO CALIFORNIA WATER DISTRICT	(951) 296-6900
WESTERN MUNICIPAL WATER DISTRICT	(951) 677-7667
TIME/WARNER (ADELPHIA CABLE)	(951) 766-4270
TIME/WARNER (COMCAST CABLE)	(951) 549-3977
AT&T CORE	(925) 944-8416
AT&T CALIFORNIA	(714) 666-5501
PACIFIC BELL TELEPHONE	(800) 422-4133
VERIZON/GENERAL TELEPHONE ELECTRONICS	(951) 929-9492
SOUTHERN CALIFORNIA GAS COMPANY	(909) 355-7507
SOUTHERN CALIFORNIA EDISON	(951) 928-6272
RIVERSIDE COUNTY FLOOD CONTROL DISTRICT	(951) 955-1200

8. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS WERE GENERATED FROM RECORD PLANS. THE CONTRACTOR SHALL TAKE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN HEREON AND ANY OTHERS NOT OF RECORD OR NOT SHOWN ON THESE PLANS. ALL DAMAGES THERETO CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE SPECIFICATIONS AND STANDARDS OF THE APPLICABLE AGENCY AT THE EXPENSE OF THE CONTRACTOR.
9. CONTRACTOR SHALL ACQUIRE A TRENCHING PERMIT FROM THE CALIFORNIA DIVISION OF INDUSTRIAL SAFETY (CAL OSHA), IF REQUIRED, FOR ALL TRENCH WORK. COPY OF PERMIT SHALL BE SUBMITTED TO THE CITY PRIOR TO START OF WORK.
10. LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS TO BE MET BY WORK TO BE DONE SHALL BE CONFIRMED BY FIELD MEASUREMENTS PRIOR TO CONSTRUCTION OF NEW WORK. NOTIFY CITY AND ENGINEER OF DISCREPANCIES PRIOR TO COMMENCEMENT OF WORK.
11. CONTRACTOR SHALL COORDINATE WITH CITY PROVIDED TESTING ENGINEER FOR ALL WORK NEEDING MATERIALS TESTING, SUCH AS BUT NOT LIMITED TO: PAVING SUBGRADE, PAVEMENT BASE, ASPHALT CONCRETE, AND PORTLAND CEMENT CONCRETE.
12. ANY WORK DONE WITHOUT INSPECTION OR MATERIALS TESTING IS SUBJECT TO REMOVAL OR CORRECTION AT CONTRACTOR'S EXPENSE.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF ANY DAMAGE TO THE EXISTING IMPROVEMENTS AND REPLACEMENT TO THE SATISFACTION OF THE CITY ENGINEER.

EARTHWORK

	CUT (CY)	FILL (CY)
RAW:	16,630	1,070
SHRINKAGE (12%)	–	2,000
SUBSIDENCE (0.10')–		800
TOTAL:	16,630	3,870
NET EXPORT:	12,760 CY	

811 Know what's below. Call before you dig.

DEMOLITION NOTES

1. PRIOR TO THE REMOVAL OF ANY TREES, THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE CITY ENGINEER. CONTRACTOR SHALL COORDINATE WITH THE CITY ENGINEER FOR SITE INSPECTION OF THE TREES PLANNED FOR REMOVAL.
2. PRIOR TO THE REMOVAL OF ANY PRIVATE IMPROVEMENTS (INCLUDING LANDSCAPING AND IRRIGATION) THE CONTRACTOR SHALL OBTAIN APPROVAL FOR THE REMOVAL FROM THE CITY ENGINEER. CONTRACTOR SHALL COORDINATE WITH THE CITY ENGINEER AND PROPERTY OWNER FOR SITE INSPECTION OF THE IMPROVEMENTS PLANNED FOR REMOVAL. THE LIMITS OF REMOVAL SHALL BE ADJUSTED AS DIRECTED BY THE CITY ENGINEER.
3. ALL PRIVATE IMPROVEMENTS OUTSIDE OF THE PUBLIC RIGHT OF WAY REMOVED TO FACILITATE THE CONSTRUCTION OF THE NEW IMPROVEMENTS SHALL BE REPLACED IN-KIND BY THE CONTRACTOR, TO THE SATISFACTION OF THE CITY ENGINEER AND PROPERTY OWNER.
4. THE LIMITS OF REMOVAL SHOWN ON THE PLANS FOR PRIVATE CONCRETE DRIVEWAYS AND WALKWAYS ARE APPROXIMATE. THE ACTUAL LIMITS SHALL BE EXTENDED, WHERE NEEDED, TO EXISTING CONSTRUCTION JOINTS WHEN THE LIMITS SHOWN ON THE PLANS FALL WITHIN 5' OF THE EXISTING CONSTRUCTION JOINT. CONTRACTOR SHALL REVIEW THE PROPOSED LIMITS OF PRIVATE CONCRETE DRIVEWAY AND WALKWAY REMOVALS WITH THE CITY ENGINEER PRIOR TO THE WORK BEING DONE. DRIVEWAY PROFILES SHALL BE ADJUSTED ACCORDINGLY.

NOTICE TO CONTRACTOR

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY: THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN, AND ANY OTHER LINES OR STRUCTURES NOT SHOWN ON THESE PLANS AND IS RESPONSIBLE FOR THE PROTECTION OF OR ANY DAMAGE TO THESE LINES OR STRUCTURES.

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF MURRIETA IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

SB&O, INC.
41689 ENTERPRISE CIRCLE NORTH, SUITE 126
TEMECULA, CA. 92590
(951)695-8900 PHONE
(951)695-8901 FAX

DANIEL J. O'ROURKE RCE 47677
EXP. 12-31-21

LEGEND

——(RW)——	RIGHT-OF-WAY
	CENTERLINE
	CURB & GUTTER
——(OHE)——	EXIST. ELECTRIC
——(G6)——	EXIST. GAS LINE
——(S15)——	EXIST. SEWER LINE
——(W16)——	EXIST. WATER LINE
	EXIST. STORM DRAIN
——(T)——	EXIST. TELEPHONE
52.5	SPOT ELEVATION
——GB——	GRADE BREAK
(52.5)	EXIST. SPOT ELEVATION
——250——	EXIST. CONTOUR
	STREET LIGHT
	FIRE HYDRANT
	DIRECTION OF DRAINAGE
	SLOPE
	RETAINING WALL
	DRIVEWAY
——x——x——	PROPOSED FENCE
	A.C. PAVEMENT
	REMOVE A.C. PAVEMENT (IN MEDIAN CURB, SEE LANDSCAPE PLANS FOR MEDAIN PAVING & PLANTING)
	P.C.C. X-GUTTER/DRIVEWAY
	P.C.C. SIDEWALK
	A.C. OVERLAY
	DIAMOND PLATE CURB COVER
B-5	BORING LOCATION PER SOILS REPORT
	V-DITCH

CONSTRUCTION NOTES

1. THE EXISTING CONDITIONS REFLECTED ON THESE PLANS ARE AS OF THE DATE THE PLANS WERE SIGNED BY THE ENGINEER OF WORK. THE CONTRACTOR SHALL MAKE NECESSARY ADJUSTMENTS IN THE NEW IMPROVEMENTS (DRIVEWAY AND WALKWAY LOCATIONS, WIDTHS, AND MATERIALS) TO CONFORM TO THE EXISTING CONDITIONS AT THE TIME OF CONSTRUCTION. THE CONTRACTOR SHALL SUBMIT ALL PROPOSED ADJUSTMENTS TO THE CITY ENGINEER FOR REVIEW PRIOR TO THEIR CONSTRUCTION.
2. ALL DRIVEWAY AND WALKWAY IMPROVEMENTS CONSTRUCTED ON PRIVATE PROPERTY TO TRANSITION FROM THE NEW PUBLIC IMPROVEMENTS TO EXISTING PRIVATE IMPROVEMENTS SHALL BE INSTALLED WITH THE FOLLOWING CRITERIA: MAXIMUM LONGITUDINAL SLOPE: DRIVEWAYS = 12%; WALKWAYS = 5% MAXIMUM CROSS SLOPE: DRIVEWAYS = 2%; WALKWAYS = 2%

UNDERGROUND UTILITY CONFLICT NOTES

1. LOCATIONS AND DEPTHS OF UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE AND BASED ON AVAILABLE RECORD DRAWINGS. LOCATIONS AND DEPTHS OF EXISTING GAS, SEWER AND WATER LATERALS ARE UNKNOWN.
2. CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE MARK-OUT OF ALL UNDERGROUND FACILITIES PRIOR TO ANY EXCAVATION OR TRENCHING.
3. CONTRACTOR IS RESPONSIBLE FOR DETERMINING ACTUAL LOCATION AND DEPTH OF ALL UNDERGROUND FACILITIES. WHERE THE CONTRACTOR DETERMINES A CONFLICT EXISTS BETWEEN AN CONTRACTOR SHALL COORDINATE THE TIMELY RELOCATION OF THE UTILITY WITH THE UTILITY OWNER. CONFLICTS FOUND BETWEEN EXISTING WATER MAINS/LATERALS AND THE PROPOSED IMPROVEMENTS SHALL BE RESOLVED BY THE CONTRACTOR BY RELOCATING THE WATER MAIN/LATERAL AS DETAILED ON THE PLANS.
4. PRIOR TO EXCAVATING FOOTINGS FOR FENCES, GATES, AND MAIL BOX POSTS, CONTRACTOR SHALL CONFIRM THAT NO UNDERGROUND UTILITIES ARE WITHIN 3' HORIZONTALLY OF THE PROPOSED EXCAVATION. ANY UTILITY FOUND TO BE WITHIN 3' OF THE EXCAVATION SHALL BE BROUGHT TO THE ATTENTION OF THE CITY ENGINEER. THE LOCATION OF THE POST SHALL BE ADJUSTED AS DIRECTED BY THE CITY ENGINEER.

BASIS OF BEARINGS

NORTH 56°03'08" WEST ALONG THE CENTERLINE OF MURRIETA HOT SPRINGS ROAD PER RECORD OF SURVEY 101/54-57, WITH THE EASTERLY TERMINUS OF THE CENTERLINE BEARING BEING THE BEGINNING OF A 1600.00 FOOT RADIUS CURVE. LOCATED 95.33 FEET, MORE OR LESS, NORTHWESTERLY OF THE CENTERLINE INTERSECTION OF MURRIETA HOT SPRINGS ROAD AND DEL HAVEN STREET.

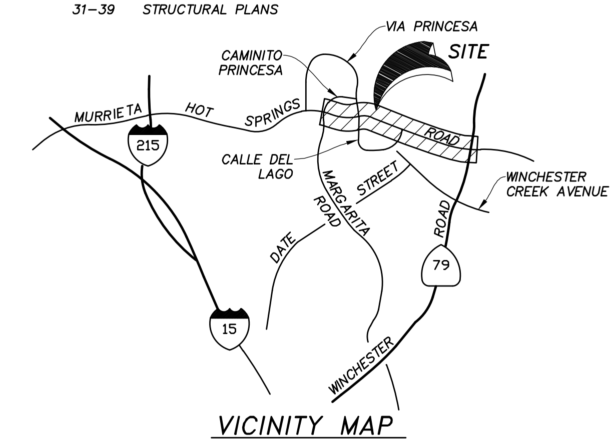
SOURCE OF TOPOGRAPHY

INLAND AERIAL SURVEY, INC.
FLIGHT DATE: NOVEMBER 30, 2009

GEOTECHNICAL ENGINEER

LEIGHTON CONSULTING, INC.
41715 ENTERPRISE CIRCLE NORTH, SUITE 103
TEMECULA, CA. 92590
CONTACT: SIMON SAIID, PE, GE
PHONE: 951-296-0530
FAX: 951-296-0534
REPORT DATED: MAY 10, 2010
PROJECT NO.: 602804-001

SHEET INDEX



VICINITY MAP
NOT TO SCALE
RIV. CO. THOMAS GUIDE 2005
PG. 928

"AS BUILT"

The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.

Engineer of work ____ Date ____
RCE ____ EXP. ____

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
JEFFREY J. HITCH DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER · DANIEL J. O'ROURKE · No. 47677 · CIVIL · STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 1 · CITY OF MURRIETA ENGINEERING DEPARTMENT · SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
TITLE SHEET - INDEX MAP

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

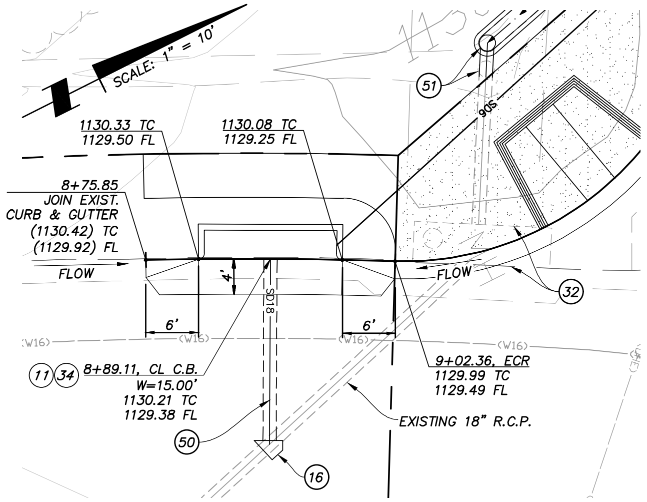
DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

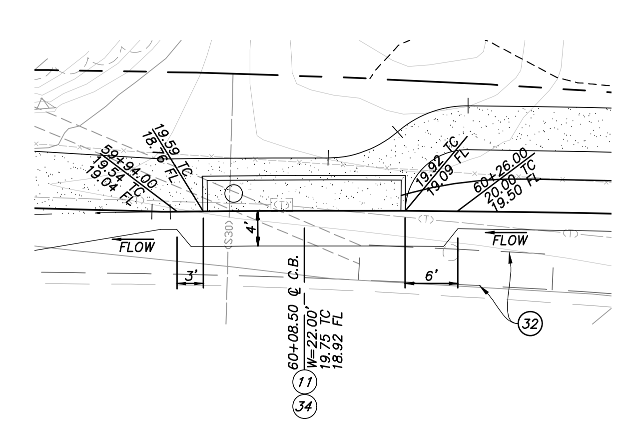
DRAWING NO.

68282.10
90% SUBMITTAL

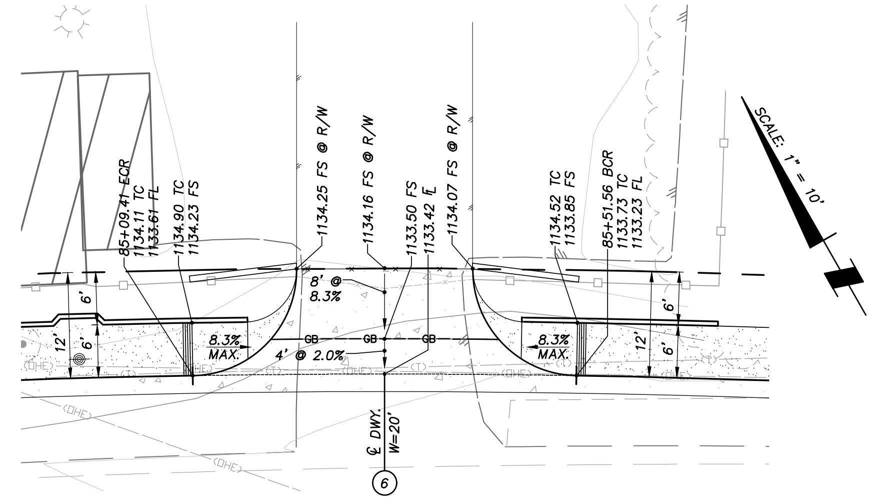
I:\68282 DATE ST & MHSRD\DWG\C-68282-SI.DWG 6/3/2020 9:14:16 AM PLOTTED BY:ROBERT FOTO



(38) LOCAL DEPRESSION DETAIL (CASE C)
DEL HAVEN ST. 8+89.11 (LT.)
SCALE: 1"=10'
SEE SHT. 9



(8) LOCAL DEPRESSION DETAIL (CASE B)
MHS ROAD STA. 60+08.50 (LT.)
SCALE: 1"=10'
SEE SHT. 5



MURRIETA HOT SPRINGS ROAD
DRIVEWAY AT STATION 85+30.48
SCALE 1"=10'
SEE SHT. 9

CONSTRUCTION NOTES

○ DESCRIPTION

6 CONSTRUCT P.C.C. DRIVEWAY APPROACH (W=PER PLAN) PER C.O.M. STD. NO. 310a. (MODIFIED, SEE DETAIL ON SHEET 2).

8 CONSTRUCT GUTTER DEPRESSION FOR CURB OPENING CATCH BASIN PER C.O.M. STD. NO. 425A, CASE "B" AND DETAILS ON SHEET 2.

9 CONSTRUCT GUTTER DEPRESSION FOR GRATE OPENING CATCH BASIN PER C.O.M. STD. NO. 424, CASE "A" AND DETAILS ON SHEET 2.

11 CONSTRUCT CURB INLET CATCH BASIN PER C.O.M. STD. NO. 401 AND 402, W PER PLAN.

12 CONSTRUCT COMBINATION INLET CATCH BASIN NO. 2 PER C.O.M. STD. NO. 404 AND 405, W PER PLAN.

15 INSTALL 24" R.C.P. (2000–D).

16 CONSTRUCT CONCRETE COLLAR PER C.O.M. STD. NO. 451.

17 CONSTRUCT PCC ACCESS RAMP PER DETAIL ON SHEET 2.

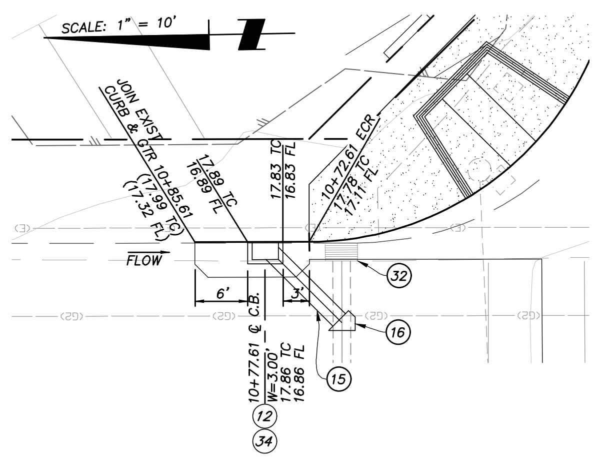
18 SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.

32 REMOVE EXISTING CATCH BASIN AND REMOVE CONFLICTING PORTION OF EXISTING PIPE.

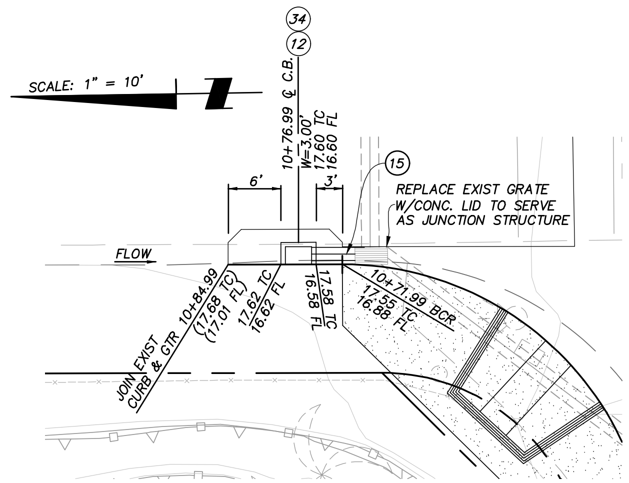
34 INSTALL BIO–CLEAN FULL CAPTURE INLET FILTER MODEL 36–36–24 WITH TROUGH SYSTEM IN CURB OPENING AND GRATED INLET CATCH BASIN.

38 CONSTRUCT GUTTER DEPRESSION FOR CURB OPENING CATCH BASIN PER C.O.M. STD. NO. 425A, CASE "C" AND DETAILS ON SHEET 2.

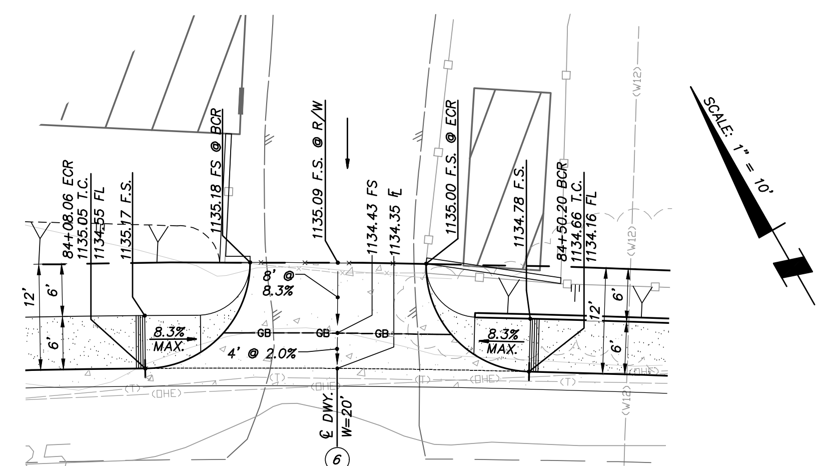
50 INSTALL 18" R.C.P. (2000–D).



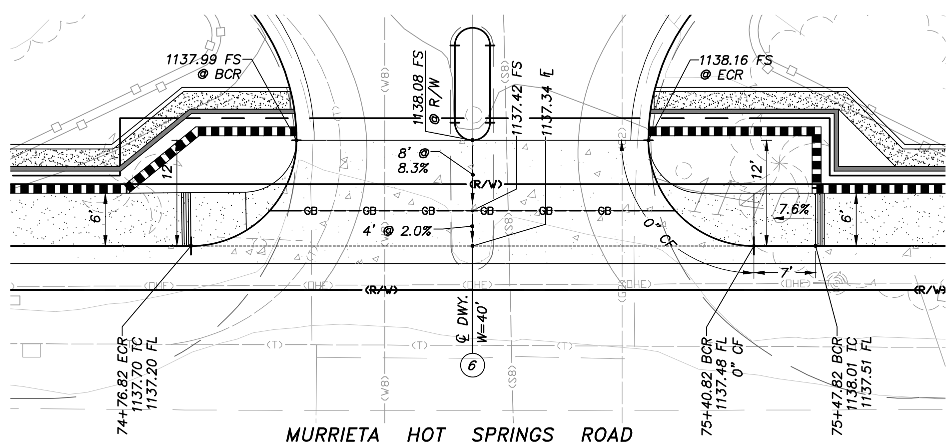
(9) LOCAL DEPRESSION DETAIL (CASE A)
VIA PRINCESA STA. 10+77.61 (RT.)
SCALE: 1"=10'
SEE SHT. 5



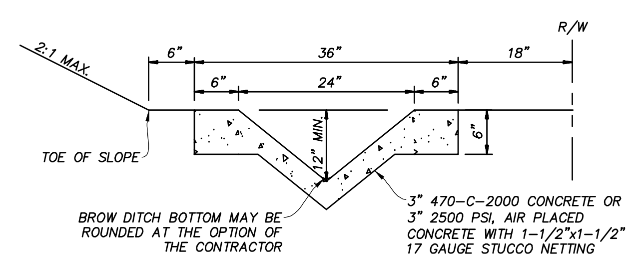
(9) LOCAL DEPRESSION DETAIL (CASE A)
VIA PRINCESA STA. 10+76.99 (LT.)
SCALE: 1"=10'
SEE SHT. 5



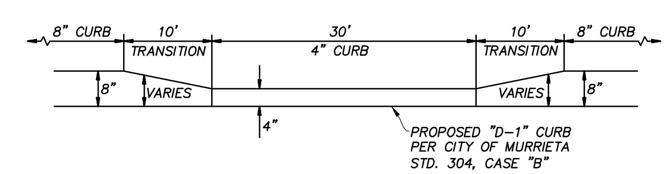
MURRIETA HOT SPRINGS ROAD
DRIVEWAY AT STATION 84+29.13
SCALE 1"=10'
SEE SHT. 8



MURRIETA HOT SPRINGS ROAD
(17) DRIVEWAY AT STATION 75+08.82
SCALE 1"=10'
SEE SHT. 11



(42) V–DITCH DETAIL
NOT TO SCALE



(44) MEDIAN DEPRESSION DETAIL
STATIONS 62+85.00, 64+85.00,
80+35.00 & 82+35.00
NOT TO SCALE
SEE SHEETS 6 & 8

811 Know what's below. Call before you dig.

"AS BUILT"

The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.

Engineer of work ____ Date ____
RCE ____ EXP. ____

BENCH MARK:
RIV. CO. BM T 46–81 RESET 1997, ELEV. 1097.163
3–1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ____ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER — DANIEL J. O'ROURKE — No. 47677 — CIVIL — STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ____ DATE ____
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 2 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

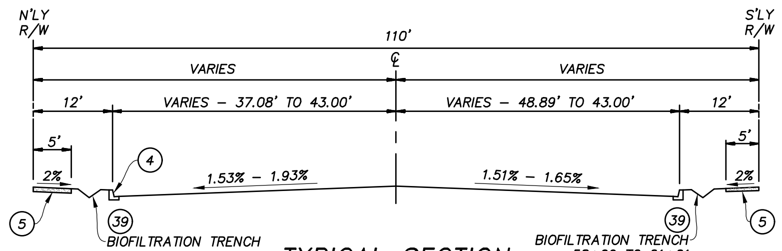
STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
MISCELLANEOUS DETAILS

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

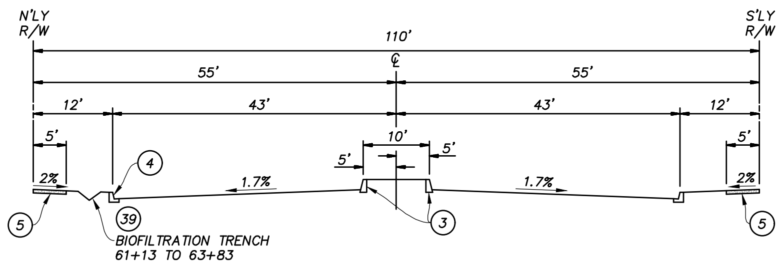
DWN BY: RLF
CHKD BY: DJO
FIELD BK:
CIP NO. 8079
PROJECT NO. 09–XXX
DRAWING NO.

68282.10
90% SUBMITTAL

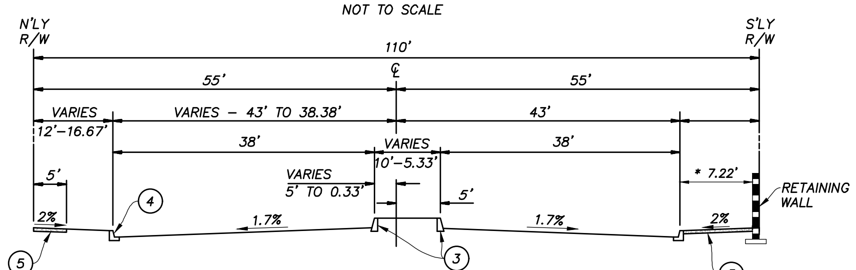
I:\68282 DATE ST & MHSRD\DWG\C-68282-SLDWG 6/3/2020 9:14:43 AM PLOTTED BY:ROBERT FOTO



TYPICAL SECTION
MURRIETA HOT SPRINGS ROAD STA.
58+11.52 TO STA. 61+13.29 LT.
58+09.16 TO 61+13.29 RT.
T.I.=8.5
NOT TO SCALE

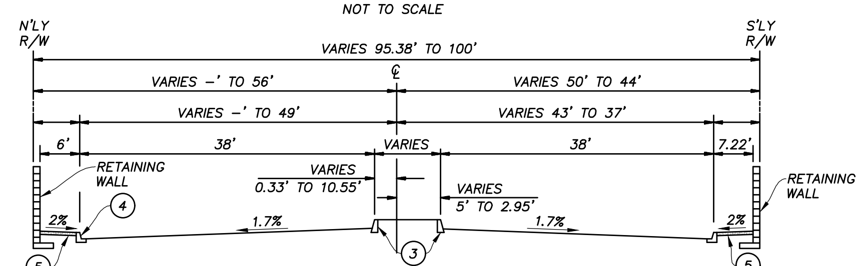


TYPICAL SECTION
MURRIETA HOT SPRINGS ROAD
STA. 61+13.29 TO STA. 64+85.68
T.I.=8.5
NOT TO SCALE

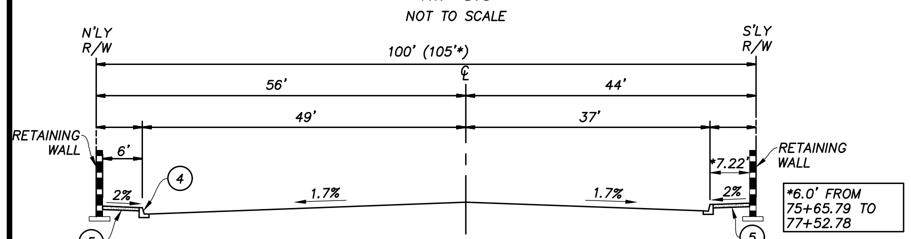


* 65+75.00 to 68+56.77

TYPICAL SECTION
MURRIETA HOT SPRINGS ROAD
STA. 64+85.68 TO STA. 68+56.77
T.I.=8.5
NOT TO SCALE

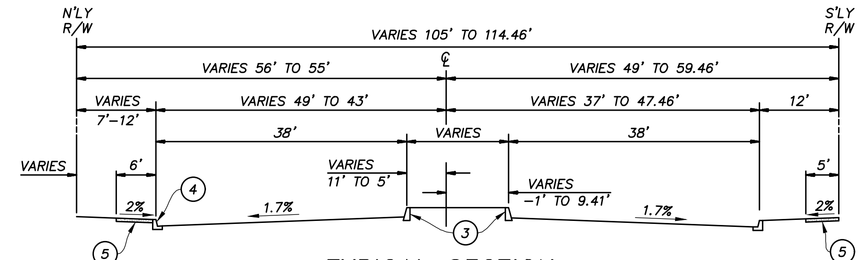


TYPICAL SECTION
MURRIETA HOT SPRINGS ROAD
STA. 68+56.77 to 73+06.84
T.I.=8.5
NOT TO SCALE

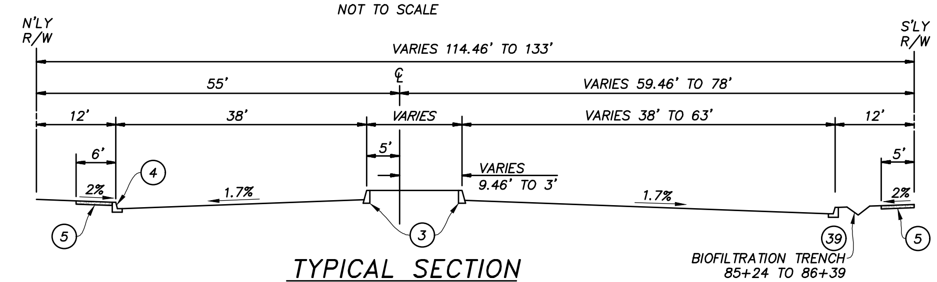


TYPICAL SECTION
MURRIETA HOT SPRINGS ROAD
STA. 73+06.84 TO STA. 77+52.78
T.I.=8.5
NOT TO SCALE

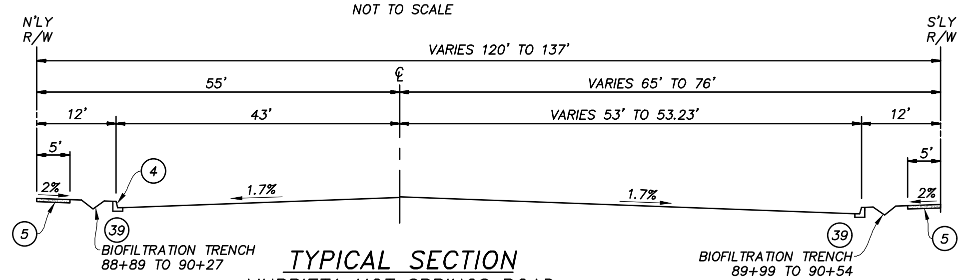
Know what's below.
Call before you dig.



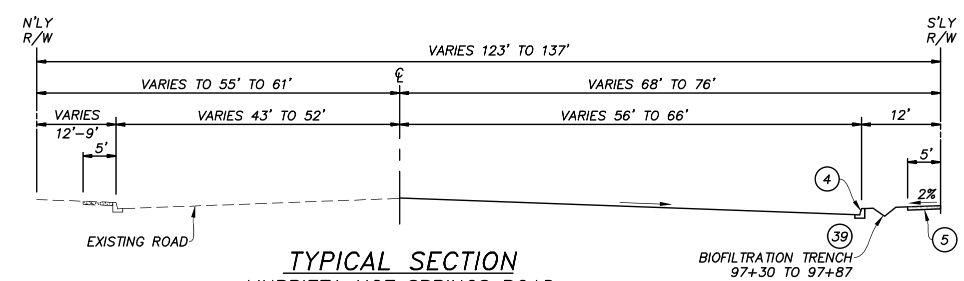
TYPICAL SECTION
MURRIETA HOT SPRINGS ROAD
STA. 77+52.78 TO 82+59.67 (RT.) & 82+89.37 (LT.)
T.I.=8.5
NOT TO SCALE



TYPICAL SECTION
MURRIETA HOT SPRINGS ROAD
STA. 82+89.37 TO 86+71.95 (LT.)
STA. 82+59.67 TO STA. 86+66.80 (RT.)
T.I.=8.5
NOT TO SCALE



TYPICAL SECTION
MURRIETA HOT SPRINGS ROAD
STA. 86+71.95 TO 90+51.08 (LT.)
STA. 88+39.80 TO STA. 90+54.16 (RT.)
T.I.=8.5
NOT TO SCALE



TYPICAL SECTION
MURRIETA HOT SPRINGS ROAD
STA. 90+51.08 TO 99+00.00 (LT.)
STA. 91+92.07 TO 99+10.00 (RT.)
T.I.=8.5
NOT TO SCALE

CONSTRUCTION NOTES

○	DESCRIPTION	QTY	
1	CONSTRUCT 5" A.C. PAVEMENT OVER 14.5" CLASS II BASE (PRELIM, R=26).	81,716	S.F.
2	GRIND EXISTING A.C. PAVEMENT 0.10' (MIN.) AND CONSTRUCT VARIABLE THICKNESS A.C. PAVEMENT OVERLAY.	186,618	S.F.
3	CONSTRUCT TYPE "D" CURB CASE A PER C.O.M. STD. NO. 305.	5,513	L.F.
4	CONSTRUCT TYPE "A-6" CURB AND GUTTER PER C.O.M. STD. NO. 301 AND 306.	7,418	L.F.
5	CONSTRUCT P.C.C. SIDEWALK PER C.O.M. STD. NO. 320 WITH THICKENED EDGE ADJACENT TO BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17 (AS OCCURS).	43,107	S.F.
6	CONSTRUCT P.C.C. DRIVEWAY APPROACH (W=PER PLAN) PER C.O.M. STD. NO. 310a. (MODIFIED, SEE DETAIL ON SHEET 2).	1,419	S.F.
7	CONSTRUCT P.C.C. ACCESS RAMP PER C.O.M. STD. NO. 321a AND 321b.	835	S.F.
8	CONSTRUCT GUTTER DEPRESSION FOR CURB OPENING CATCH BASIN PER C.O.M. STD. NO. 425A, CASE "B" AND DETAILS ON SHEET 2.	126	S.F.
9	CONSTRUCT GUTTER DEPRESSION FOR GRATE OPENING CATCH BASIN PER C.O.M. STD. NO. 424, CASE "A" AND DETAILS ON SHEET 2.	100	S.F.
10	CONSTRUCT CROSS GUTTER AND SPANDREL PER C.O.M. STD. NO. 311 AND 312.	4,056	S.F.
11	CONSTRUCT CURB INLET CATCH BASIN PER C.O.M. STD. NO. 401 AND 402, W PER PLAN.	2	EA.
12	CONSTRUCT COMBINATION INLET CATCH BASIN NO. 2 PER C.O.M. STD. NO. 404 AND 405, W PER PLAN.	2	EA.
13	CONSTRUCT RETAINING WALL PER DETAILS ON SHEETS 14,15 & 31-39.	–	–
14	CONSTRUCT 10' WIDE CONCRETE OVERFLOW DRAIN TO MATCH EXISTING, SEE DETAIL ON SHEET 12.	135	L.F.
15	INSTALL 24" R.C.P. (2000-D).	15	L.F.
16	CONSTRUCT CONCRETE COLLAR PER C.O.M. STD. NO. 451.	2	EA.
17	CONSTRUCT PCC ACCESS RAMP PER DETAIL ON SHEET 2.	2	EA.
18	SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.	32,900	S.F.
19	ADJUST TO GRADE (ITEM AS INDICATED).	–	–
20	PROTECT IN PLACE (ITEM AS INDICATED).	–	–
21	INSTALL POWER POLE (BY OTHERS).	–	–
22	RELOCATE DRY UTILITY (BY OTHERS, ITEM AS INDICATED).	–	–
23	RELOCATE WATER METER (BY OTHERS).	–	–
24	RELOCATE FIRE HYDRANT (BY OTHERS).	–	–
25	RELOCATE EXISTING AIR RELEASE/BLOW-OFF VALVE/CP TEST STATION (BY OTHERS).	–	–
26	REMOVE/DISPOSE OF (ITEM AS INDICATED).	–	–
27	RELOCATE/RECONSTRUCT FENCE AND/OR GATE, IN-KIND.	990	L.F.
28	REMOVE EXISTING CURB AND GUTTER OR CURB ONLY.	9,254	L.F.
29	REMOVE EXISTING CROSS GUTTER AND SPANDREL.	2,821	S.F.
30	REMOVE EXISTING TREE.	12	EA.
31	REMOVE EXISTING CONCRETE.	2,834	S.F.
32	REMOVE EXISTING CATCH BASIN AND REMOVE CONFLICTING PORTION OF EXISTING PIPE.	2	EA.
33	RELOCATE PRIVATE LIGHT POLE	5	EA.
34	INSTALL BIO-CLEAN FULL CAPTURE INLET FILTER MODEL 36-36-24 WITH TROUGH SYSTEM IN CURB OPENING AND GRATED INLET CATCH BASIN.	5	EA.
35	LED STREET LIGHT PER SEPARATE PLAN.	8	EA.
36	TIE OUT EXISTING MONUMENT PRIOR TO CONSTRUCTION AND INSTALL NEW STREET CENTERLINE MONUMENT PER C.O.M. STD. NO. 617b.	10	EA.
37	CONSTRUCT 3" A.C. PAVEMENT OVER 4" CLASS II BASE (PRELIM).	20,987	S.F.
38	CONSTRUCT GUTTER DEPRESSION FOR CURB OPENING CATCH BASIN PER C.O.M. STD. NO. 425A, CASE "C" AND DETAILS ON SHEET 2.	15	L.F.
39	CONSTRUCT BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17.	888	L.F.
40	CONSTRUCT BROOKS PRODUCTS CB1212 WITH STEEL PARKWAY GRATE AND BIO-CLEAN STAINLESS STEEL FULL CAPTURE INLET FILTER MODEL 12-12-12 W/HANDLE (NO HYDROCARBON BOOM).	8	EA.
41	INSTALL 6" P.V.C. STORM DRAIN PIPE (SOLID WALL, SCH 40).	590	L.F.
42	CONSTRUCT 24" V-DITCH PER DETAIL ON SHEET 2.	651	L.F.
43	INSTALL 6" DUAL WALL HDPE PIPE WITH AASHTO CLASS II SLOTTED PERFORATION PATTERN	871	L.F.
44	CONSTRUCT 4" MEDIAN CURB DEPRESSION PER DETAIL ON SHEET 2.	120	L.F.
45	CONSTRUCT DIAMOND PLATE CURB COVER PER C.O.M. STD. NO. 602.	3	EA.
46	CONSTRUCT TYPE "D" CURB CASE B PER C.O.M. STD. NO. 305.	154	L.F.
47	REMOVE POWER POLE (BY OTHERS).	14	EA.
48	INSTALL BUS TURNOUT PER C.O.M. STD. NO. 217 (MODIFIED WIDTH).	6,100	S.F.
49	CONSTRUCT STAMPED CONCRETE PER LANDSCAPE ARCHITECT PLANS.	361	S.F.
50	INSTALL 18" R.C.P. (2000-D).	21	L.F.
51	RELOCATE EXIST. TYPE IX INLET TO ACCEPT DITCH FLOWS.	1	EA.
52	PAINT 4" WHITE PARKING STRIPE.	332	L.F.
53	REMOVE & REPLACE 8' STUCCO SCREEN WALL, IN-KIND.	18	L.F.
54	CONSTRUCT CURB OPENING AND RIP-RAP INTO BIOFILTRATION TRENCH PER DETAIL ON SHEET 17.	15	EA.
55	CONSTRUCT STORM DRAIN CLEANOUT PER DETAIL ON SHEET 17.	8	EA.
56	CONSTRUCT PCC ACCESS RAMP PER SPPWC 111-5, CASE B, TYPE 1.	2	EA.

"AS BUILT"
The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.

Engineer of work ______ Date ______
RCE ______ EXP. ______

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ______ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 3 OF SHEETS 39
CITY OF MURRIETA
ENGINEERING DEPARTMENT

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
TYPICAL SECTIONS

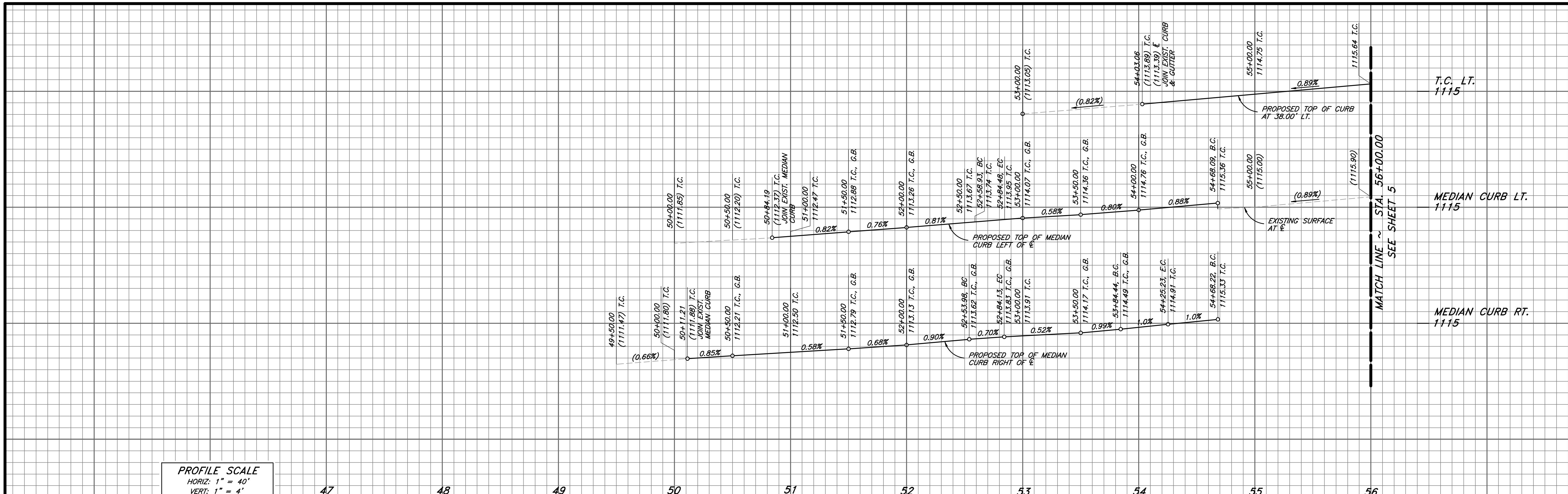
APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX
DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-SLDWG 6/3/2020 9:14:44 AM PLOTTED BY: ROBERT FOTO

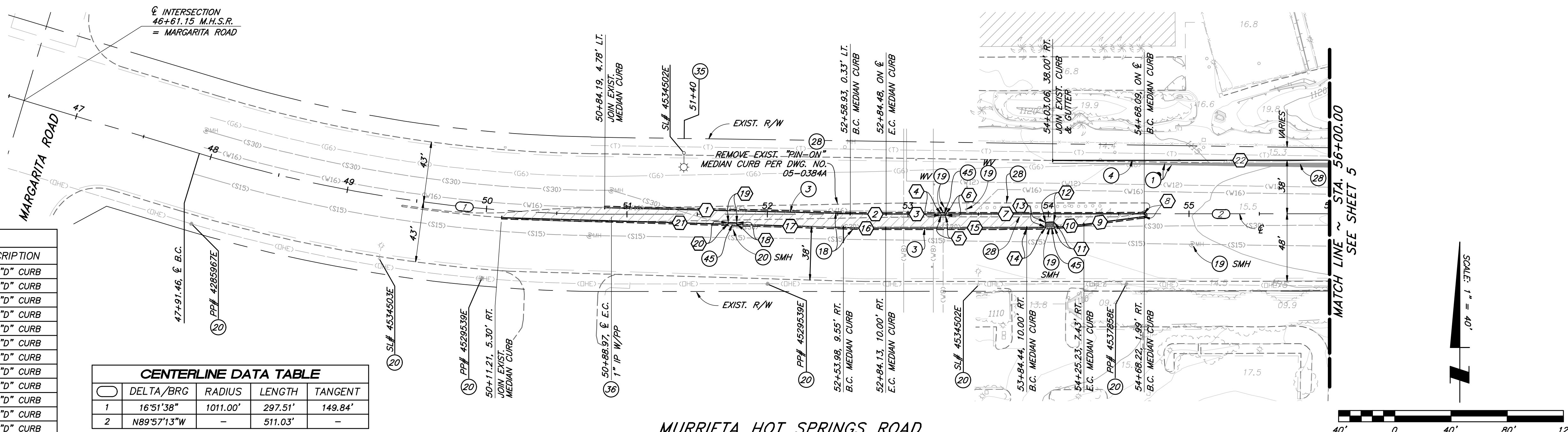
68282.10
90% SUBMITTAL



PROFILE SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'

CONSTRUCTION NOTES

○	DESCRIPTION
1	CONSTRUCT 5" A.C. PAVEMENT OVER 14.5" CLASS II BASE (PRELIM, R=26).
3	CONSTRUCT TYPE "D" CURB CASE A PER C.O.M. STD. NO. 305.
4	CONSTRUCT TYPE "A-6" CURB AND GUTTER PER C.O.M. STD. NO. 301 AND 306.
18	SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.
19	ADJUST TO GRADE (ITEM AS INDICATED).
20	PROTECT IN PLACE (ITEM AS INDICATED).
28	REMOVE EXISTING CURB AND GUTTER OR CURB ONLY.
35	LED STREET LIGHT PER SEPARATE PLAN.
36	TIE OUT EXISTING MONUMENT PRIOR TO CONSTRUCTION AND INSTALL NEW STREET CENTERLINE MONUMENT PER C.O.M. STD. NO. 617b.
45	CONSTRUCT DIAMOND PLATE CURB COVER PER C.O.M. STD. NO. 602.



CURB DATA TABLE

⬡	DELTA/BRG	RADIUS	LENGTH	TANGENT	DESCRIPTION
1	N88°34'55"W	–	174.78'	–	TYPE "D" CURB
2	01°27'52"	1000.00'	25.56'	12.78'	TYPE "D" CURB
3	N89°57'13"E	–	39.14'	–	TYPE "D" CURB
4	N00°02'47"W	–	1.03'	–	TYPE "D" CURB
5	N89°57'13"E	–	3.00'	–	TYPE "D" CURB
6	N00°02'47"W	–	1.03'	–	TYPE "D" CURB
7	N89°57'13"W	–	141.47'	–	TYPE "D" CURB
8	172°47'25"	1.00'	3.02'	15.87'	TYPE "D" CURB
9	N82°44'38"E	–	43.33'	–	TYPE "D" CURB
10	03°45'23"	325.00'	21.31'	10.66'	TYPE "D" CURB
11	N03°29'59"W	–	3.74'	–	TYPE "D" CURB
12	01°03'31"	321.26'	5.94'	2.97'	TYPE "D" CURB
13	N02°26'27"W	–	3.74'	–	TYPE "D" CURB
14	02°23'41"	325.00'	13.58'	6.79'	TYPE "D" CURB
15	N89°57'13"E	–	100.31'	–	TYPE "D" CURB
16	01°42'37"	1010.00'	30.15'	15.08'	TYPE "D" CURB
17	N88°20'09"W	–	75.97'	–	TYPE "D" CURB
18	N01°44'54"E	–	1.19'	–	TYPE "D" CURB
19	N88°20'09"W	–	6.00'	–	TYPE "D" CURB
20	N01°39'51"E	–	1.19'	–	TYPE "D" CURB
21	N88°20'09"W	–	161.24'	–	TYPE "D" CURB
22	N89°57'13"E	–	196.94'	–	TYPE "A-6" CURB

CENTERLINE DATA TABLE

⬭	DELTA/BRG	RADIUS	LENGTH	TANGENT
1	16°51'38"	1011.00'	297.51'	149.84'
2	N89°57'13"W	–	511.03'	–

SCALE: 1" = 40'

40' 0 40' 80' 120'

811 Know what's below. Call before you dig.

"AS BUILT"

The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.

Engineer of work ______ Date ______

RCE ______ EXP. ______

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE

JEFFREY J. HITCH ______ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
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SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 4 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
MARGARITA ROAD TO STA. 56+00.00

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-SI (PP).DWG 6/3/2020 9:14:49 AM PLOTTED BY:ROBERT FOTO

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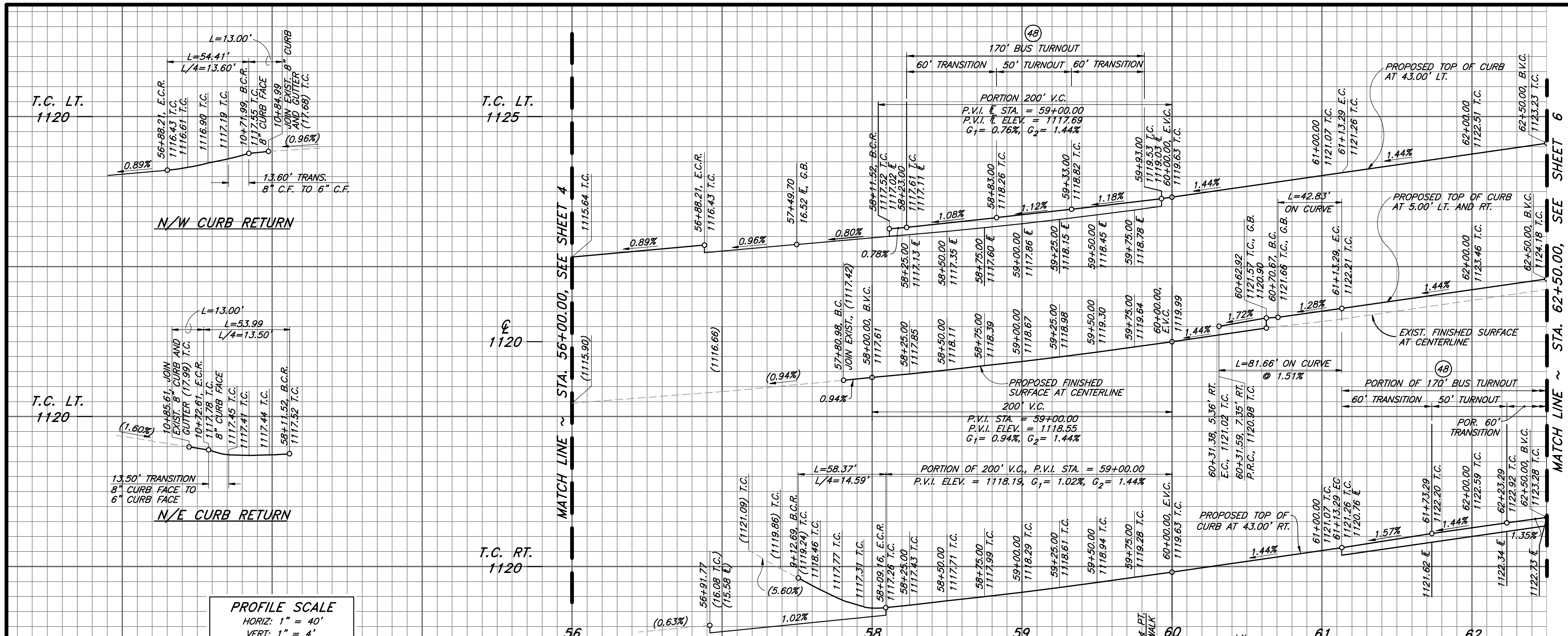
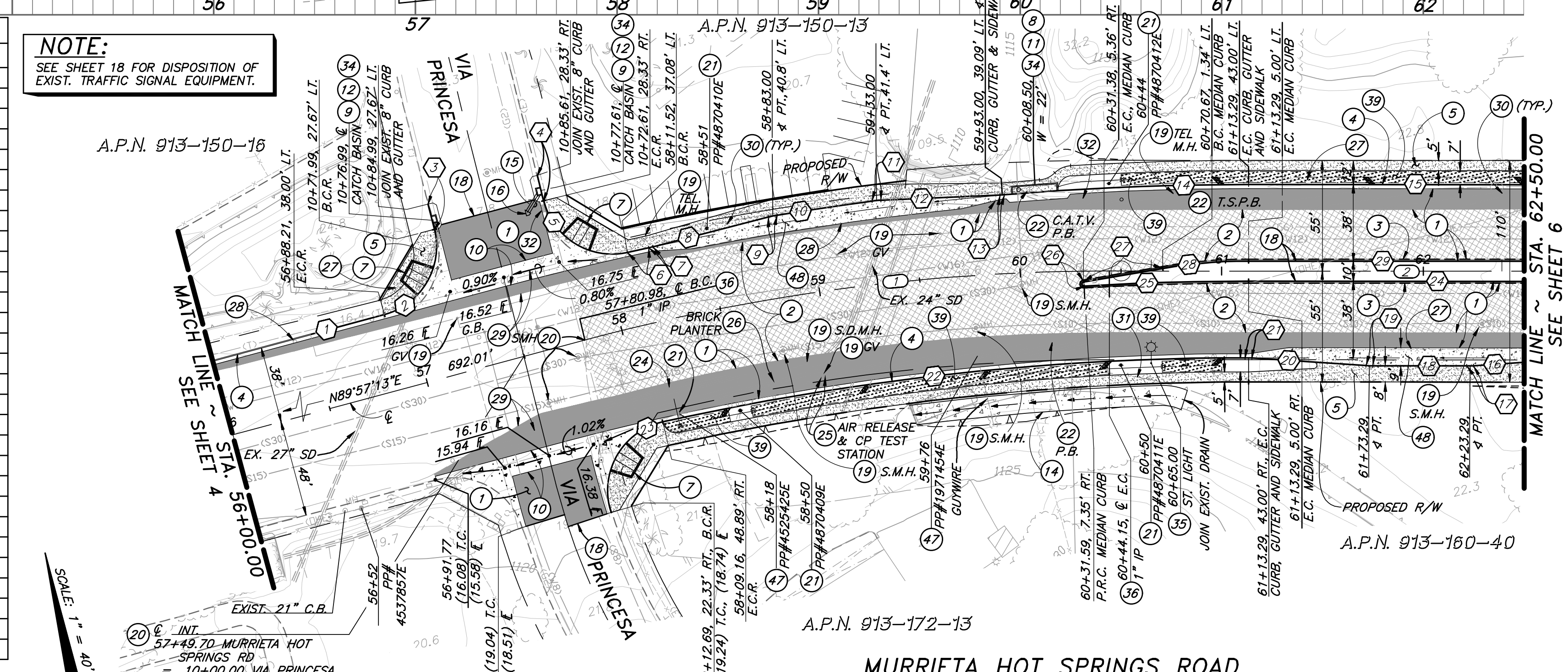
90% SUBMITTAL



CURB DATA TABLE

⬡	DELTA/BRG	RADIUS	LENGTH	TANGENT	DESCRIPTION
1	N89°57'13"E	–	88.21'	–	TYPE "A-6" CURB
2	89°04'06"	35.00'	54.41'	34.44'	TYPE "A-6" CURB
3	N00°53'07"E	–	13.00'	–	TYPE "A-8" CURB
4	N74°13'43"E	–	13.00'	–	TYPE "A-8" CURB
5	88°23'16"	35.00'	53.99'	34.03'	TYPE "A-6" CURB
6	00°43'86	1420.17'	10.87'	5.44'	TYPE "A-6" CURB
7	02°37'54"	1420.17'	2.07'	1.04'	TYPE "A-6" CURB
8	N89°26'21"W	–	59.22'	–	TYPE "A-8" CURB
9	05°01'63"	50.00'	4.38'	2.19'	TYPE "A-6" CURB
10	01°91'71"	1424.17'	47.65'	23.83'	TYPE "A-6" CURB
11	05°01'66"	50.00'	4.38'	2.19'	TYPE "A-6" CURB
12	N77°58'16"W	–	59.22'	–	TYPE "A-6" CURB
13	02°37'60"	50.00'	2.07'	1.04'	TYPE "A-6" CURB
14	04°89'75"	1420.17'	121.39'	60.73'	TYPE "A-6" CURB
15	N74°58'04"W	–	136.69'	–	TYPE "A-6" CURB
16	N78°46'54"W	–	25.14'	–	TYPE "A-6" CURB
17	03°48'51"	50.00'	3.33'	1.67'	TYPE "A-6" CURB
18	N74°58'04"W	–	46.67'	–	TYPE "A-6" CURB
19	03°48'51"	50.00'	3.33'	1.67'	TYPE "A-6" CURB
20	N71°09'12"W	–	56.78'	–	TYPE "A-6" CURB
21	03°53'16"	50.00'	3.39'	1.70'	TYPE "A-6" CURB
22	12°30'23"	1334.17'	291.22'	146.19'	TYPE "A-6" CURB
23	95°33'33"	35.00'	58.37'	38.57'	TYPE "A-6" CURB
24	N74°58'04"W	–	136.71'	–	TYPE "D" CURB
25	03°24'35"	1372.17'	81.66'	40.84'	TYPE "D" CURB
26	173°35'37"	1.00'	3.03'	17.87'	TYPE "D" CURB
27	N84°47'01"W	–	39.80'	–	TYPE "D" CURB
28	09°48'58"	250.00'	42.83'	21.47'	TYPE "D" CURB
29	N74°58'04"W	–	136.71'	–	TYPE "D" CURB

NOTE:
SEE SHEET 18 FOR DISPOSITION OF EXIST. TRAFFIC SIGNAL EQUIPMENT.



CONSTRUCTION NOTES

○ DESCRIPTION

1 CONSTRUCT 5" A.C. PAVEMENT OVER 14.5" CLASS II BASE (PRELIM, R=26).
2 GRIND EXISTING A.C. PAVEMENT 0.10' (MIN.) AND CONSTRUCT VARIABLE THICKNESS A.C. PAVEMENT OVERLAY.
3 CONSTRUCT TYPE "D" CURB CASE A PER C.O.M. STD. NO. 305.
4 CONSTRUCT TYPE "A-6" CURB AND GUTTER PER C.O.M. STD. NO. 301 AND 306.
5 CONSTRUCT P.C.C. SIDEWALK PER C.O.M. STD. NO. 320 WITH THICKENED EDGE ADJACENT TO BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17 (AS OCCURS).
7 CONSTRUCT P.C.C. ACCESS RAMP PER C.O.M. STD. NO. 321a AND 321b.
8 CONSTRUCT GUTTER DEPRESSION FOR CURB OPENING CATCH BASIN PER C.O.M. STD. NO. 425A, CASE "B" AND DETAILS ON SHEET 2.
9 CONSTRUCT GUTTER DEPRESSION FOR GRATE OPENING CATCH BASIN PER C.O.M. STD. NO. 424, CASE "A" AND DETAILS ON SHEET 2.
10 CONSTRUCT CROSS GUTTER AND SPANDREL PER C.O.M. STD. NO. 311 AND 312.
11 CONSTRUCT CURB INLET CATCH BASIN PER C.O.M. STD. NO. 401 AND 402, W PER PLAN.
12 CONSTRUCT COMBINATION INLET CATCH BASIN NO. 2 PER C.O.M. STD. NO. 404 AND 405, W PER PLAN.
14 CONSTRUCT 10' WIDE CONCRETE OVERFLOW DRAIN TO MATCH EXISTING, SEE DETAIL ON SHEET 12.
15 INSTALL 24" R.C.P. (2000-D).
16 CONSTRUCT CONCRETE COLLAR PER C.O.M. STD. NO. 451.
18 SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.
19 ADJUST TO GRADE (ITEM AS INDICATED).
20 PROTECT IN PLACE (ITEM AS INDICATED).
21 INSTALL POWER POLE (BY OTHERS).
22 RELOCATE DRY UTILITY (BY OTHERS, ITEM AS INDICATED).
24 RELOCATE FIRE HYDRANT (BY OTHERS).
25 RELOCATE EXISTING AIR RELEASE/BLOW-OFF VALVE/CP TEST STATION (BY OTHERS).
26 REMOVE/DISPOSE OF (ITEM AS INDICATED).
27 RELOCATE/RECONSTRUCT FENCE AND/OR GATE, IN-KIND.
28 REMOVE EXISTING CURB AND GUTTER OR CURB ONLY.
29 REMOVE EXISTING CROSS GUTTER AND SPANDREL.
30 REMOVE EXISTING TREE.
31 REMOVE EXISTING CONCRETE.
32 REMOVE EXISTING CATCH BASIN AND REMOVE CONFLICTING PORTION OF EXISTING PIPE.
34 INSTALL BIO-CLEAN FULL CAPTURE INLET FILTER MODEL 36-36-24 WITH TROUGH SYSTEM IN CURB OPENING AND GRATED INLET CATCH BASIN.
35 LED STREET LIGHT PER SEPARATE PLAN.
36 TIE OUT EXISTING MONUMENT PRIOR TO CONSTRUCTION AND INSTALL NEW STREET CENTERLINE MONUMENT PER C.O.M. STD. NO. 617b.
39 CONSTRUCT BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17.
47 REMOVE POWER POLE (BY OTHERS).
48 INSTALL BUS TURNOUT PER C.O.M. STD. NO. 217 (MODIFIED WIDTH).

CENTERLINE DATA TABLE

⬭	DELTA/BRG	RADIUS	LENGTH	TANGENT
1	15°04'43"	1000.00'	263.17'	132.35'
2	N74°58'04"W	–	205.85'	–

40' 0 40' 80' 120'

Know what's **below.** **Call** before you dig.

"AS BUILT"

The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.

Engineer of work ______ Date ______

RCE ______ EXP. ______

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET - JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE

JEFFREY J. HITCH ______ DATE

CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER
DANIEL J. O'ROURKE
No. 47677
CIVIL
STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-6900
951-695-6901 Fax

PREPARED BY DATE

DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 5 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
STA. 56+00.00 TO 62+50.00

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-SI (PP).DWG 6/3/2020 9:14:56 AM PLOTTED BY:ROBERT FOTO

68282.10
90% SUBMITTAL

CONSTRUCTION NOTES

○ DESCRIPTION

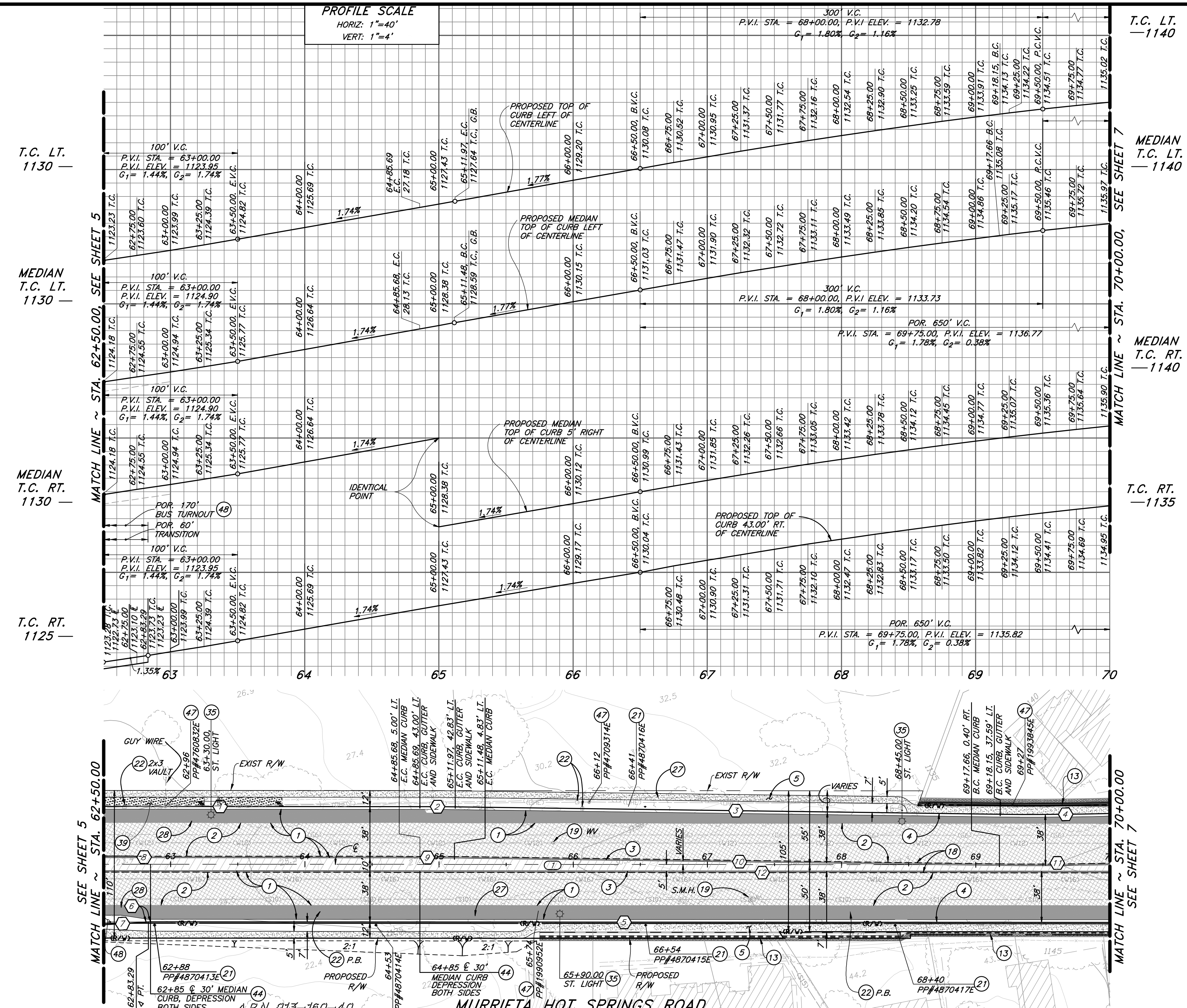
1 CONSTRUCT 5" A.C. PAVEMENT OVER 14.5" CLASS II BASE (PRELIM, R=26).
2 GRIND EXISTING A.C. PAVEMENT 0.10' (MIN.) AND CONSTRUCT VARIABLE THICKNESS A.C. PAVEMENT OVERLAY.
3 CONSTRUCT TYPE "D" CURB CASE A PER C.O.M. STD. NO. 305.
4 CONSTRUCT TYPE "A-6" CURB AND GUTTER PER C.O.M. STD. NO. 301 AND 306.
5 CONSTRUCT P.C.C. SIDEWALK PER C.O.M. STD. NO. 320 WITH THICKENED EDGE ADJACENT TO BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17 (AS OCCURS).
13 CONSTRUCT RETAINING WALL PER DETAILS ON SHEETS 14,15 & 31-39.
17 CONSTRUCT PCC ACCESS RAMP PER DETAIL ON SHEET 2.
18 SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.
19 ADJUST TO GRADE (ITEM AS INDICATED).
21 INSTALL POWER POLE (BY OTHERS).
22 RELOCATE DRY UTILITY (BY OTHERS, ITEM AS INDICATED).
27 RELOCATE/RECONSTRUCT FENCE AND/OR GATE, IN-KIND.
28 REMOVE EXISTING CURB AND GUTTER OR CURB ONLY.
35 LED STREET LIGHT PER SEPARATE PLAN.
39 CONSTRUCT BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17.
44 CONSTRUCT 4" MEDIAN CURB DEPRESSION PER DETAIL ON SHEET 2.
47 REMOVE POWER POLE (BY OTHERS).
48 INSTALL BUS TURNOUT PER C.O.M. STD. NO. 217 (MODIFIED WIDTH).

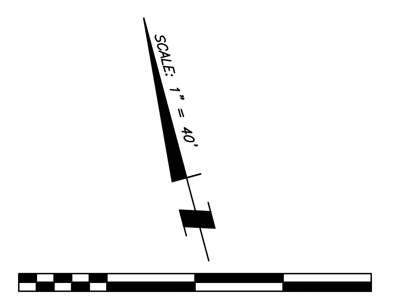
CURB DATA TABLE

⬡	DELTA/BRG	RADIUS	LENGTH	TANGENT	DESCRIPTION
1	N74°58'04"W	–	235.71'	–	TYPE "A-6" CURB
2	0°44'20"	2038.00'	26.28'	13.14'	TYPE "A-6" CURB
3	N74°13'43"W	–	406.22'	–	TYPE "A-6" CURB
4	02°23'26"	1962.00'	81.86'	40.93'	TYPE "A-6" CURB
5	N74°58'04"W	–	715.05'	–	TYPE "A-6" CURB
6	03°48'51"	50.00'	3.33'	1.67'	TYPE "A-6" CURB
7	N78°46'54"W	–	31.67'	–	TYPE "A-6" CURB
8	N74°58'04"W	–	235.68'	–	TYPE "D" CURB
9	00°44'20"	2000.00'	25.79'	12.90'	TYPE "D" CURB
10	N74°13'43"W	–	406.22'	–	TYPE "D" CURB
11	02°21'33"	2000.00'	82.35'	41.18'	TYPE "D" CURB
12	N74°58'04"W	–	750.00'	–	TYPE "D" CURB

CENTERLINE DATA TABLE

⬭	DELTA/BRG	RADIUS	LENGTH	TANGENT
1	N74°58'04"W	–	750.00'	–





Know what's below. Call before you dig.

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

"AS BUILT"
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Engineer of work ______ Date ______
RCE ______ EXP. ______

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ______ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER, DANIEL J. O'ROURKE, No. 47677, CIVIL, STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-6900
951-695-6901 Fax

PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 6 — SHEETS 39

CITY OF MURRIETA
ENGINEERING DEPARTMENT

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
STA. 62+50.00 TO 70+00.00

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

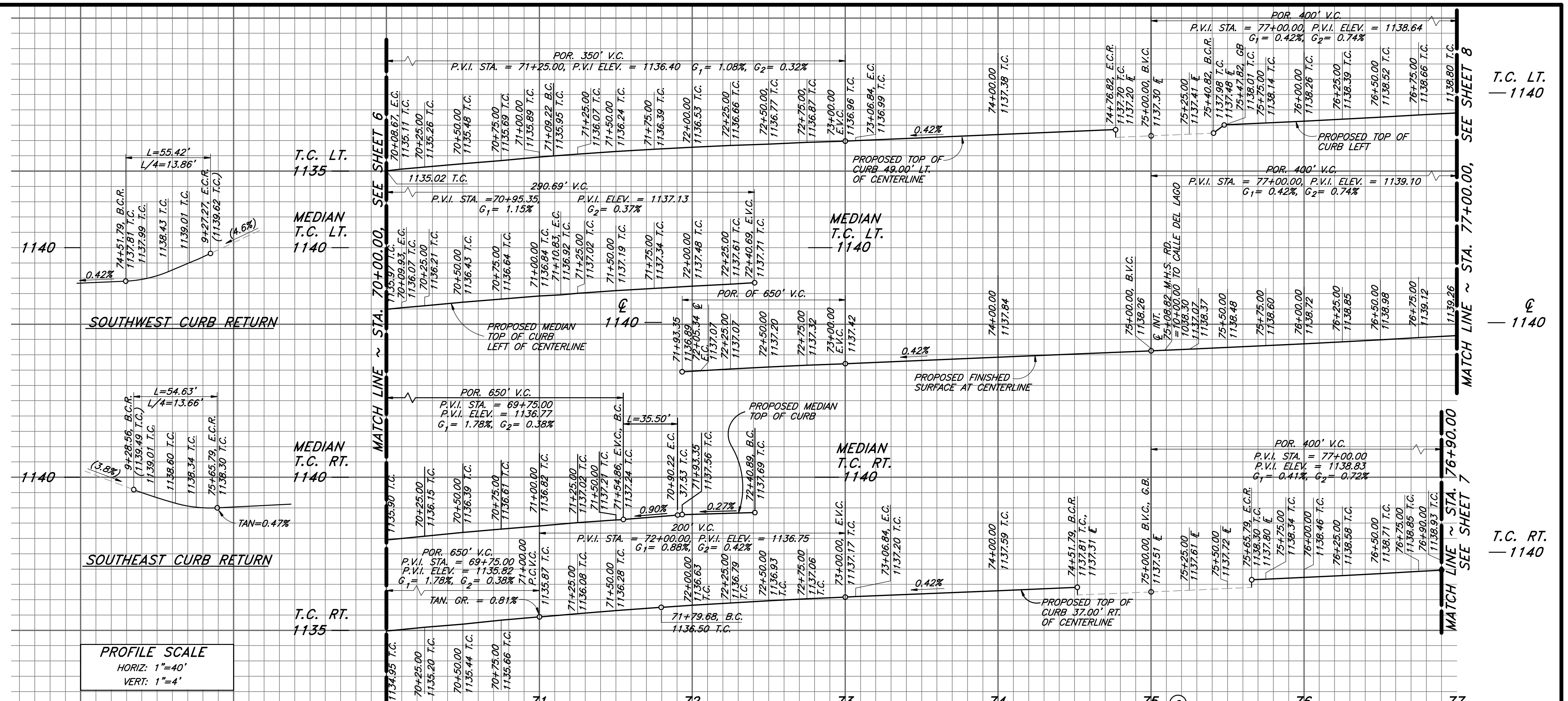
DWN BY: RLF
CHKD BY: DJO
FIELD BK:
CIP NO. 8079
PROJECT NO. 09-XXX
DRAWING NO.

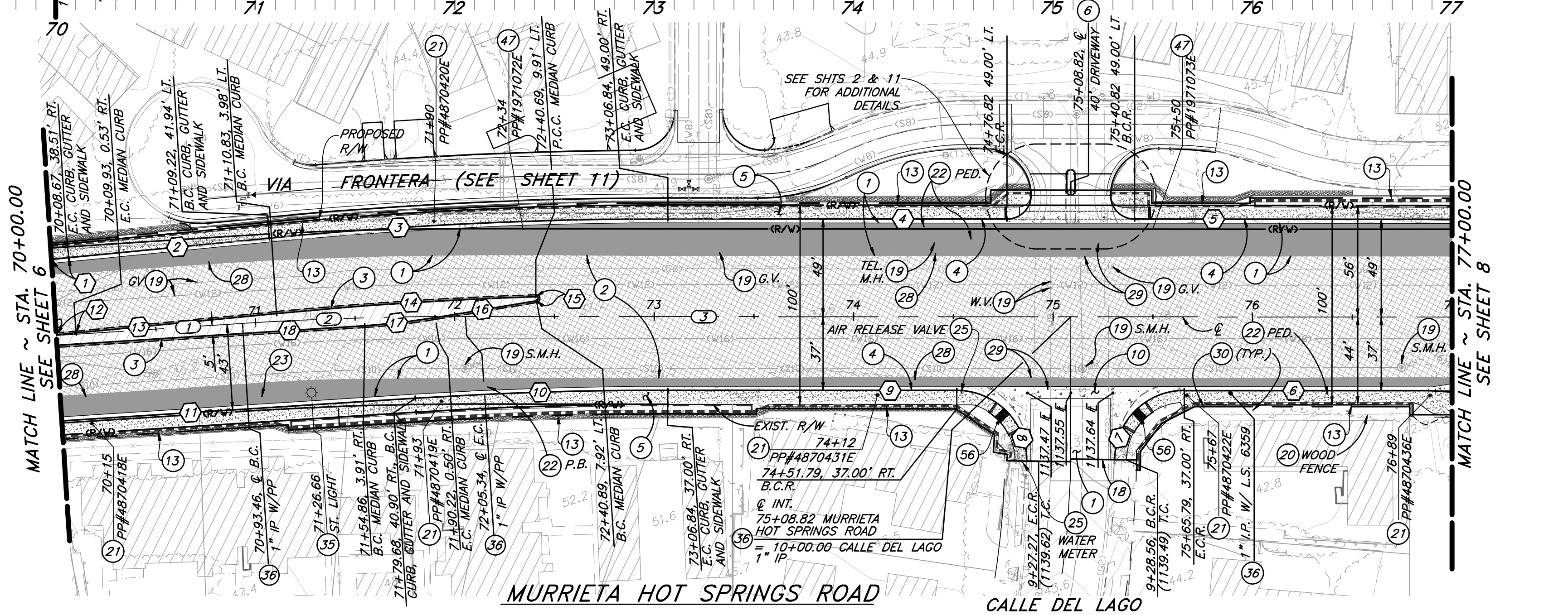
68282.10
90% SUBMITTAL

I:\68282 DATE ST & MHSRD\DWG\C-68282-SI (PP).DWG 6/3/2020 9:15:02 AM PLOTTED BY:ROBERT FOTO

CONSTRUCTION NOTES

○	DESCRIPTION
1	CONSTRUCT 5" A.C. PAVEMENT OVER 14.5" CLASS II BASE (PRELIM, R=26).
2	GRIND EXISTING A.C. PAVEMENT 0.10' (MIN.) AND CONSTRUCT VARIABLE THICKNESS A.C. PAVEMENT OVERLAY.
3	CONSTRUCT TYPE "D" CURB CASE A PER C.O.M. STD. NO. 305.
4	CONSTRUCT TYPE "A-6" CURB AND GUTTER PER C.O.M. STD. NO. 301 AND 306.
5	CONSTRUCT P.C.C. SIDEWALK PER C.O.M. STD. NO. 320 WITH THICKENED EDGE ADJACENT TO BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17 (AS OCCURS).
6	CONSTRUCT P.C.C. DRIVEWAY APPROACH (W=PER PLAN) PER C.O.M. STD. NO. 310a. (MODIFIED, SEE DETAIL ON SHEET 2).
10	CONSTRUCT CROSS GUTTER AND SPANDREL PER C.O.M. STD. NO. 311 AND 312.
13	CONSTRUCT RETAINING WALL PER DETAILS ON SHEETS 14,15 & 31-39.
17	CONSTRUCT PCC ACCESS RAMP PER DETAIL ON SHEET 2.
18	SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.
19	ADJUST TO GRADE (ITEM AS INDICATED).
20	PROTECT IN PLACE (ITEM AS INDICATED).
21	INSTALL POWER POLE (BY OTHERS).
22	RELOCATE DRY UTILITY (BY OTHERS, ITEM AS INDICATED).
23	RELOCATE WATER METER (BY OTHERS).
28	REMOVE EXISTING CURB AND GUTTER OR CURB ONLY.
29	REMOVE EXISTING CROSS GUTTER AND SPANDREL.
30	REMOVE EXISTING TREE.
35	LED STREET LIGHT PER SEPARATE PLAN.
36	TIE OUT EXISTING MONUMENT PRIOR TO CONSTRUCTION AND INSTALL NEW STREET CENTERLINE MONUMENT PER C.O.M. STD. NO. 617b.
47	REMOVE POWER POLE (BY OTHERS).
56	CONSTRUCT PCC ACCESS RAMP PER SPPWC 111-5, CASE B, TYPE 1.





CURB DATA TABLE

⬡	DELTA/BRG	RADIUS	LENGTH	TANGENT	DESCRIPTION
1	00°15'11"	1962.00'	8.67'	4.33'	TYPE "A-6" CURB
2	N76°52'20"W	–	100.99'	–	TYPE "A-6" CURB
3	05°36'25"	2046.00'	200.22'	100.19'	TYPE "A-6" CURB
4	N71°15'56"W	–	169.98'	–	TYPE "A-6" CURB
5	N71°15'56"W	–	159.18'	–	TYPE "A-6" CURB
6	N71°15'56"W	–	134.21'	–	TYPE "A-6" CURB
7	89°26'06"	35.00'	54.63'	34.66'	TYPE "A-6" CURB
8	90°43'44"	35.00'	55.42'	35.45'	TYPE "A-6" CURB
9	N71°15'56"W	–	144.94'	–	TYPE "A-6" CURB
10	03°42'08"	1960.00'	126.65'	63.34'	TYPE "A-6" CURB
11	N74°58'04"W	–	177.61'	–	TYPE "A-6" CURB
12	00°17'04"	2000.00'	9.93'	4.97'	TYPE "D" CURB
13	N76°52'20"W	–	100.99'	–	TYPE "D" CURB
14	03°43'08"	2008.00'	130.33'	65.19'	TYPE "D" CURB
15	172°22'30"	1.00'	3.01'	15.01'	TYPE "D" CURB
16	N80°46'43"W	–	51.37'	–	TYPE "D" CURB
17	05°48'39"	350.00'	35.50'	17.76'	TYPE "D" CURB
18	N74°58'04"W	–	154.71'	–	TYPE "D" CURB

CENTERLINE DATA TABLE

⬭	DELTA/BRG	RADIUS	LENGTH	TANGENT
1	N74°58'04"W	–	93.46'	–
2	03°42'08"	1731.44'	111.88'	55.96'
3	N71°15'56"W	–	494.66'	–

SCALE: 1" = 40'

40' 0 40' 80' 120'

811 Know what's below. Call before you dig.

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

"AS BUILT"
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Engineer of work ______ Date ______
RCE ______ EXP. ______

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ______ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 7 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
STA. 70+00.00 TO 77+00.00

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:
CIP NO. 8079
PROJECT NO. 09-XXX
DRAWING NO.

I: \68282 DATE ST & MHSRD\DWG\C-68282-S (PP).DWG 6/3/2020 9:15:08 AM PLOTTED BY:ROBERT FOTO

68282.10
90% SUBMITTAL

CONSTRUCTION NOTES

○ DESCRIPTION

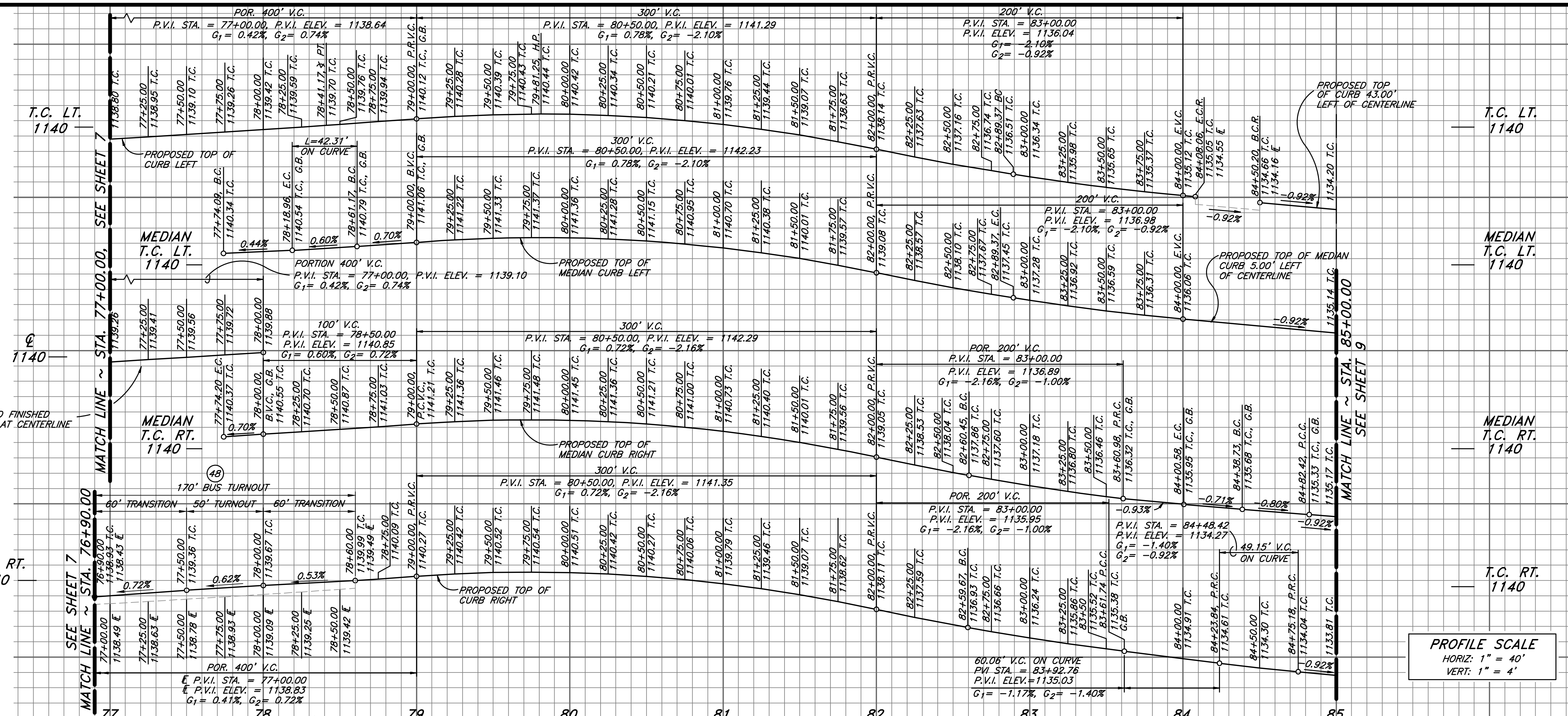
1 CONSTRUCT 5" A.C. PAVEMENT OVER 14.5" CLASS II BASE (PRELIM, R=26).
2 GRIND EXISTING A.C. PAVEMENT 0.10' (MIN.) AND CONSTRUCT VARIABLE THICKNESS A.C. PAVEMENT OVERLAY.
3 CONSTRUCT TYPE "D" CURB CASE A PER C.O.M. STD. NO. 305.
4 CONSTRUCT TYPE "A-6" CURB AND GUTTER PER C.O.M. STD. NO. 301 AND 306.
5 CONSTRUCT P.C.C. SIDEWALK PER C.O.M. STD. NO. 320 WITH THICKENED EDGE ADJACENT TO BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17 (AS OCCURS).
6 CONSTRUCT P.C.C. DRIVEWAY APPROACH (W=PER PLAN) PER C.O.M. STD. NO. 310a. (MODIFIED, SEE DETAIL ON SHEET 2).
13 CONSTRUCT RETAINING WALL PER DETAILS ON SHEETS 14,15 & 31-39.
17 CONSTRUCT PCC ACCESS RAMP PER DETAIL ON SHEET 2.
18 SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.
19 ADJUST TO GRADE (ITEM AS INDICATED).
21 INSTALL POWER POLE (BY OTHERS).
22 RELOCATE DRY UTILITY (BY OTHERS, ITEM AS INDICATED).
24 RELOCATE FIRE HYDRANT (BY OTHERS).
25 RELOCATE EXISTING AIR RELEASE/BLOW-OFF VALVE/CP TEST STATION (BY OTHERS).
26 REMOVE/DISPOSE OF (ITEM AS INDICATED).
28 REMOVE EXISTING CURB AND GUTTER OR CURB ONLY.
35 LED STREET LIGHT PER SEPARATE PLAN.
36 TIE OUT EXISTING MONUMENT PRIOR TO CONSTRUCTION AND INSTALL NEW STREET CENTERLINE MONUMENT PER C.O.M. STD. NO. 617b.
42 CONSTRUCT 24" V-DITCH PER DETAIL ON SHEET 2.
44 CONSTRUCT 4" MEDIAN CURB DEPRESSION PER DETAIL ON SHEET 2.
47 REMOVE POWER POLE (BY OTHERS).
48 INSTALL BUS TURNOUT PER C.O.M. STD. NO. 217 (MODIFIED WIDTH).

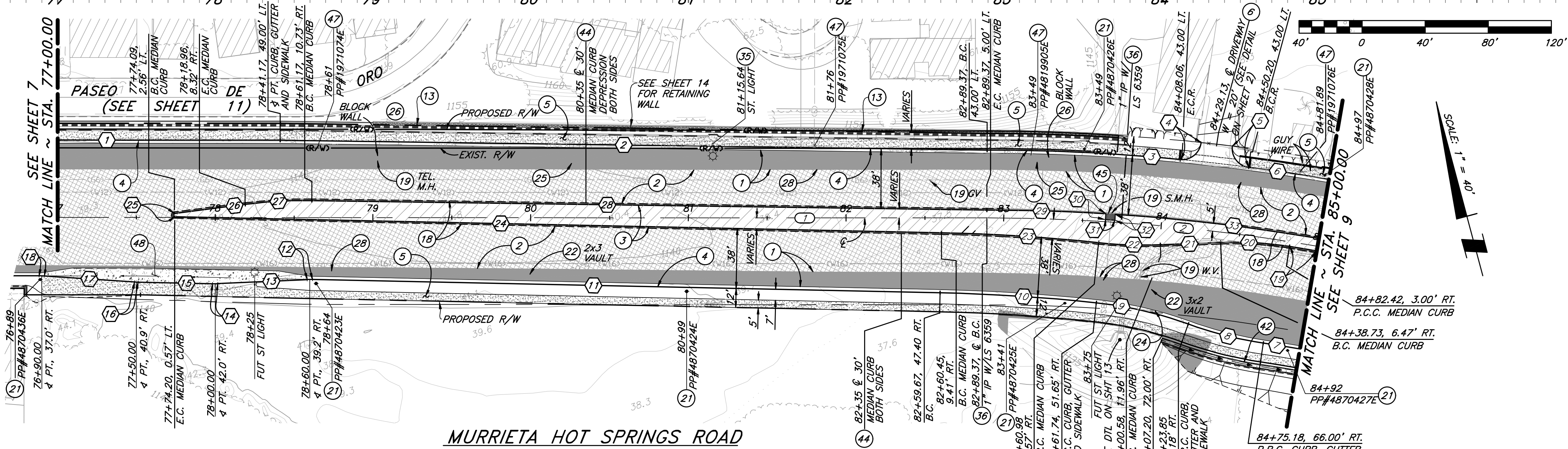
CURB DATA TABLE

⬡	DELTA/BRG	RADIUS	LENGTH	TANGENT	DESCRIPTION
1	N71°15'56"W	–	141.17'	–	TYPE "A-6" CURB
2	N70°29'55"W	–	448.24'	–	TYPE "A-6" CURB
3	05°28'27"	1285.32'	122.80'	61.45'	TYPE "A-6" CURB
4	89°28'12"	12.00'	18.74'	11.89'	TYPE "A-6" CURB
5	89°28'12"	12.00'	18.74'	11.89'	TYPE "A-6" CURB
6	02°18'50"	1285.32'	49.80'	30.64'	TYPE "A-6" CURB
7	01°08'42"	1176.32'	23.51'	11.75'	TYPE "A-6" CURB
8	11°15'50"	250.00'	49.15'	24.65'	TYPE "A-6" CURB
9	13°45'53"	250.00'	60.06'	30.18'	TYPE "A-6" CURB
10	04°53'36"	1162.00'	99.24'	49.65'	TYPE "A-6" CURB
11	N70°05'25"W	–	398.10'	–	TYPE "A-6" CURB
12	03°49'07"	50.00'	3.33'	1.67'	TYPE "A-6" CURB
13	N73°54'31"W	–	56.73'	–	TYPE "A-6" CURB
14	03°49'07"	50.00'	3.33'	1.67'	TYPE "A-6" CURB
15	N70°05'25"W	–	47.22'	–	TYPE "A-6" CURB
16	02°35'07"	50.00'	2.26'	1.13'	TYPE "A-6" CURB
17	N67°30'18"W	–	57.36'	–	TYPE "A-6" CURB
18	03°45'38"	50.00'	3.28'	1.64'	TYPE "A-6 CURB
19	00°48'39"	1239.32'	17.54'	8.77'	TYPE "D" CURB
20	11°08'06"	225.00'	43.73'	21.93'	TYPE "D" CURB
21	N73°29'49"W	–	38.26'	–	TYPE "D" CURB
22	08°10'41"	275.00'	39.25'	19.66'	TYPE "D" CURB
23	04°46'17"	1200.00'	99.93'	49.99'	TYPE "D" CURB
24	N70°05'25"W	–	486.36'	–	TYPE "D" CURB
25	171°30'41"	1.00'	2.99'	13.47'	TYPE "D" CURB
26	N78°34'43"W	–	45.24'	–	TYPE "D" CURB
27	08°04'49"	300.00'	42.31'	21.19'	TYPE "D" CURB
28	N70°29'55"W	–	428.24'	–	TYPE "D" CURB
29	03°27'48"	1247.32'	75.40'	37.71'	TYPE "D" CURB
30	N22°11'53"E	–	3.74'	–	TYPE "D" CURB
31	00°16'28"	1242.58'	5.96'	2.98	TYPE "D" CURB
32	N22°28'21"E	–	3.74'	–	TYPE "D" CURB
33	05°59'58"	1247.32'	130.61'	65.36'	TYPE "D" CURB

CENTERLINE DATA TABLE

⬭	DELTA/BRG	RADIUS	LENGTH	TANGENT
1	N71°15'56"W	–	589.37'	–
2	09°42'52"	1242.32	210.63'	105.57'





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Engineer of work ______ Date ______
RCE ______ EXP. ______

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ______ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER, DANIEL J. O'ROURKE, No. 47677, CIVIL, STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 8 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN MURRIETA HOT SPRINGS ROAD
STA. 77+00.00 TO 85+00.00

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK: ______

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

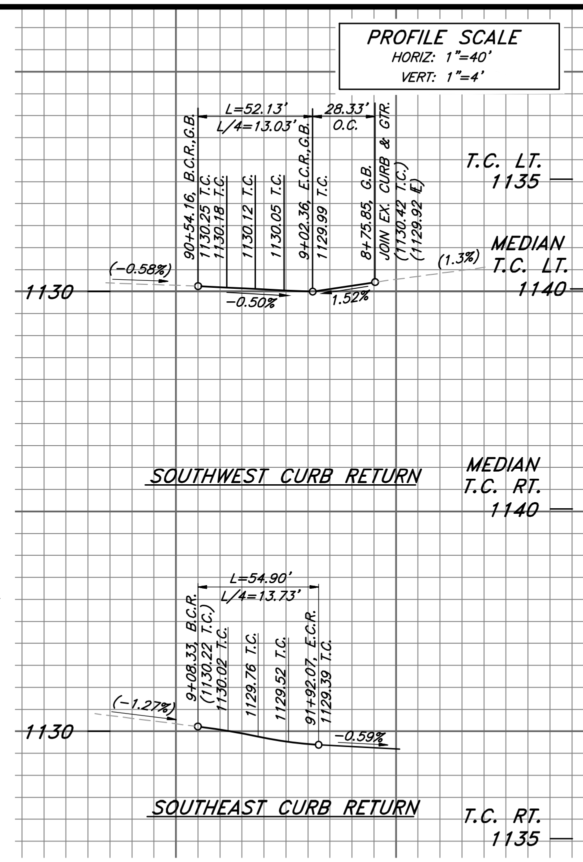
I:\68282 DATE ST & MHSRD\DWG\C-68282-SI (PP).DWG 6/3/2020 9:15:14 AM PLOTTED BY:ROBERT FOTO

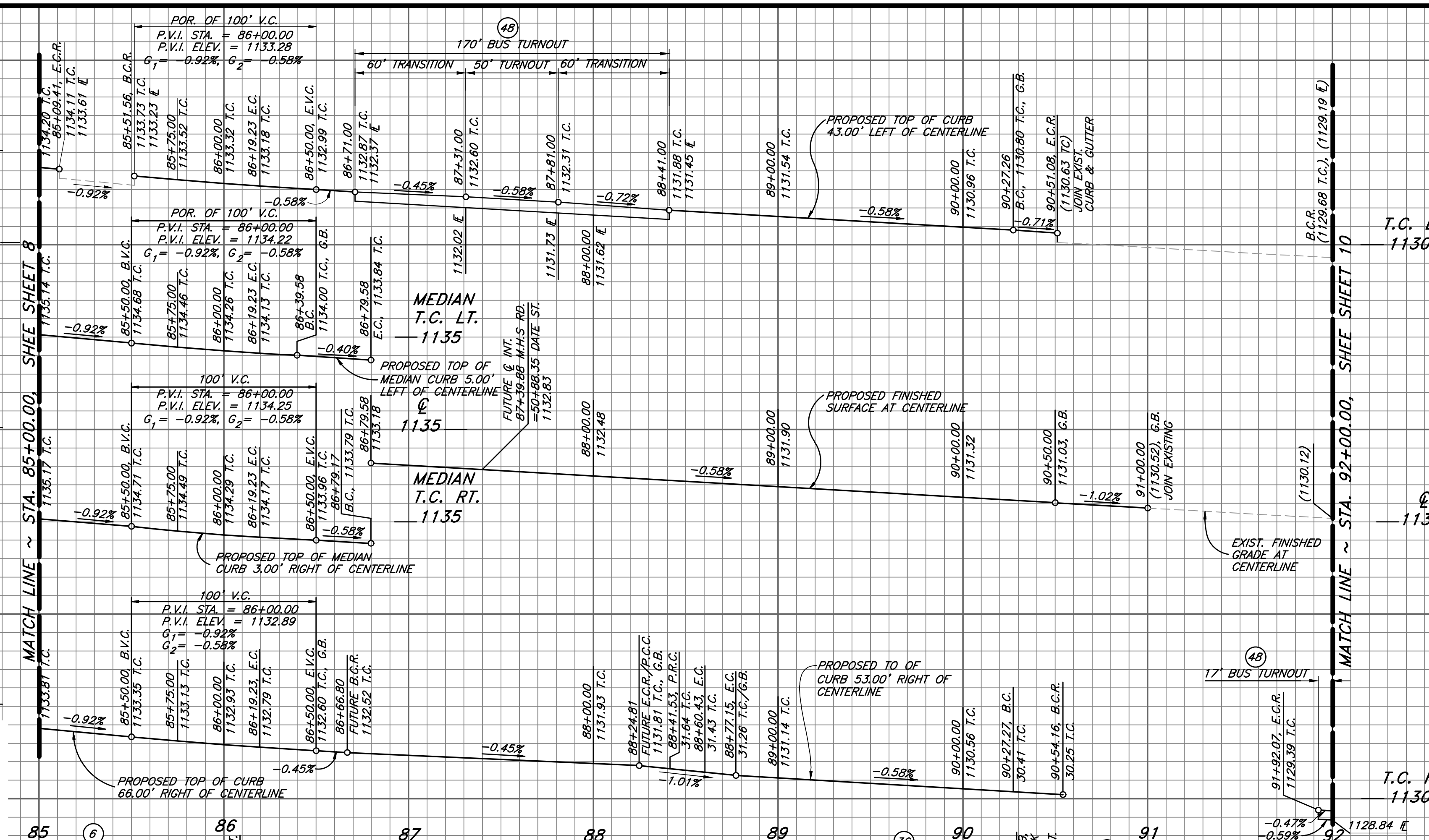
68282.10
90% SUBMITTAL

CONSTRUCTION NOTES

○ DESCRIPTION

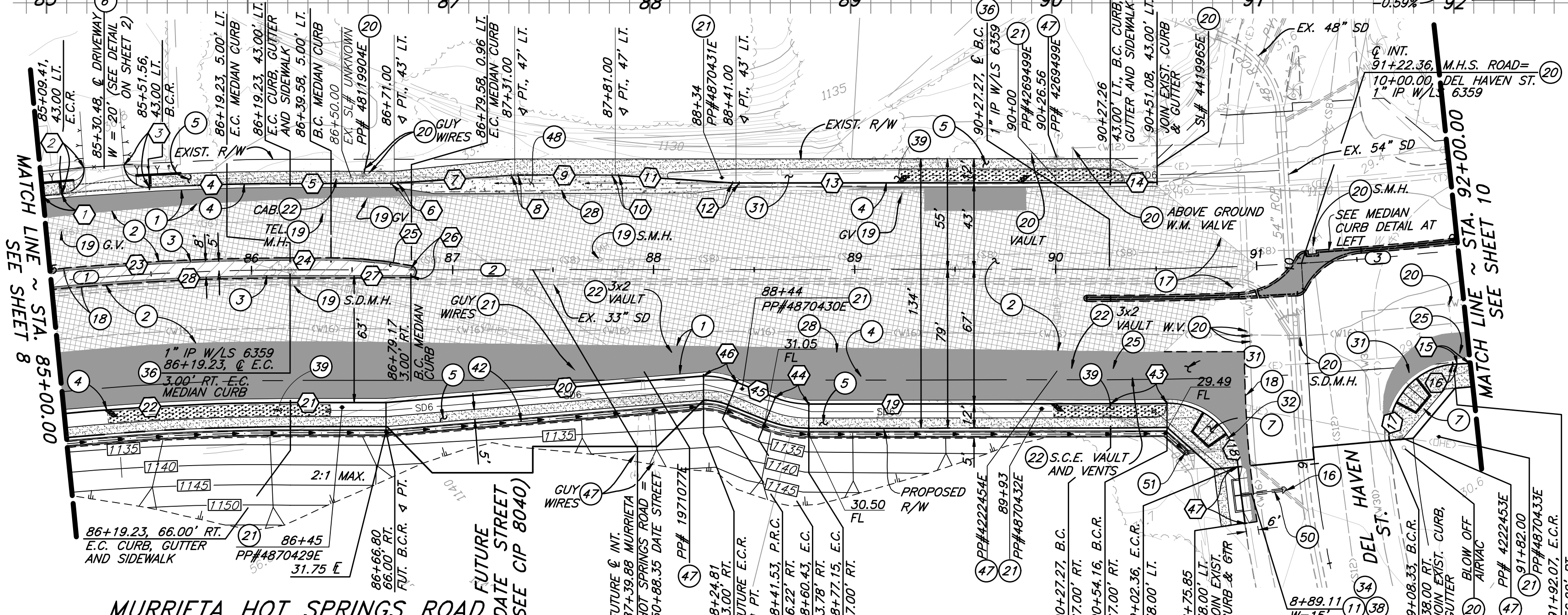
1 CONSTRUCT 5" A.C. PAVEMENT OVER 14.5" CLASS II BASE (PRELIM, R=26).
2 GRIND EXISTING A.C. PAVEMENT 0.10' (MIN.) AND CONSTRUCT VARIABLE THICKNESS A.C. PAVEMENT OVERLAY.
3 CONSTRUCT TYPE "D" CURB CASE A PER C.O.M. STD. NO. 305.
4 CONSTRUCT TYPE "A-6" CURB AND GUTTER PER C.O.M. STD. NO. 301 AND 306.
5 CONSTRUCT P.C.C. SIDEWALK PER C.O.M. STD. NO. 320 WITH THICKENED EDGE ADJACENT TO BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17 (AS OCCURS).
6 CONSTRUCT P.C.C. DRIVEWAY APPROACH (W=PER PLAN) PER C.O.M. STD. NO. 310a. (MODIFIED, SEE DETAIL ON SHEET 2).
7 CONSTRUCT P.C.C. ACCESS RAMP PER C.O.M. STD. NO. 321a AND 321b.
11 CONSTRUCT CURB INLET CATCH BASIN PER C.O.M. STD. NO. 401 AND 402, W PER PLAN.
16 CONSTRUCT CONCRETE COLLAR PER C.O.M. STD. NO. 451.
17 CONSTRUCT PCC ACCESS RAMP PER DETAIL ON SHEET 2.
18 SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.
19 ADJUST TO GRADE (ITEM AS INDICATED).
20 PROTECT IN PLACE (ITEM AS INDICATED).
21 INSTALL POWER POLE (BY OTHERS).
22 RELOCATE DRY UTILITY (BY OTHERS, ITEM AS INDICATED).
25 RELOCATE EXISTING AIR RELEASE/BLOW-OFF VALVE/CP TEST STATION (BY OTHERS).
28 REMOVE EXISTING CURB AND GUTTER OR CURB ONLY.
31 REMOVE EXISTING CONCRETE.
32 REMOVE EXISTING CATCH BASIN AND REMOVE CONFLICTING PORTION OF EXISTING PIPE.
34 INSTALL BIO-CLEAN FULL CAPTURE INLET FILTER MODEL 36-36-24 WITH TROUGH SYSTEM IN CURB OPENING AND GRATED INLET CATCH BASIN.
36 TIE OUT EXISTING MONUMENT PRIOR TO CONSTRUCTION AND INSTALL NEW STREET CENTERLINE MONUMENT PER C.O.M. STD. NO. 617b.
38 CONSTRUCT GUTTER DEPRESSION FOR CURB OPENING CATCH BASIN PER C.O.M. STD. NO. 425A, CASE "C" AND DETAILS ON SHEET 2.
39 CONSTRUCT BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17.
42 CONSTRUCT 24" V-DITCH PER DETAIL ON SHEET 2.
45 CONSTRUCT DIAMOND PLATE CURB COVER PER C.O.M. STD. NO. 602.
46 CONSTRUCT TYPE "D" CURB CASE B PER C.O.M. STD. NO. 305.
47 REMOVE POWER POLE (BY OTHERS).
48 INSTALL BUS TURNOUT PER C.O.M. STD. NO. 217 (MODIFIED WIDTH).
50 INSTALL 18" R.C.P. (2000-D).
51 RELOCATE EXIST. TYPE IX INLET TO ACCEPT DITCH FLOWS.

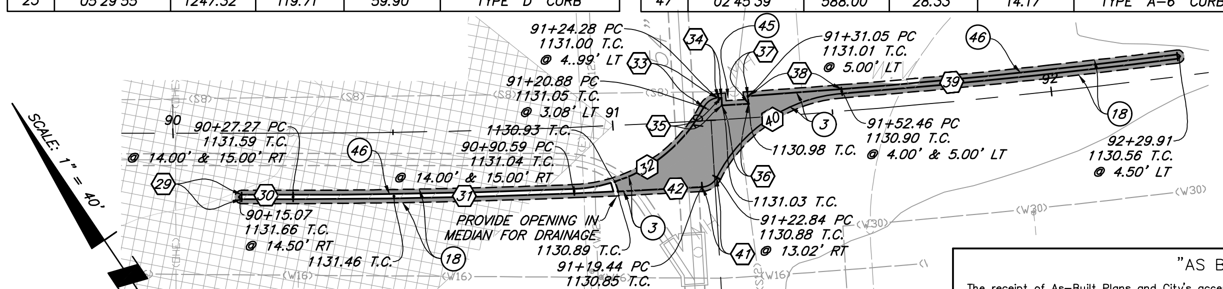




CURB DATA TABLE

⬡	DELTA/BRG	RADIUS	LENGTH	TANGENT	DESCRIPTION
1	00°25'01"	1285.32'	9.41'	30.64'	TYPE "A-6" CURB
2	89°28'12"	12.00'	18.74'	11.89'	TYPE "A-6" CURB
3	89°28'12"	12.00'	18.74'	11.89'	TYPE "A-6" CURB
4	03°07'15"	1285.32'	70.01'	35.01'	TYPE "A-6" CURB
5	N56°03'08"W	–	50.10'	–	TYPE "A-6" CURB
6	03°81'41"	50.00'	3.33'	1.66'	TYPE "A-6" CURB
7	N59°51'59"W	–	56.80'	–	TYPE "A-6" CURB
8	03°81'41"	50.00'	3.33'	1.66'	TYPE "A-6" CURB
9	N56°03'08"W	–	46.67'	–	TYPE "A-6" CURB
10	03°81'41"	50.00'	3.33'	1.66'	TYPE "A-6" CURB
11	N52°14'18"W	–	56.80'	–	TYPE "A-6" CURB
12	03°81'41"	50.00'	3.33'	1.66'	TYPE "A-6" CURB
13	N56°03'08"W	–	184.60'	–	TYPE "A-6" CURB
14	00°51'10"	1557.00'	23.17'	11.59'	TYPE "A-6" CURB
15	N58°45'02"W	–	6.24'	–	TYPE "A-6" CURB
16	02°25'50"	50.00'	2.12'	1.06'	TYPE "A-6" CURB
17	89°52'03"	35.00'	54.90'	34.92'	TYPE "A-6" CURB
18	85°20'39"	35.00'	52.13'	32.27'	TYPE "A-6" CURB
19	N56°03'08"W	–	150.12'	–	TYPE "A-6" CURB
20	N60°20'59"W	–	158.54'	–	TYPE "A-6" CURB
21	N56°03'08"W	–	47.57'	–	TYPE "A-6" CURB
22	05°29'55"	1176.32'	112.89'	56.49'	TYPE "A-6" CURB
23	05°29'55"	1247.32'	119.71'	59.90'	TYPE "D" CURB
24	N56°03'08"W	–	20.35'	–	TYPE "D" CURB
25	11°32'11"	2400.00'	40.27'	20.20'	TYPE "D" CURB
26	168°27'49"	2.00'	5.88'	19.80'	TYPE "D" CURB
27	168°2749"	2.00'	5.88'	19.80'	TYPE "D" CURB
28	05°29'55"	1239.32'	118.94'	59.51'	TYPE "D" CURB
29	180°00'00"	0.50'	1.57'	–	TYPE "D" CURB CASE B
30	N56°03'08"W	–	11.69'	–	TYPE "D" CURB CASE B
31	02°16'04"	1615.00'	63.88'	31.95'	TYPE "D" CURB CASE B
32	59°44'05"	35.00'	36.49'	20.10'	TYPE "D" CURB
33	58°31'34"	4.00'	4.09'	2.24'	TYPE "D" CURB
34	00°01'34"	1591.02'	0.73'	0.36'	TYPE "D" CURB
35	N30°26'09"E	–	1.76'	–	TYPE "D" CURB
36	00°12'54"	1603.00'	6.01'	3.01'	TYPE "D" CURB
37	N30°13'10"E	–	1.76'	–	TYPE "D" CURB
38	00°45'53"	1599.07'	21.35'	10.67'	TYPE "D" CURB
39	01°41'53"	1599.07'	76.70'	38.36'	TYPE "D" CURB CASE B
40	58°33'35"	35.00'	35.77'	19.63'	TYPE "D" CURB
41	59°19'16"	4.00'	4.14'	2.28'	TYPE "D" CURB
42	01°01'59"	1615.00'	29.12'	14.56'	TYPE "D" CURB
43	00°57'47"	1667.00'	28.02'	14.01'	TYPE "D" CURB
44	21°48'10"	45.00'	17.12'	8.67'	TYPE "D" CURB
45	N34°14'59"W	–	20.36'	–	TYPE "D" CURB
46	21°48'10"	45.00'	17.12'	8.67'	TYPE "D" CURB
47	02°45'39"	588.00'	28.33'	14.17'	TYPE "A-6" CURB





MEDIAN CURB DETAIL

SCALE: 1"=20'

CENTERLINE DATA TABLE

⬭	DELTA/BRG	RADIUS	LENGTH	TANGENT
1	05°29'55"	1242.32'	119.23'	59.66'
2	N56°03'08"W	–	408.04'	–
3	06°11'09"	1600.00'	172.74'	86.45'

40' 0 40' 80' 120'

811 Know what's below. Call before you dig.

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

"AS BUILT"
The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.
Engineer of work ______ Date ______
RCE ______ EXP. ______

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ______ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE: HORIZONTAL AS NOTED; VERTICAL AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 9 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN MURRIETA HOT SPRINGS ROAD
STA. 85+00.00 TO 92+00.00

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

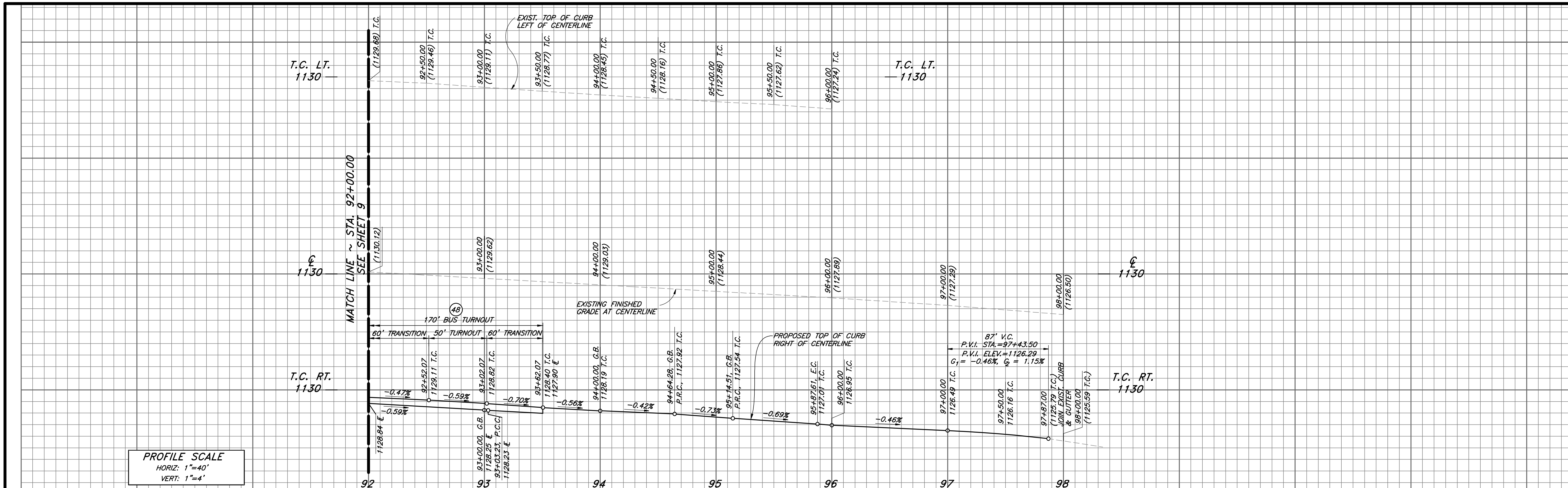
DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-SI (PP).DWG 6/3/2020 9:15:23 AM PLOTTED BY:ROBERT FOTO

68282.10
90% SUBMITTAL



CONSTRUCTION NOTES

○ DESCRIPTION

1 CONSTRUCT 5" A.C. PAVEMENT OVER 14.5" CLASS II BASE (PRELIM, R=26).

4 CONSTRUCT TYPE "A-6" CURB AND GUTTER PER C.O.M. STD. NO. 301 AND 306.

5 CONSTRUCT P.C.C. SIDEWALK PER C.O.M. STD. NO. 320 WITH THICKENED EDGE ADJACENT TO BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17 (AS OCCURS).

20 PROTECT IN PLACE (ITEM AS INDICATED).

21 INSTALL POWER POLE (BY OTHERS).

22 RELOCATE DRY UTILITY (BY OTHERS, ITEM AS INDICATED).

25 RELOCATE EXISTING AIR RELEASE/BLOW-OFF VALVE/CP TEST STATION (BY OTHERS).

28 REMOVE EXISTING CURB AND GUTTER OR CURB ONLY.

34 INSTALL BIO-CLEAN FULL CAPTURE INLET FILTER MODEL 36-36-24 WITH TROUGH SYSTEM IN CURB OPENING AND GRATED INLET CATCH BASIN.

39 CONSTRUCT BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17.

46 CONSTRUCT TYPE "D" CURB CASE B PER C.O.M. STD. NO. 305.

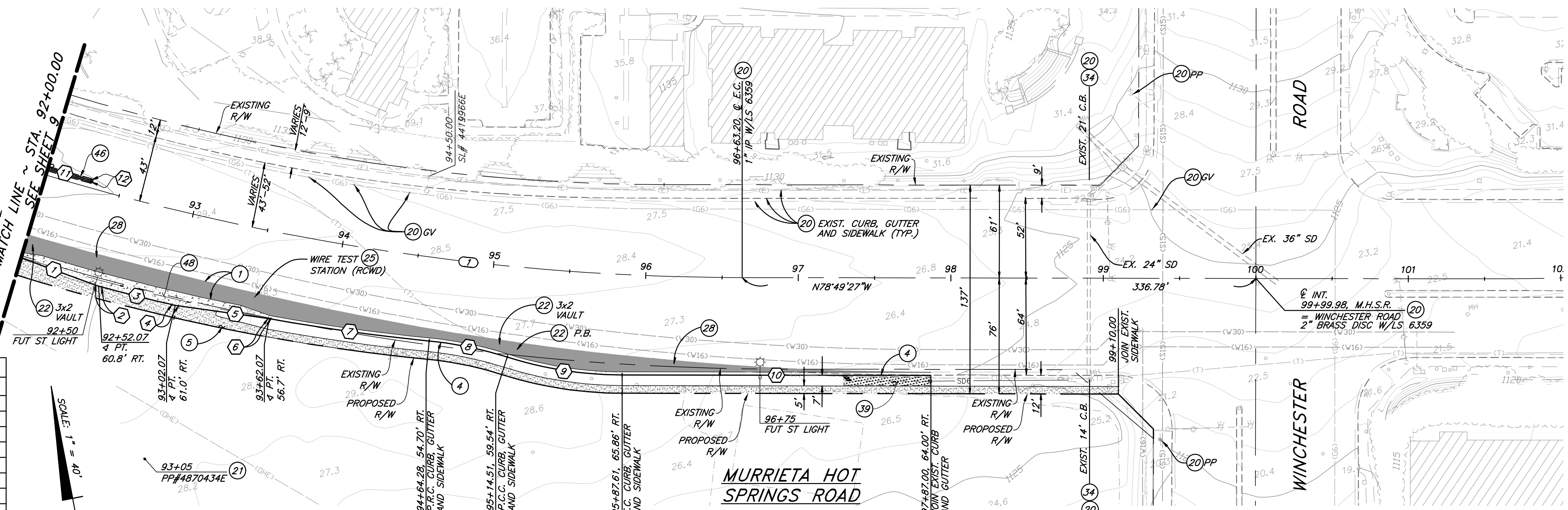
48 INSTALL BUS TURNOUT PER C.O.M. STD. NO. 217 (MODIFIED WIDTH).

CENTERLINE DATA TABLE

	DELTA/BRG	RADIUS	LENGTH	TANGENT
1	16°35'10"	1600.00'	463.20'	233.22'

CURB DATA TABLE

	DELTA/BRG	RADIUS	LENGTH	TANGENT	DESCRIPTION
1	N58°45'02"W	–	51.78'	–	TYPE "A-6" CURB
2	05°06'31"	50.00'	4.46'	2.23'	TYPE "A-6" CURB
3	01°58'23"	1376.95'	47.42'	23.71'	TYPE "A-6" CURB
4	05°04'01"	50.00'	4.42'	2.21'	TYPE "A-6" CURB
5	N70°53'58"W	–	59.17'	–	TYPE "A-6" CURB
6	02°14'12"	50.00'	1.95'	0.98'	TYPE "A-6" CURB
7	04°37'13"	1300.00'	104.83'	52.45'	TYPE "A-6" CURB
8	11°59'44"	250.00'	52.31'	26.27'	TYPE "A-6" CURB
9	17°32'12"	250.00'	76.52'	38.56'	TYPE "A-6" CURB
10	N78°49'27"W	–	202.47'	–	TYPE "A-6" CURB
11	01°03'00"	1599.07'	29.31'	14.65'	TYPE "D" CURB CASE B
12	180°44'59"	0.50'	1.58'	–	TYPE "D" CURB CASE B



40' 0 40' 80' 120'

811 Know what's below. Call before you dig.

"AS BUILT"

The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.

Engineer of work ______ Date ______

RCE ______ EXP. ______

BENCH MARK:

RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE

JEFFREY J. HITCH ______ DATE

CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ______ DATE

DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 10 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
STA. 92+00.00 TO WINCHESTER ROAD

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-SI (PP).DWG 6/3/2020 9:15:29 AM PLOTTED BY:ROBERT FOTO

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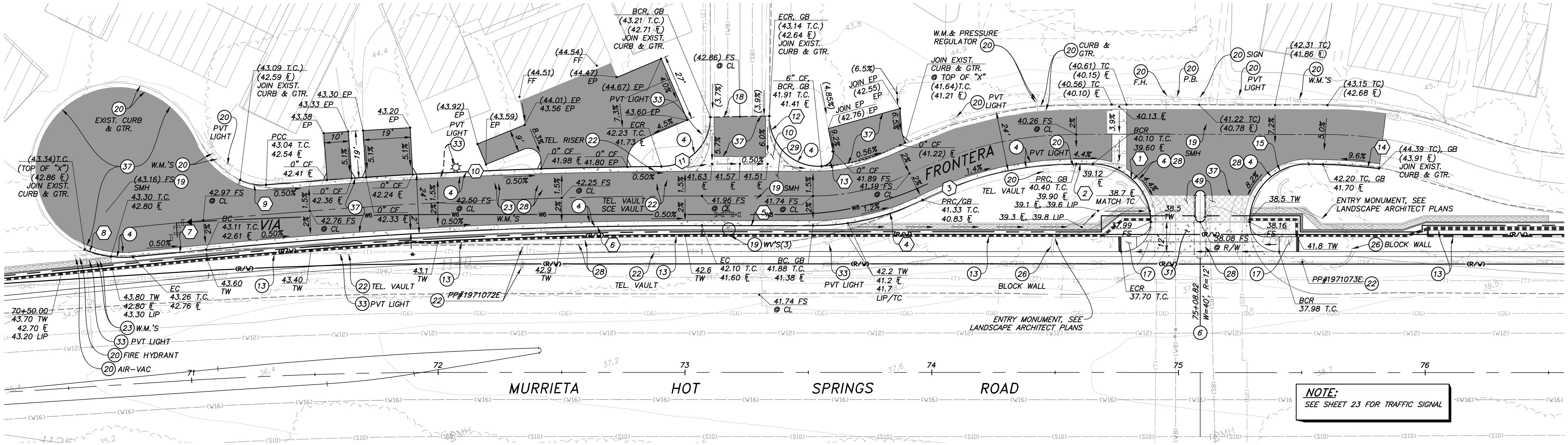
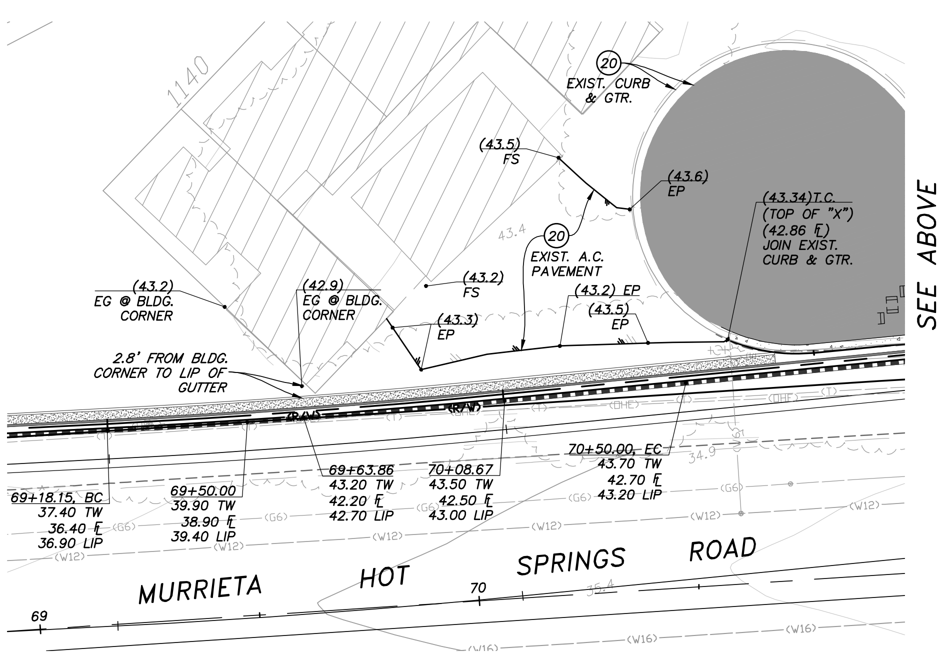


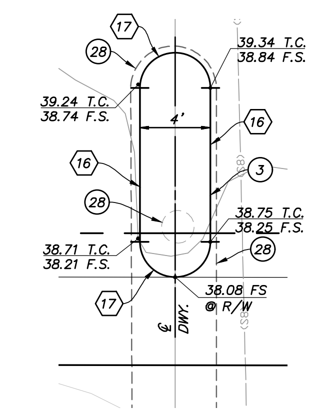


CONSTRUCTION NOTES

◯	DESCRIPTION
3	CONSTRUCT TYPE "D" CURB CASE A PER C.O.M. STD. NO. 305.
4	CONSTRUCT TYPE "A-6" CURB AND GUTTER PER C.O.M. STD. NO. 301 AND 306.
6	CONSTRUCT P.C.C. DRIVEWAY APPROACH (W=PER PLAN) PER C.O.M. STD. NO. 310a. (MODIFIED, SEE DETAIL ON SHEET 2).
10	CONSTRUCT CROSS GUTTER AND SPANDREL PER C.O.M. STD. NO. 311 AND 312.
13	CONSTRUCT RETAINING WALL PER DETAILS ON SHEETS 14,15 & 31-39.
17	CONSTRUCT PCC ACCESS RAMP PER DETAIL ON SHEET 2.
18	SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.
19	ADJUST TO GRADE (ITEM AS INDICATED).
20	PROTECT IN PLACE (ITEM AS INDICATED).
22	RELOCATE DRY UTILITY (BY OTHERS, ITEM AS INDICATED).
23	RELOCATE WATER METER (BY OTHERS).
26	REMOVE/DISPOSE OF (ITEM AS INDICATED).
28	REMOVE EXISTING CURB AND GUTTER OR CURB ONLY.
29	REMOVE EXISTING CROSS GUTTER AND SPANDREL.
33	RELOCATE PRIVATE LIGHT POLE
37	CONSTRUCT 3" A.C. PAVEMENT OVER 4" CLASS II BASE (PRELIM).
49	CONSTRUCT STAMPED CONCRETE PER LANDSCAPE ARCHITECT PLANS.

CURVE/LINE DATA TABLE

⬡	DELTA/BRG	RADIUS	LENGTH	TANGENT
1	90°00'00"	23.50'	36.91'	23.50'
2	N71°15'56"W	–	6.80'	–
3	26°23'04"	140.00'	64.47'	32.82'
4	26°23'04"	100.00'	46.05'	23.44'
5	N71°15'56"W	–	45.03'	–
6	5°36'25"	2056.50'	201.25'	100.70'
7	N76°52'20"W	–	29.81'	–
8	28°41'12"	40.00'	20.03'	10.23'
9	30°56'48"	20.00'	10.80'	5.54'
10	4°25'10"	2080.50'	160.48'	80.28'
11	89°38'02"	20.00'	31.29'	19.87'
12	94°17'36"	20.00'	32.92'	21.56'
13	97°56'43"	5.00'	8.55'	5.75'
14	N69°53'29"W	–	5.71'	–
15	91°22'27"	23.50'	37.48'	24.07'
16	N18°44'04"E	–	8.75'	–
17	180°00'00"	2.00'	6.28'	–



MEDIAN DETAIL
SCALE: 1"=5'

SCALE: 1" = 20'

20' 0 20' 40' 60'

Know what's below. Call before you dig. 811

"AS BUILT"

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Engineer of work ____ Date ____

RCE ____ EXP. ____

BENCH MARK:
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APPROVED FOR SIGNATURE
JEFFREY J. HITCH ____ DATE
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951-695-8900
951-695-8901 Fax

PREPARED BY ____ DATE

DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 11 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

STREET IMPROVEMENT PLAN
VIA FRONTERA / PRIVATE DRIVEWAY

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

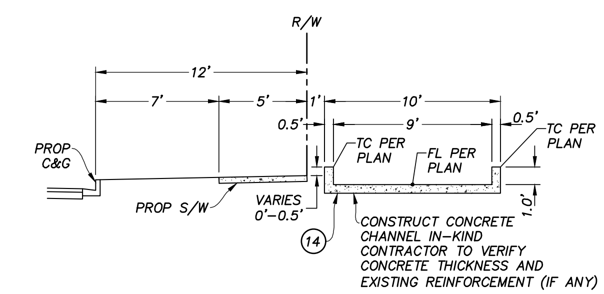
DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-S (PP).DWG 6/1/2020 9:15:40 AM PLOTTED BY:ROBERT FOTO

68282.10
90% SUBMITTAL

CONSTRUCTION NOTES

	DESCRIPTION
3	CONSTRUCT TYPE "D" CURB CASE A PER C.O.M. STD. NO. 305.
14	CONSTRUCT 10' WIDE CONCRETE OVERFLOW DRAIN TO MATCH EXISTING, SEE DETAIL ON SHEET 12.
18	SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.
20	PROTECT IN PLACE (ITEM AS INDICATED).
26	REMOVE/DISPOSE OF (ITEM AS INDICATED).
37	CONSTRUCT 3" A.C. PAVEMENT OVER 4" CLASS II BASE (PRELIM).
52	PAINT 4" WHITE PARKING STRIPE.



SECTION A-A
NTS

SCALE: 1" = 20'

GRAPHIC SCALE
20' 0 20' 40' 60'

"AS BUILT"
The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.
Engineer of work ______ Date ______
RCE ______ EXP. ______

Know what's below. Call before you dig. 811

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ______ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-6900
951-695-6901 Fax

PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 12 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
OFFSITE GRADING DETAILS

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

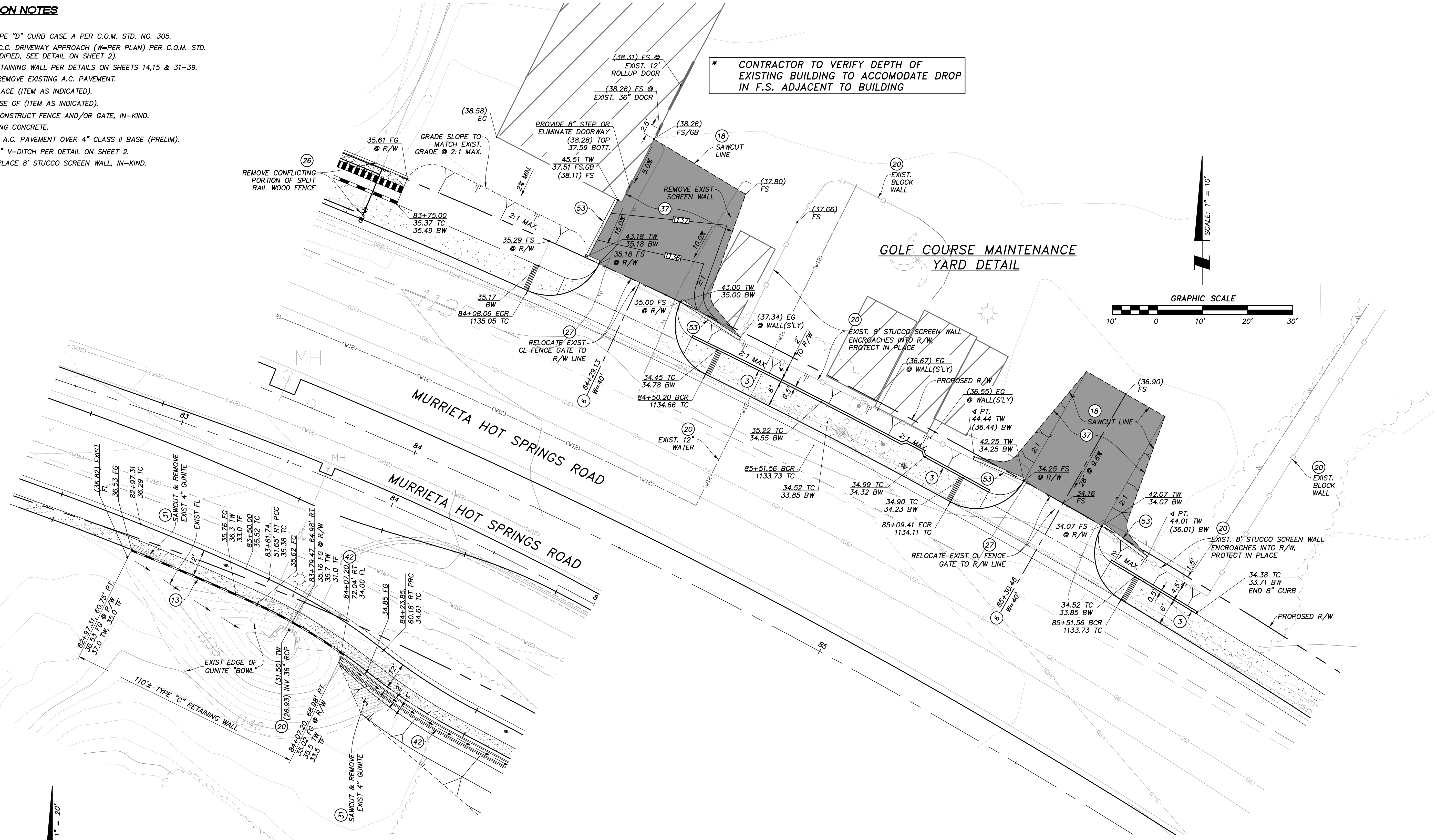
DWN BY: RLF
CHKD BY: DJO
FIELD BK:
CIP NO. 8079
PROJECT NO. 09-XXX
DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-SI.DWG 6/3/2020 9:15:45 AM PLOTTED BY: ROBERT FOTO

68282.10
90% SUBMITTAL

CONSTRUCTION NOTES

○	DESCRIPTION
3	CONSTRUCT TYPE "D" CURB CASE A PER C.O.M. STD. NO. 305.
6	CONSTRUCT P.C.C. DRIVEWAY APPROACH (W=PER PLAN) PER C.O.M. STD. NO. 310A. (MODIFIED, SEE DETAIL ON SHEET 2).
13	CONSTRUCT RETAINING WALL PER DETAILS ON SHEETS 14,15 & 31–39.
18	SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.
20	PROTECT IN PLACE (ITEM AS INDICATED).
26	REMOVE/DISPOSE OF (ITEM AS INDICATED).
27	RELOCATE/RECONSTRUCT FENCE AND/OR GATE, IN-KIND.
31	REMOVE EXISTING CONCRETE.
37	CONSTRUCT 3" A.C. PAVEMENT OVER 4" CLASS II BASE (PRELIM).
42	CONSTRUCT 24" V-DITCH PER DETAIL ON SHEET 2.
53	REMOVE & REPLACE 8' STUCCO SCREEN WALL, IN-KIND.



Know what's below. Call before you dig. 811

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Engineer of work ________ Date ________

RCE ________ EXP. ________

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APPROVED FOR SIGNATURE

JEFFREY J. HITCH ________ DATE

CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER — DANIEL J. O'ROURKE — No. 47677 — CIVIL — STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ________ DATE

DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 13 — CITY OF MURRIETA, ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN MURRIETA HOT SPRINGS ROAD OFFSITE GRADING DETAILS

APPROVED
ROBERT K. MOEHLING ________ DATE ________
CITY ENGINEER RCE 63056

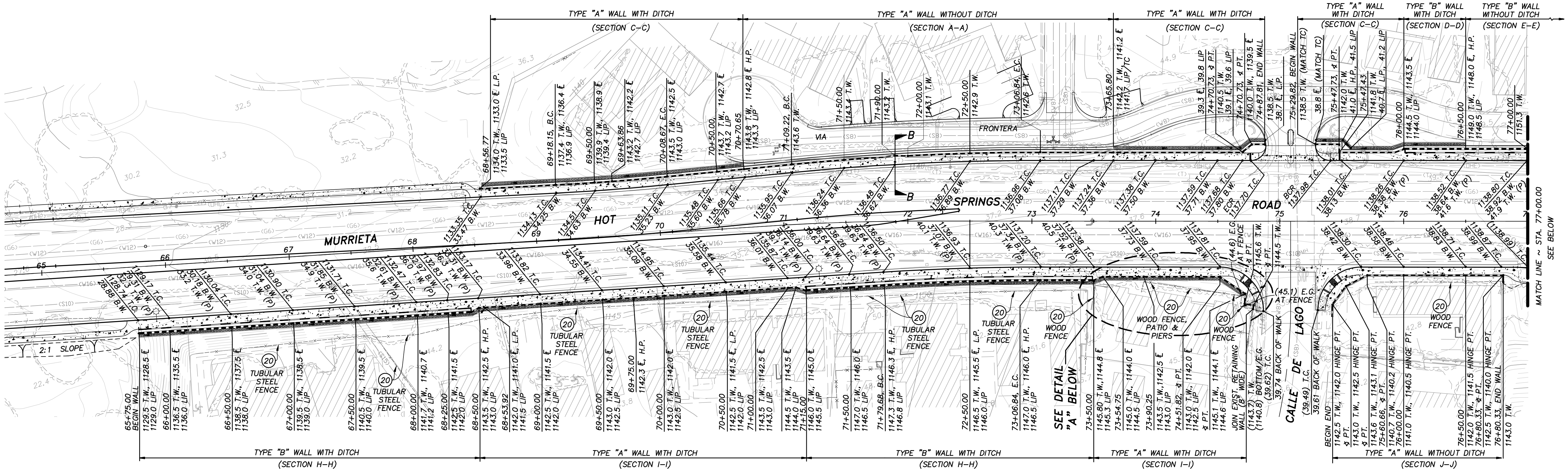
DWN BY: RLF
CHKD BY: DJO
FIELD BK:

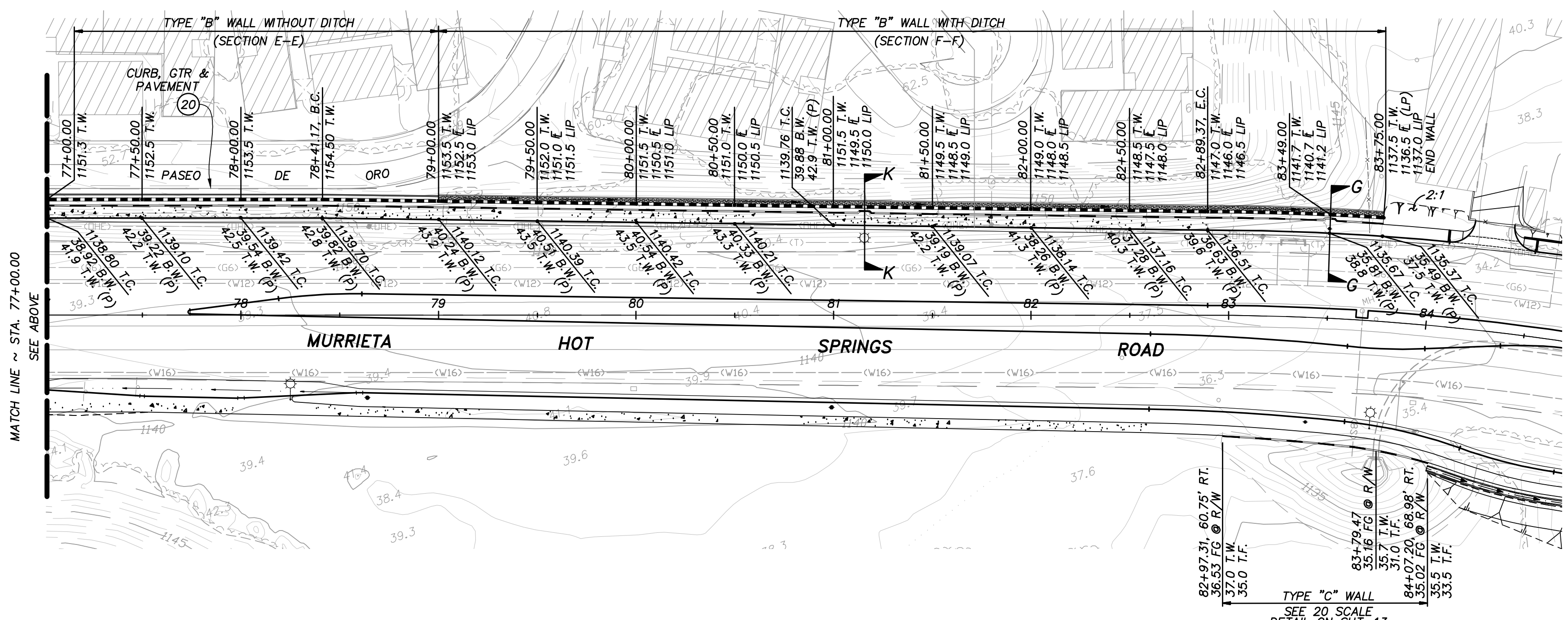
CIP NO. 8079
PROJECT NO. 09-XXX

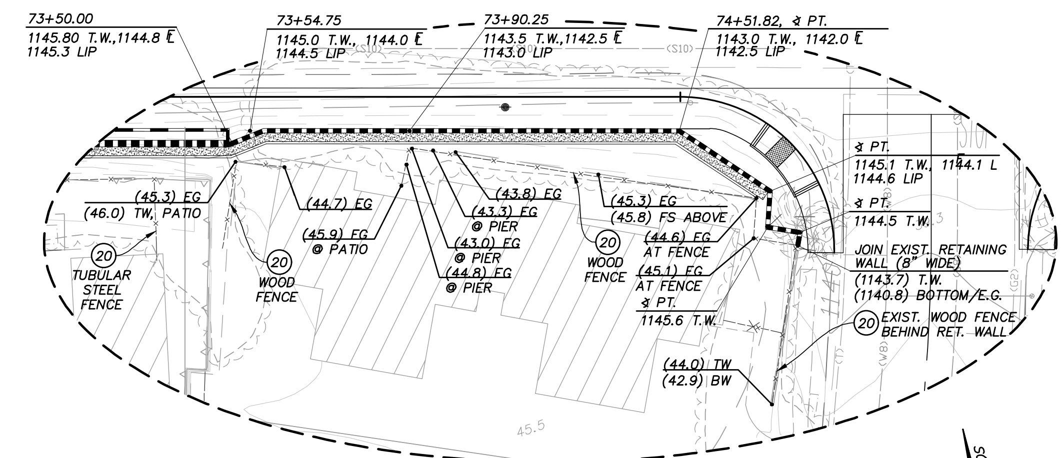
DRAWING NO.

68282.10
90% SUBMITTAL

I:\68282 DATE ST & MHSRD\DWG\C-68282-SLDWG 6/3/2020 9:15:53 AM PLOTTED BY:ROBERT FOTO







DETAIL "A"

SCALE: 1"=20'

CONSTRUCTION NOTES

○ DESCRIPTION

20 PROTECT IN PLACE (ITEM AS INDICATED).

NOTE: TOP OF WALL ELEVATIONS ARE SHOWN AS "MINIMUMS" IN ORDER TO ACHIEVE GRADE. FOR ACTUAL TOP OF SHORING WALL ELEVATIONS, REFER TO STRUCTURAL PLANS.

SEE SHEET 15 FOR SECTIONS A-A THROUGH J-J

SCALE: 1" = 40'

40' 0 40' 80' 120'

"AS BUILT"

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Engineer of work ____ Date ____

RCE ____ EXP. ____

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CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

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SCALE	
HORIZONTAL	AS NOTED
VERTICAL	AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
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951-695-6900
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PREPARED BY ____ DATE

DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 14 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL PLAN

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

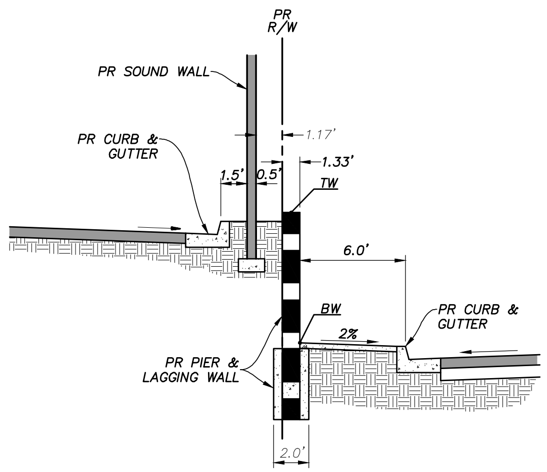
DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

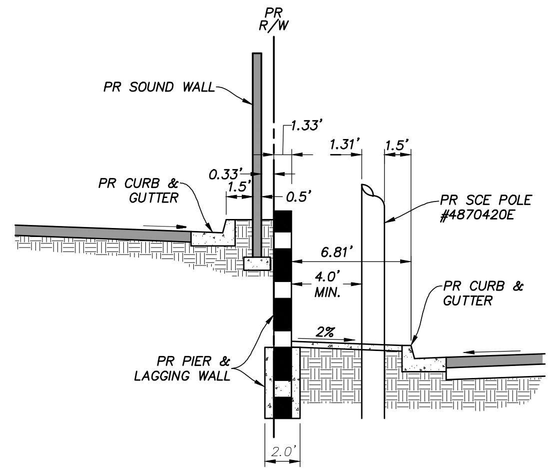
DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-RW.DWG 6/3/2020 9:16:06 AM PLOTTED BY:ROBERT FOTO

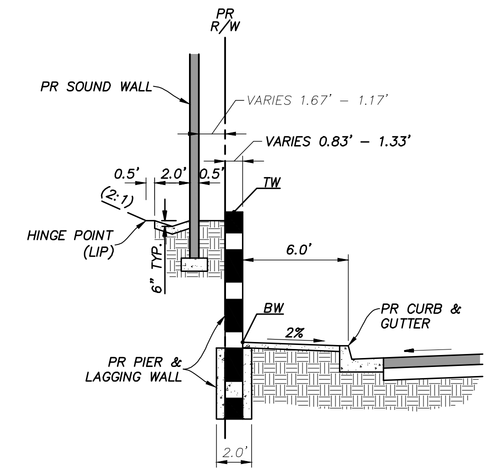
68282.10
90% SUBMITTAL



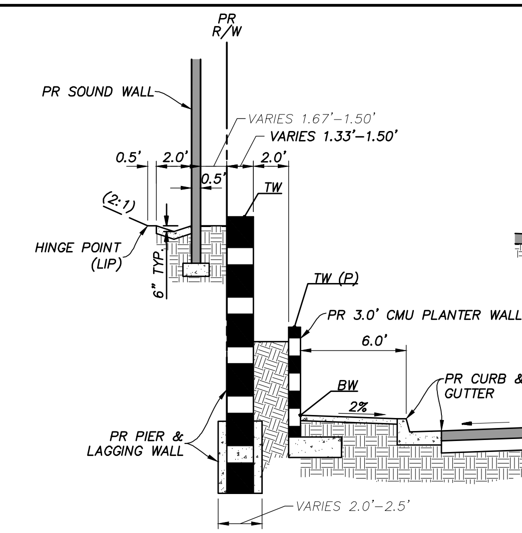
SECTION A–A (TYPE "A")
SCALE: 1"=5'
STA. 70+70.65 TO 73+65.80 (LT.)



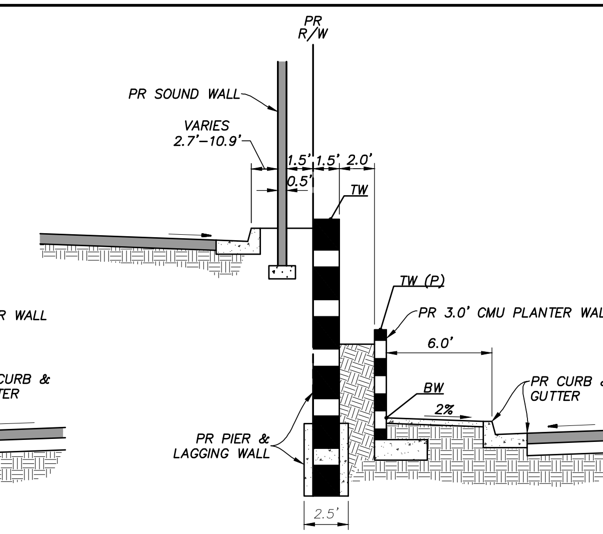
SECTION B–B (TYPE "A")
SCALE: 1"=5'
STA. 71+90.00 (LT.)



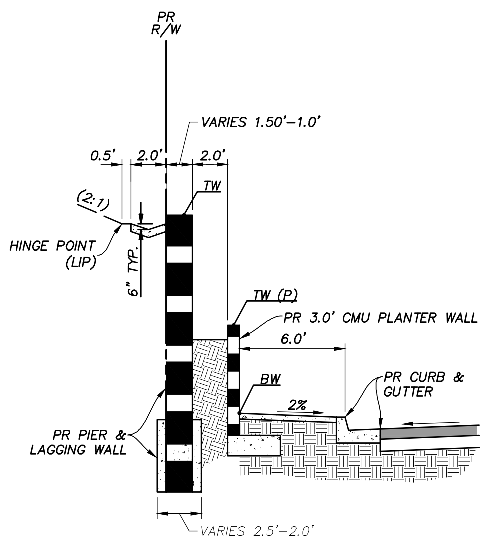
SECTION C–C (TYPE "A")
SCALE: 1"=5'
STA. 68+56.77 TO 70+70.65 (LT.) & STA. 73+65.80 TO 74+87.81 (LT.) &
STA. 75+29.82 TO 76+00.00 (LT.)



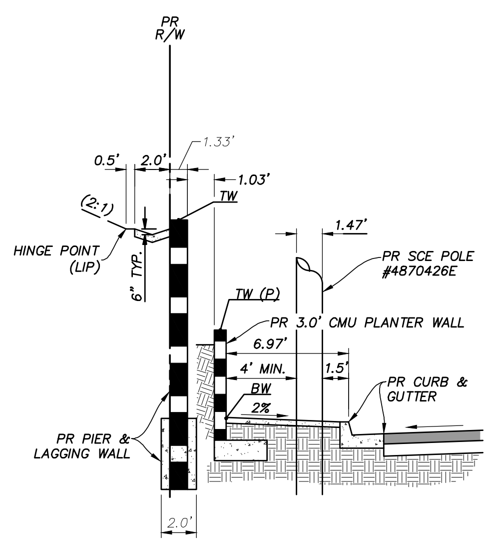
SECTION D–D (TYPE "B")
SCALE: 1"=5'
STA. 76+00.00 TO 76+50.00 (LT.)



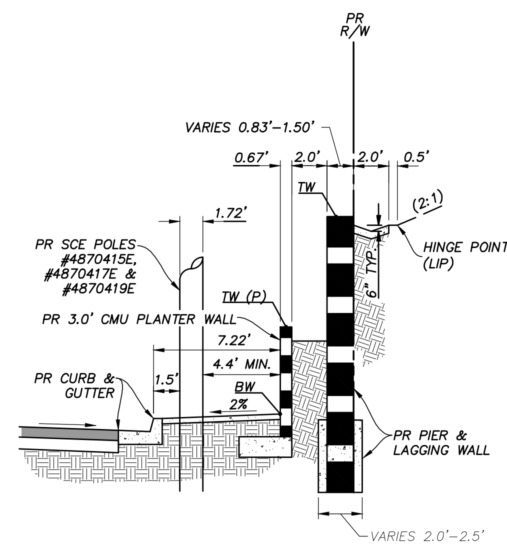
SECTION E–E (TYPE "B")
SCALE: 1"=5'
STA. 76+50.00 TO 79+00.00 (LT.)



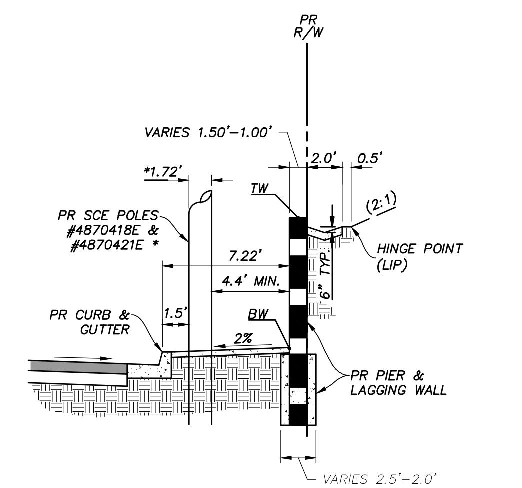
SECTION F–F (TYPE "B")
SCALE: 1"=5'
STA. 79+00.00 TO 83+75.00 (LT.)



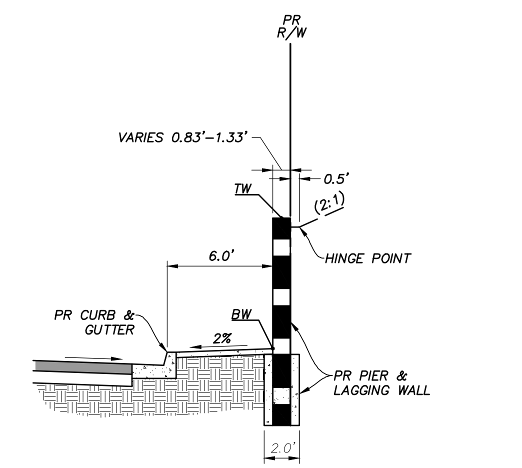
SECTION G–G (TYPE "B")
SCALE: 1"=5'
STA. 83+49.00 (LT.)



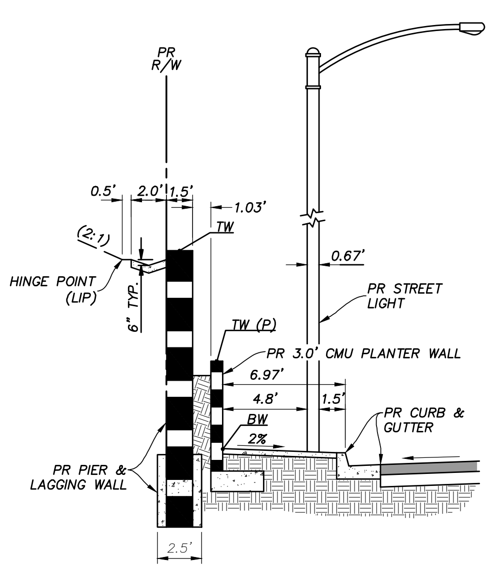
SECTION H–H (TYPE "B")
SCALE: 1"=5'
STA. 65+75.00 TO 68+50.00 (RT.) & STA. 71+15.00 TO 73+50.00 (RT.)



SECTION I–I (TYPE "A")
SCALE: 1"=5'
STA. 68+50.00 TO 71+15.00 (RT.) & STA. 73+50.00 TO 74+51.82 (RT.)



SECTION J–J (TYPE "A")
SCALE: 1"=5'
STA. 75+65.82 TO 76+78.82 (RT.)



SECTION K–K (TYPE "B")
SCALE: 1"=5'
STA. 81+15.64 (LT.)

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BENCH MARK:
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Engineer of work ____ Date ____
RCE ____ EXP. ____

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ____ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER, DANIEL J. O'ROURKE, No. 47677, CIVIL, STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-6900
951-695-6901 Fax

PREPARED BY ____ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12–31–21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 15 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL NOTES AND DETAILS

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:
CIP NO. 8079
PROJECT NO. 09–XXX
DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C–68282–RW.DWG 6/3/2020 9:16:07 AM PLOTTED BY:ROBERT FOTO

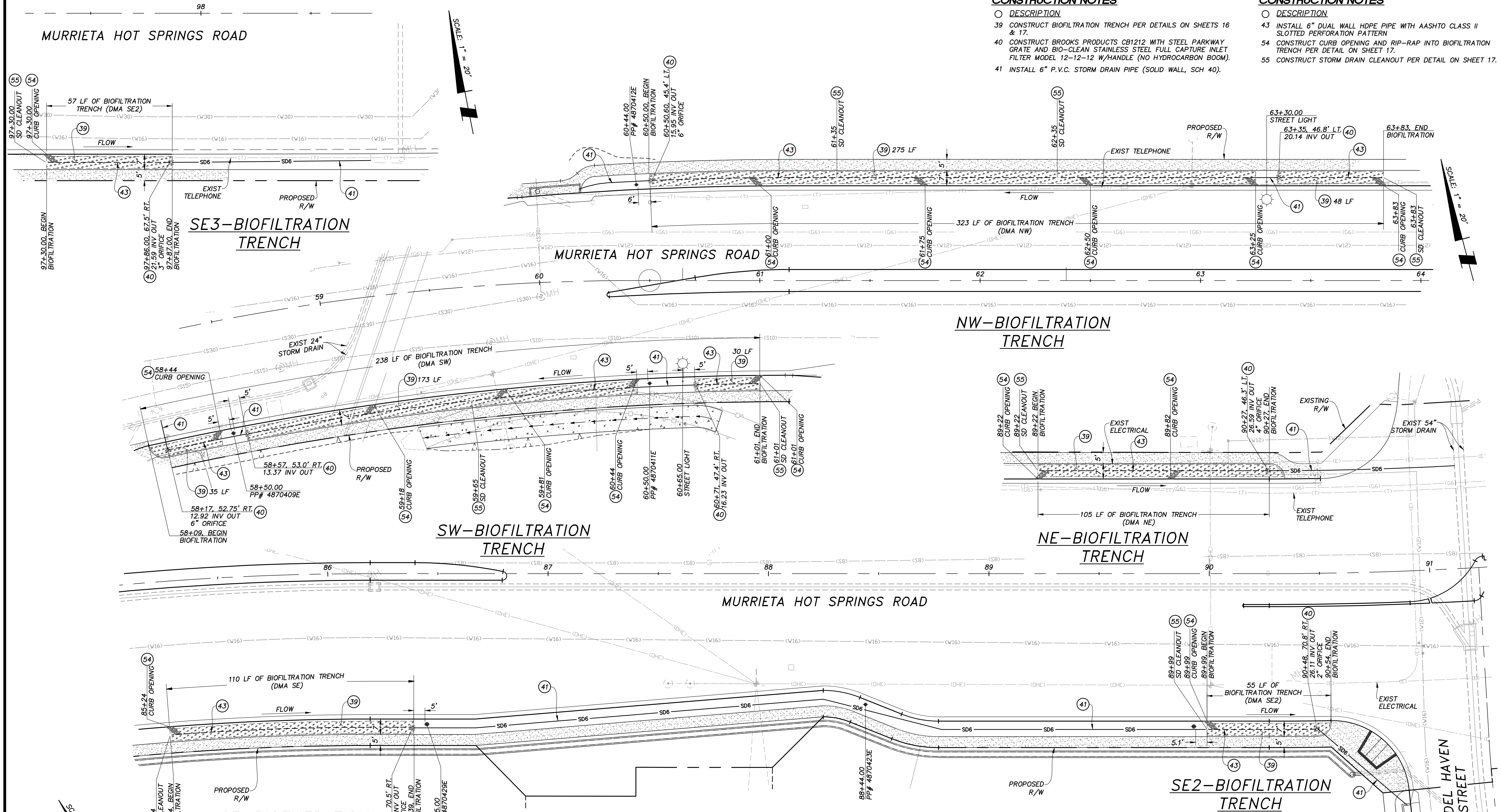
68282.10
90% SUBMITTAL

CONSTRUCTION NOTES

○	DESCRIPTION
39	CONSTRUCT BIOFILTRATION TRENCH PER DETAILS ON SHEETS 16 & 17.
40	CONSTRUCT BROOKS PRODUCTS CB1212 WITH STEEL PARKWAY GRATE AND BIO-CLEAN STAINLESS STEEL FULL CAPTURE INLET FILTER MODEL 12-12-12 W/HANDLE (NO HYDROCARBON BOOM).
41	INSTALL 6" P.V.C. STORM DRAIN PIPE (SOLID WALL, SCH 40).

CONSTRUCTION NOTES

○	DESCRIPTION
43	INSTALL 6" DUAL WALL HDPE PIPE WITH AASHTO CLASS II SLOTTED PERFORATION PATTERN
54	CONSTRUCT CURB OPENING AND RIP-RAP INTO BIOFILTRATION TRENCH PER DETAIL ON SHEET 17.
55	CONSTRUCT STORM DRAIN CLEANOUT PER DETAIL ON SHEET 17.



Know what's **below.** **Call** before you dig. 811

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Engineer of work ______ Date ______

RCE ______ EXP. ______

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APPROVED FOR SIGNATURE
JEFFREY J. HITCH ______ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
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SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
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PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 16 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

STREET IMPROVEMENT PLAN MURRIETA HOT SPRINGS ROAD BMP DETAILS

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

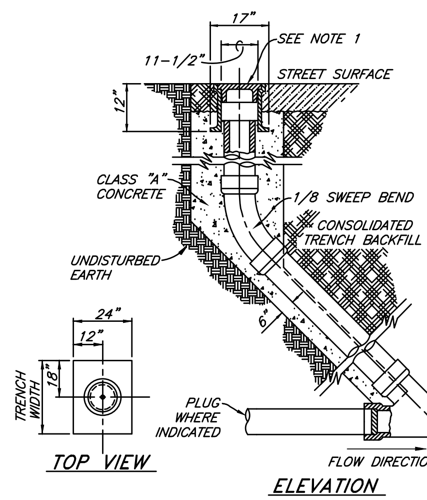
DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

68282.10
90% SUBMITTAL

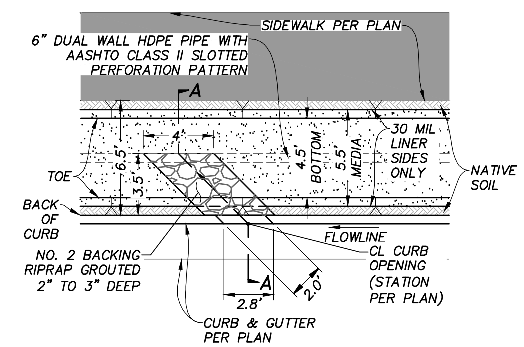
I:\68282 DATE ST & MHSRD\DWG\C-68282-SI.DWG 6/3/2020 9:16:21 AM PLOTTED BY:ROBERT FOTO



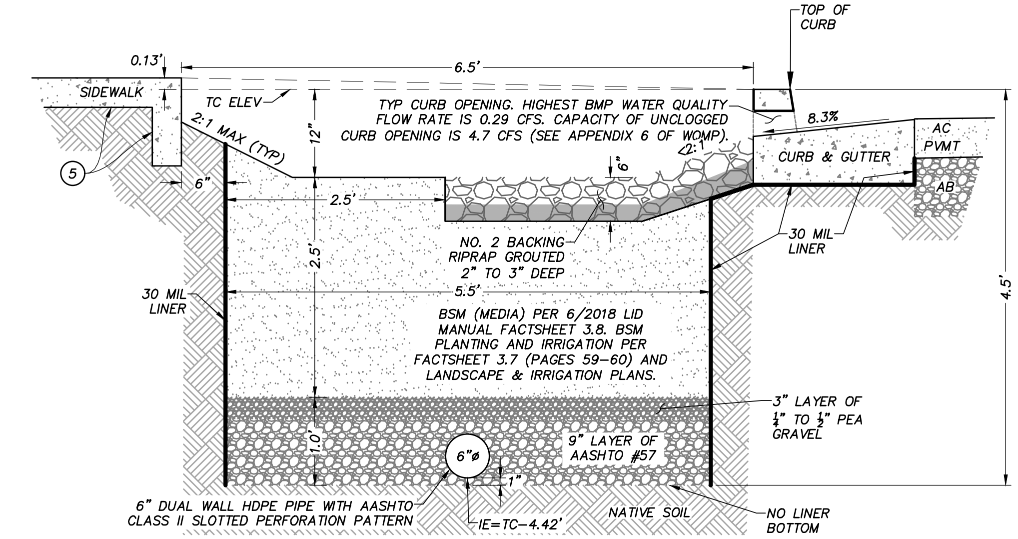
NOTES:
1. CASTING WILL BE ALHAMBRA FOUNDRY NO. A-1241 OR APPROVED EQUAL AS PER ENGINEER.
2. PLUGS WILL BE CEMENTED IN PLACE WITH CEMENT MORTAR. NEOPRENE PLUGS OR APPROVED EQUALS MAY BE SUBSTITUTED.
3. STATION OF WYE OR LOWER 1/8 SWEEP BEND WILL CORRESPOND TO THE CLEAN-OUT STATION SHOWN ON CONSTRUCTION DRAWINGS WITH CLEAN-OUT CONSTRUCTION EXTENDED BEYOND THAT POINT AS NECESSARY.
4. USE ONLY CLASS "A" CONCRETE FOR CONSTRUCTION.

NOTE: WHERE CLEANOUT IS INSTALLED AT A CHANGE IN DIRECTION, THE PIPE BEND SHALL BE LOCATED DOWNSTREAM OF THE WYE FITTING.

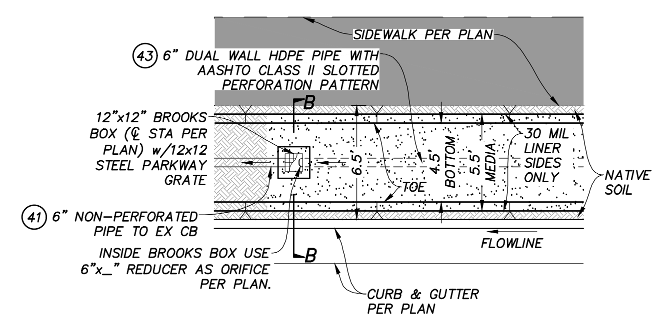
55 DETAIL - STORM DRAIN CLEANOUT
NOT TO SCALE



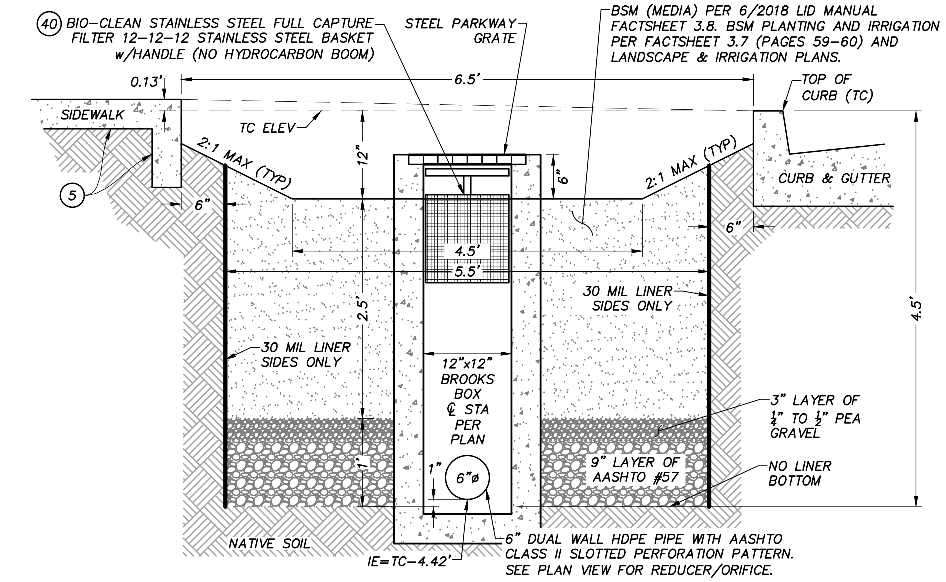
54 TYPICAL CURB OPENING AND RIPRAP
PLAN VIEW
SCALE 1" = 5'



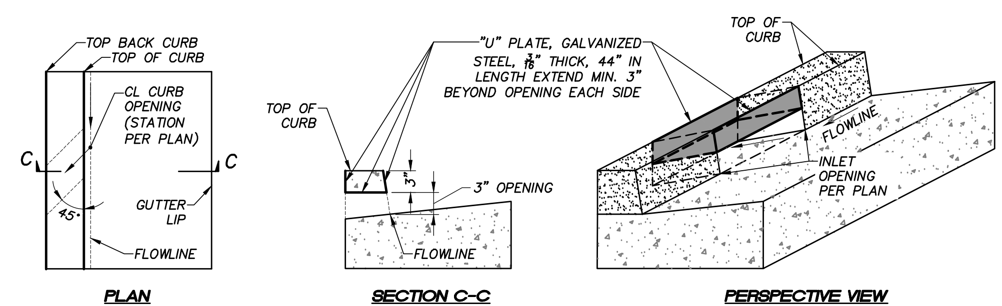
39 TYPICAL BIOFILTRATION TRENCH DETAIL w/CURB OPENING AND RIPRAP
SECTION A-A
SCALE 1" = 1'



TYPICAL BROOKS BOX/OVERFLOW GRATE AND ORIFICE/REDUCER
PLAN VIEW
SCALE 1" = 5'



39 40 TYPICAL BIOFILTRATION TRENCH DETAIL w/BROOKS BOX/OVERFLOW GRATE
SECTION B-B
SCALE 1" = 1'



54 CURB OPENING
NOT TO SCALE

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Engineer of work ____ Date ____
RCE ____ EXP. ____

SEAL: REGISTERED PROFESSIONAL ENGINEER, DANIEL J. O'ROURKE, No. 47677, CIVIL, STATE OF CALIFORNIA

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
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951-695-6900
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811 Know what's below. Call before you dig.

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APPROVED FOR SIGNATURE
JEFFREY J. HITCH ____ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

PREPARED BY ____ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 17 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
BMP DETAILS

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:
CIP NO. 8079
PROJECT NO. 09-XXX
DRAWING NO.

68282.10
90% SUBMITTAL

I:\68282 DATE ST & MHSRD\DWG\C-68282-SI.DWG 6/3/2020 9:16:28 AM PLOTTED BY: ROBERT FOTO

SIGNING AND STRIPING GENERAL NOTES

1. The contractor shall be responsible for the clearing of the proposed work area, and relocation cost of all existing utilities. Permittee must inform the city of construction schedule at least 48 hours prior to beginning of construction. Phone: (951) 461–6028.
2. Traffic stripes, pavement markings and raised pavement markers per 2006 California MUTCD (manual on uniform traffic control devices), Caltrans standard plans and specifications, latest edition, City of Murrieta Public Works Department improvement standards and the latest edition of standard specification for public works construction (green book).
3. All stripes, signs, and pavement markings shall be reflectorized. Stencils for pavement markings shall match metric standard stencils exactly. All striping and marking details shall match Caltrans standard plans details.
4. All conflicting stripes and pavement marking shall be removed by sandblasting. Conflicting signs and raised pavement markers shall be removed. All removals of signs and marking shall be the responsibility of the developer or applicant.
5. Painted traffic stripes and painted pavement markings (if allowed) shall be applied in two coats. Pavement markings shall be applied in thermoplastic format unless approved otherwise. Repaint existing striping 300' in each direction of intersection. Cat track approval from the city engineering required prior to striping.
6. All removed signs shall be salvaged and delivered to the city yard as directed by the city inspector.
8. Raised pavement markers shall be furnished and installed by the contractor in accordance ith the striping details shown on the signing and striping plan. Installation shall be complete within seven working days of roadway striping. Raised pavement markers are to be installed on roadways with arterial classifications or higher, or as determined by the city engineer.
9. Street name signs shall conform to city standard no. 601 and 601a.
10. Blue raised reflective pavement markers shall be placed to mark fire hydrant and/or water supply locations at the direction of the city inspector following final sealant and striping.
11. Work may not start until permits have been obtained.
12. The contractor shall verify all utility locations with underground service alert at 1–800–227–2600 at least two (2) working days prior to any excavation.
13. Equipment and materials shall be stored in a neat and protected manner. Storage location will be approved by city inspector.
14. The contractor will conduct his operations as to offer the least possible obstruction and inconvenience to public traffic, and he shall have under construction no greater length or amount of work than he can execute properly. On existing roads, traffic shall be permitted to pass through the work area with as little inconvenience and delay as possible. Restricted hours may be required.
15. Existing traffic signals and lighting systems shall be kept in operation for the benefit of the traveling public, and to minimize any interference with routine maintenance of existing systems during work progress.
16. Whenever the contractor's operation creates a hazardous condition to traffic or to the public, he shall furnish at his own expense, such flagmen and guards as are necessary to give adequate warning to the public of any dangerous conditions. He shall also furnish, erect and maintain such fences barricades, lights, signs, and other devices necessary to prevent accidents and injury to the public.
17. Where survey monuments exist, such monuments will be protected or shall be referenced and reset, pursuant to business and professions code, sections 8700 to 8805 (land surveyor's act).
18. All existing street signs, roadside markers, etc., shall be protected and/or replaced in kind to the current city standard plans and current traffic manual, at no cost to the city.
19. The existence and location of any underground utility pipes or structures shown on these plans were obtained by a search of the available records. To the best of our knowledge, there are no existing utilities except as shown on these plans, the contractor is required to take due precautionary measures to protect all utility line, including any other lines not shown on these plans or not of record.
20. It shall be the responsibility of the contractor to apply to the city of murrieta engineering department, for an encroachment permit for all work on existing city maintained roads, and for utility work within offers of dedication for public use.
22. Any service shut down shall be done at night, prior to any shut down, the contractor shall notify the director, engineer, customer, fire department, servicing water district, and all others affected by the shut down a minimum of two (2) weeks in advance.
23. All stationing refers to centerline of construction unless otherwise noted.
24. The applicant is hereby noticed that they must comply with all state and federal endangered species law. The City of Murrieta is not responsible for any such violation of state or federal endangered species law due to the applicant's non–compliance.
25. It shall be the responsibility of the developer or contractor to apply to california department of transportation (Caltrans) for an encroachment permit for all work performed within the state right–of–way.

LEGEND

- MATERIAL: P= PAINT(2 COATS), T= THERMOPLASTIC
- DT XX/XX — INSTALL PER CALTRANS DETAIL
- DETAIL NUMBER
- SIGN NUMBER
- IS XX/XX — INSTALL SIGN AS NOTED
- MOUNTING LOCATION: SP= SIGN POLE, MA= ON MAST ARM, TP= TELESPAR POST
- TYPE OF TRAFFIC STRIPING MATERIAL T= THERMOPLASTIC, P= PAINT (2 COATS)
- PM XX — INSTALL PAVEMENT MARKING (AS SHOWN) PER PAGE A24A THRU A24E OF THE STANDARD PLANS, CALTRANS
- SB — REMOVE, BY WET SANDBLASTING, ALL CONFLICTING STRIPING
- RS — REMOVE AND SALVAGE TO CITY OF MURRIETA
- RL — EQUIPMENT TO BE RELOCATED
- P — PROTECT IN PLACE
- PROPOSED SIGN
- SNS — STREET NAME SIGN PER CITY OF MURRIETA DETAIL No 601, 612A
- RC — RELOCATE SIGN
- RE — RESET SIGN

GRAPHIC SCALE

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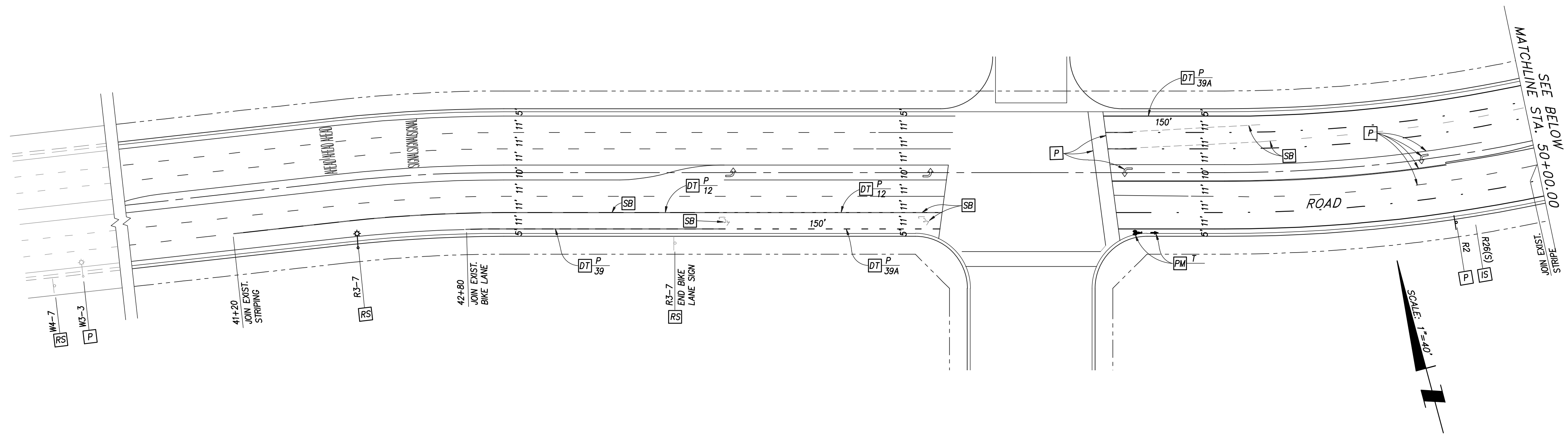

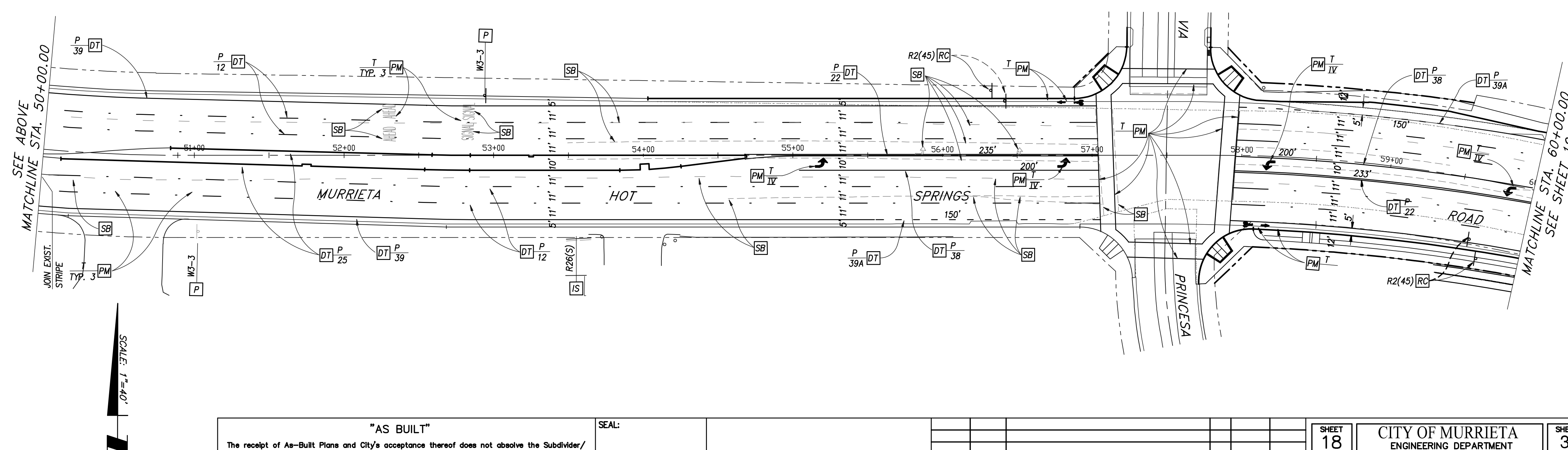

Know what's **below.**
Call before you dig.

"AS BUILT"

The receipt of As–Built Plans and City's acceptance thereof does not absolve the Subdivider/ Developer of any responsibility for their accuracy.

Engineer of work ______ Date ______

RCE ______ EXP. ______

SEAL:

BENCH MARK:
RIV. CO. BM T 46–81 RESET 1997, ELEV. 1097.163
3–1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE

BRIAN STEPHENSON, P.E., T.E. DATE
PLAN CHECK FIRM–RICK ENGINEERING COMPANY
CITY OF MURRIETA
R.C.E. NO. 69471
EXP. 6/30/18

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

PREPARED BY DATE

–

R.C.E NO. – EXP. DATE –

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 18 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

SIGNING & STRIPING PLAN MURRIETA HOT SPRINGS ROAD

STA. 40+00.00 TO STA. 60+00.00

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09–XXX

DRAWING NO.

Feb 25, 2020 – 10:34am

C: \Users\Steve Zevallos\Dropbox (TJW Engineering Inc.)\TJW Projects\SBO Projects\SBO–18–001\SBO18001 AutoCAD\SBO18001–Design_Ver–A.2.dwg

68282.10
90% SUBMITTAL

Xref I:\68282 Date St & MHSRD\dwg\SI\8079\68282Imp-Border.dwg

LEGEND

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- DETAIL NUMBER
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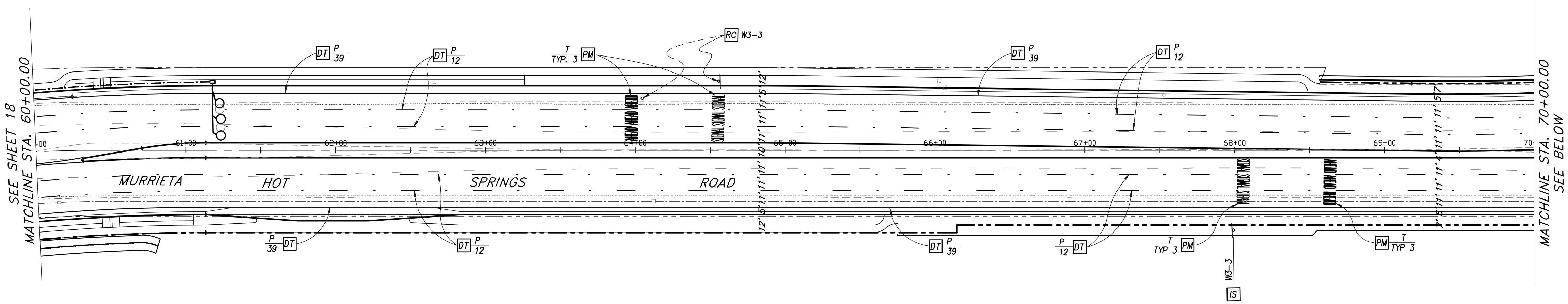
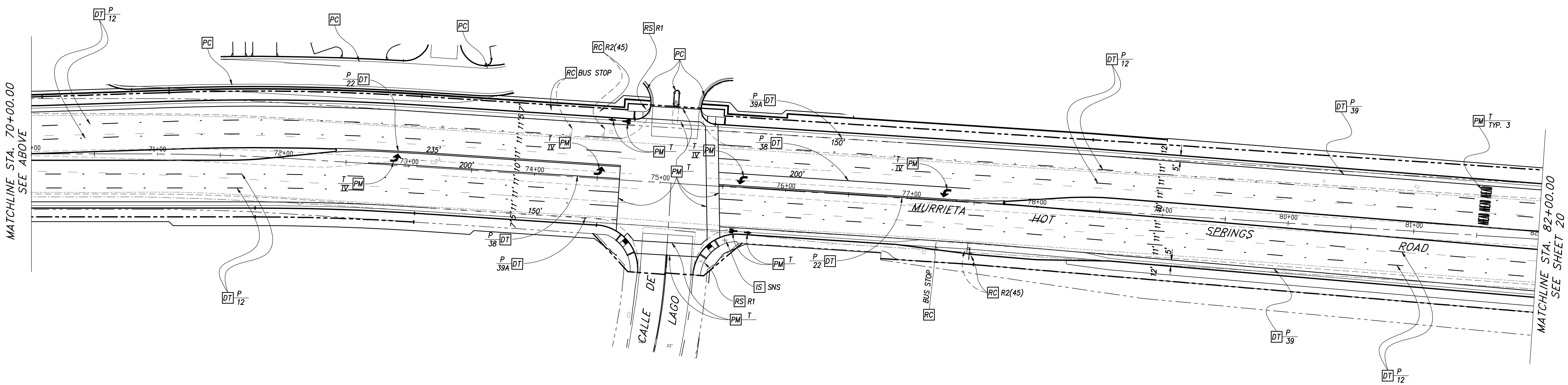
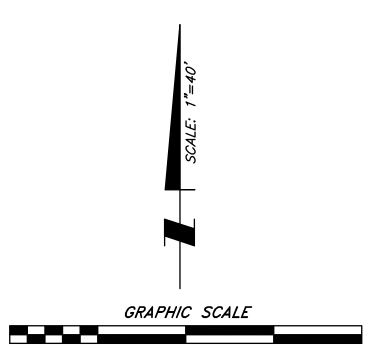
- RS — REMOVE AND SALVAGE TO CITY OF MURRIETA
- RL — EQUIPMENT TO BE RELOCATED
- P — PROTECT IN PLACE
- PROPOSED SIGN
- SNS — STREET NAME SIGN PER CITY OF MURRIETA DETAIL No 601, 612A
- RC — RELOCATE SIGN
- RE — RESET SIGN
- PC — PAINT CURB RED WITH 4" WHITE LETTERING "NO PARKING FIRE LANE CVC 225001"







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Engineer of work ____ Date ____

RCE ____ EXP. ____

SEAL:

BENCH MARK:

RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163 3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET - JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE

BRIAN STEPHENSON, P.E., T.E. — DATE
PLAN CHECK FIRM-RICK ENGINEERING COMPANY

CITY OF MURRIETA
R.C.E. NO. 69471
EXP. 6/30/18

SCALE	
HORIZONTAL	AS NOTED
VERTICAL	AS NOTED

PREPARED BY — DATE

R.C.E NO. - EXP. DATE -

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 19 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

SIGNING & STRIPING PLAN MURRIETA HOT SPRINGS ROAD

STA. 60+00.00 TO STA. 82+00.00

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

Feb 25, 2020 - 10:34am

C: \Users\Steve Zevallos\Dropbox (TJW Engineering Inc.)\TJW Projects\SBO Projects\SBO-18-001\SBO18001 AutoCAD\SBO18001-Design_Ver-A.2.dwg

68282.10
90% SUBMITTAL

Xref I:\68282 Date St & MHSRD\dwg\SI\8079\68282Imp-Border.dwg

LEGEND

- MATERIAL: P= PAINT(2 COATS), T= THERMOPLASTIC
- DT XX/XX — INSTALL PER CALTRANS DETAIL
- DETAIL NUMBER
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- IS XX/XX — INSTALL SIGN AS NOTED
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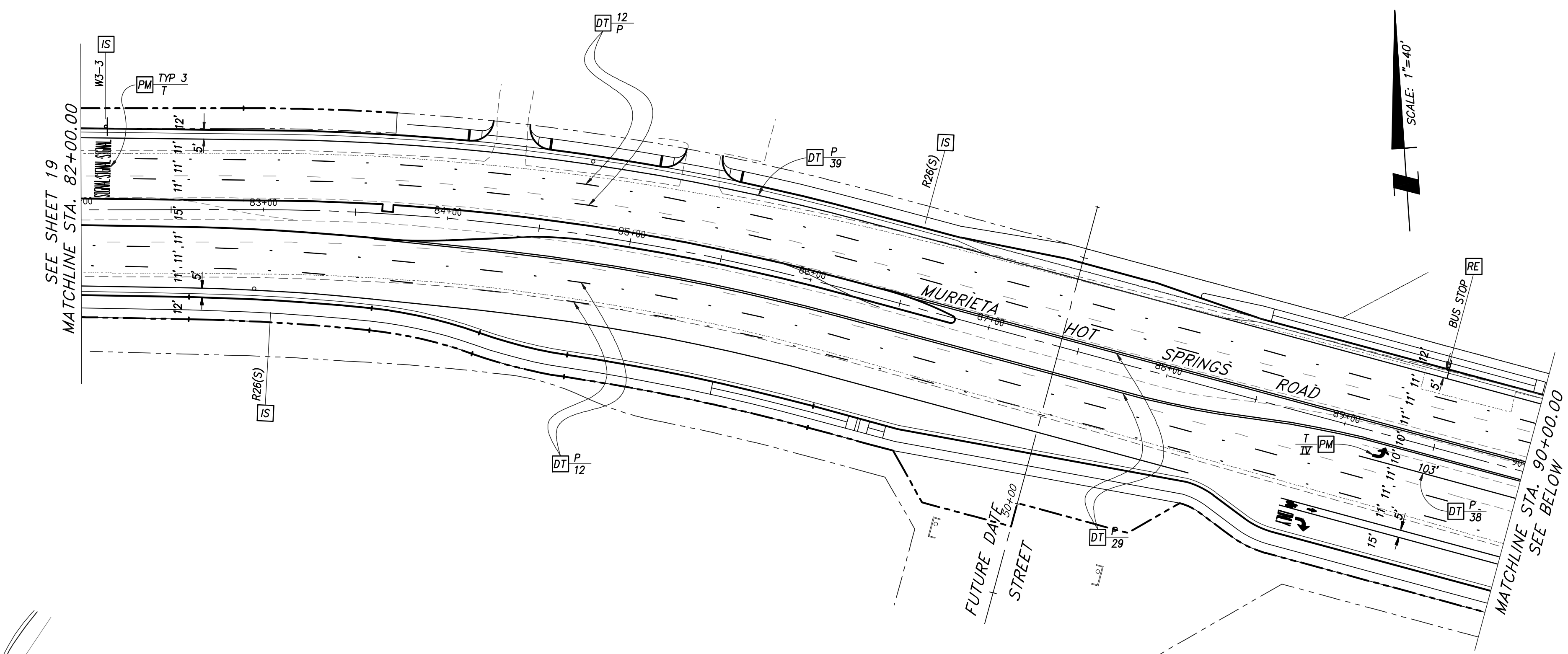

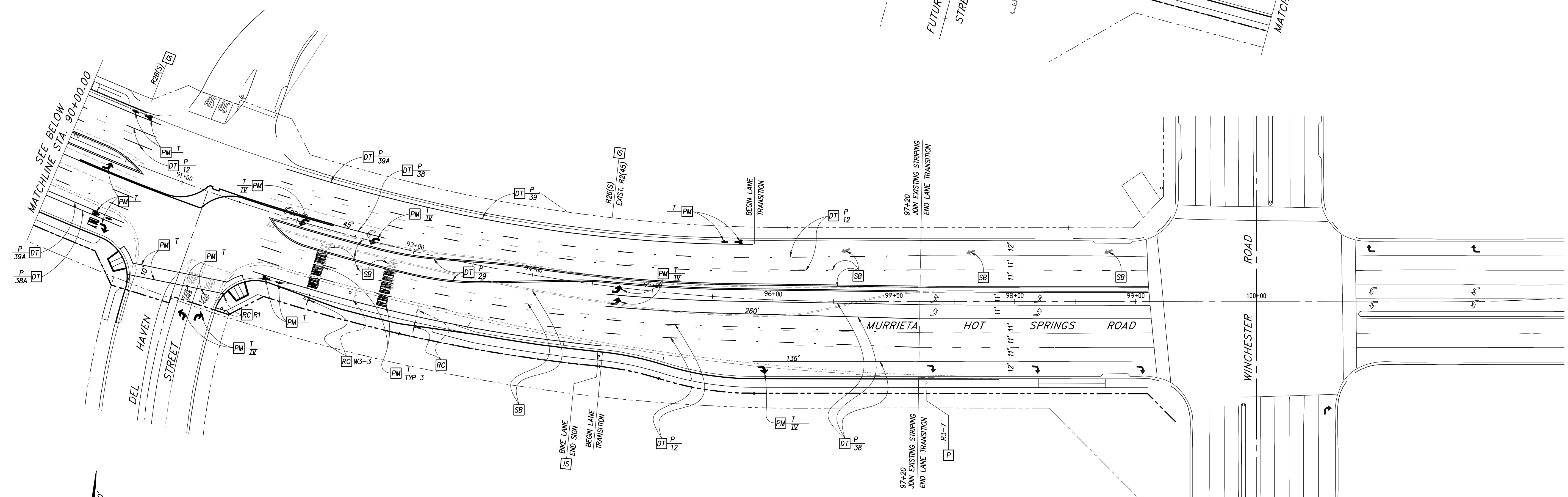

SCALE: 1"=40'

GRAPHIC SCALE

40 0 40 80 120

Know what's below. Call before you dig.

BENCH MARK:
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3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

"AS BUILT"
The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.
Engineer of work ______ Date ______
RCE ______ EXP. ______

APPROVED FOR SIGNATURE
BRIAN STEPHENSON, P.E., T.E. DATE
PLAN CHECK FIRM–RICK ENGINEERING COMPANY
CITY OF MURRIETA
R.C.E. NO. 69471
EXP. 6/30/18

SEAL:

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

PREPARED BY DATE
R.C.E NO. – EXP. DATE –

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 20 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

SIGNING & STRIPING PLAN MURRIETA HOT SPRINGS ROAD

STA. 82+00.00 TO STA. 97+20.00

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

Feb 25, 2020 – 10:34am

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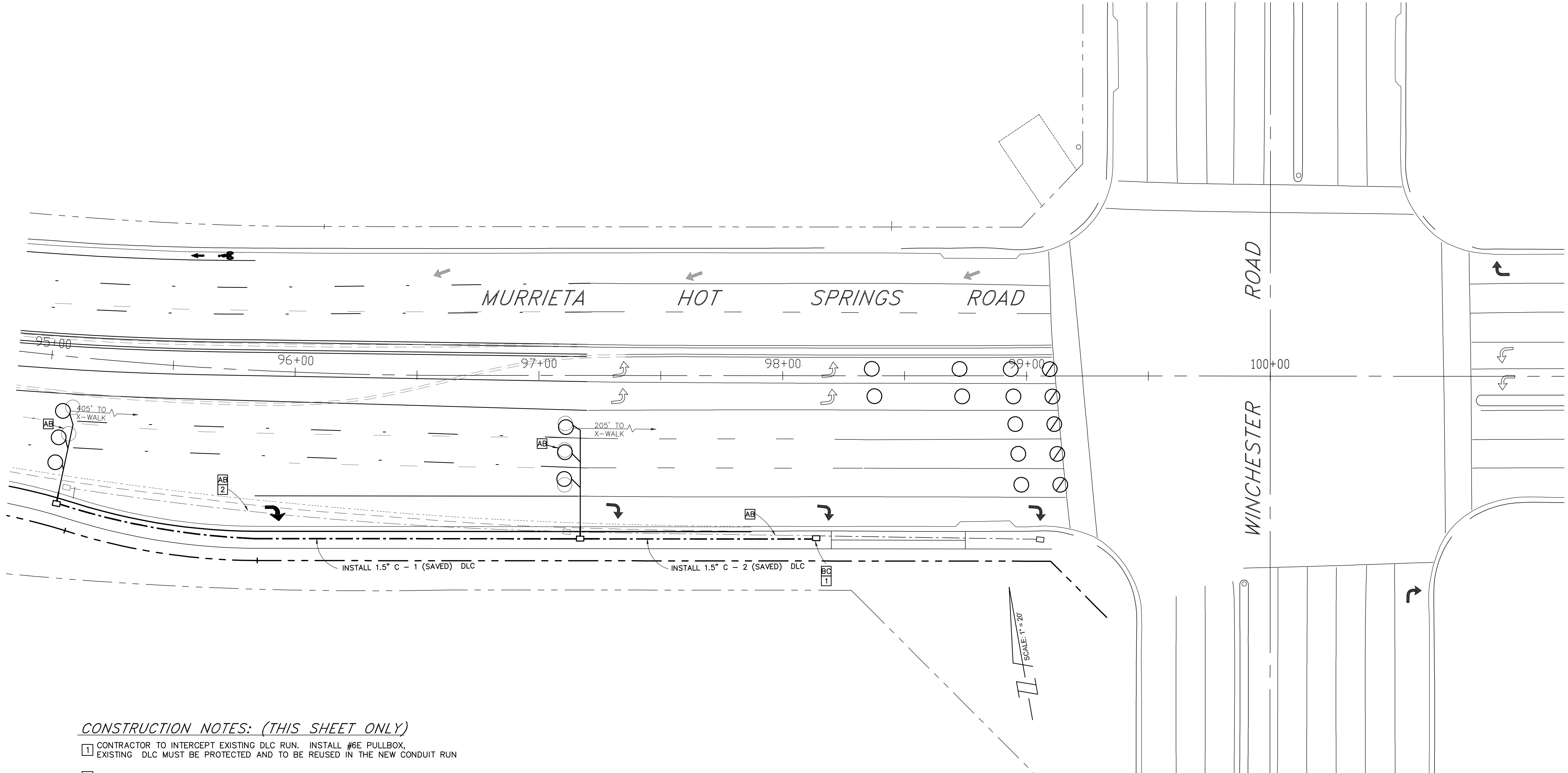
68282.10
90% SUBMITTAL

Xref I:\68282 Date St & MHSRD\dwg\SI\8079\68282Imp-Border.dwg



CONSTRUCTION NOTES: (THIS SHEET ONLY)

1. CONTRACTOR TO INTERCEPT EXISTING DLC RUN. INSTALL #6E PULLBOX, EXISTING DLC MUST BE PROTECTED AND TO BE REUSED IN THE NEW CONDUIT RUN

2. REMOVE EXISTING DLC FROM ADVANCE LOOP PULLBOX.. PROTECTED AND TO BE REUSED IN THE NEW CONDUIT RUN

Know what's **below.** **Call** before you dig.

"AS BUILT"

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Engineer of work ______ Date ______

RCE ______ EXP. ______

SEAL:

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APPROVED FOR SIGNATURE

BRIAN STEPHENSON, P.E., T.E. ______ DATE
PLAN CHECK FIRM-RICK ENGINEERING COMPANY

CITY OF MURRIETA
R.C.E. NO. 69471
EXP. 6/30/18

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

PREPARED BY ______ DATE

-

R.C.E NO. - ______ EXP. DATE -

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 21 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

DETECTOR LOOP PLAN
MURRIETA HOT SPRINGS ROAD
AT WINCHESTER ROAD

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK: ______

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

Feb 25, 2020 - 10:34am

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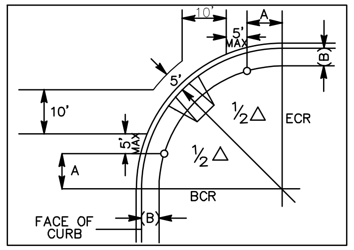
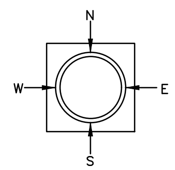
68282.10
90% SUBMITTAL

Xref I:\68282 Date St & MHSRD\dwg\SI\8079\68282Imp-Border.dwg



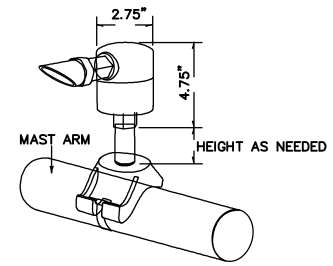
POLE LOCATION DETAIL

NOT TO SCALE



QUADRANT DETAIL

PEDESTRIAN PUSH BUTTON LOCATION (TOP VIEW)



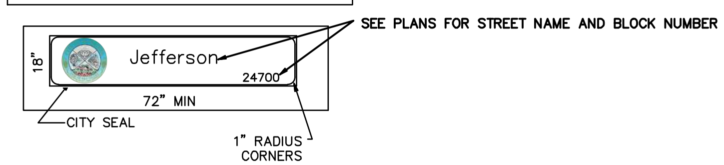
EMERGENCY VEHICLE PRE-EMPTION DETECTOR ASSEMBLY

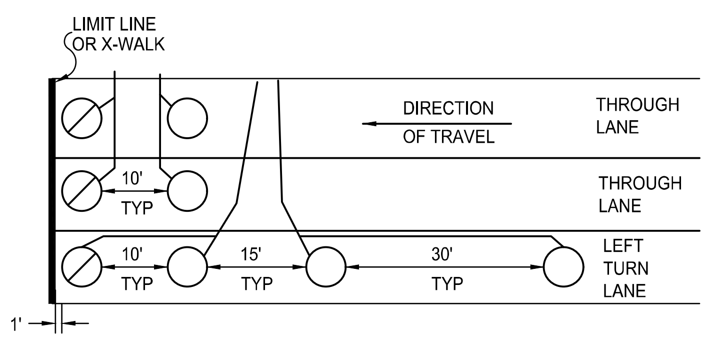
NO SCALE

TRAFFIC SIGNAL GENERAL NOTES

1. CONTRACTOR SHALL OBTAIN APPROVAL FROM CITY ENGINEER FOR EXACT LOCATION OF EQUIPMENT, POLES AND LOOPS PRIOR TO INSTALLATION.
2. ALL TRAFFIC SIGNAL PULL BOXES WITH THREE (3) OR MORE ENTERING CONDUITS SHALL BE No. 6 OR GREATER. ALL OTHER TRAFFIC SIGNAL PULL BOXES SHALL BE No. 5. ALL FIBER OPTIC PULL BOXES SHALL BE No. 6E. ALL CONDUIT INTO FIBER OPTIC PULL BOXES SHALL END IN 45°, 36-INCH RADIUS BENDS.
3. PULL BOXES SHALL BE SPACED NO MORE THAN 400 FEET.
4. CONTRACTOR SHALL COORDINATE A MEETING WITH THE EVP SUPPLIER AND CITY INSPECTOR TO DETERMINE PROPER LOCATION, ALIGNMENT, AND MOUNTING METHOD FOR EVP HEADS PRIOR TO INSTALLATION.
5. BURIED CONDUIT SHALL BE PVC UNLESS NOTED OTHERWISE ON THE PLANS OR SPECIFICATIONS. PVC CONDUIT WITH FIBER OPTIC SHALL HAVE A NO. 8 THWN LOCATOR WIRE.
6. ALL 12 AND 3 CONDUCTOR CABLE SHALL BE CONTINUOUS WITHOUT SPLICE FROM CONTROLLER CABINET TO TERMINAL BOX AT SIGNAL POLE.
7. 560-C-3250 CONCRETE MIX SHALL BE USED WHEN TRENCHING IN PAVEMENT METHOD IS USED.
8. THE CONTRACTOR SHALL PROVIDE POLE ORDER THE DAY OF THE BID.
9. TRAFFIC RATED PULL BOXES SHALL BE USED IN ALL SHOULDER AREAS OR WHERE CURB IS NOT PRESENT.
10. ALL LATERAL CONDUIT CROSSINGS SHALL BE 90 DEGREES TO CURB FACE.
11. CONTRACTOR SHALL PROVIDE 'AS-BUILT' DRAWINGS TO CITY INSPECTOR PRIOR TO SIGNAL TURN-ON.
12. DETECTOR AND FIBER OPTIC CONDUITS SHALL BE LOCATED BEHIND CURB USING DIRECTIONAL BORING OR TRENCHING METHODS UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. JACKING SHALL NOT BE PERMITTED. TRENCHING IN PAVEMENT METHOD SHALL ONLY BE PERMITTED IF DIRECTIONAL BORING OR TRENCHING IS NOT FEASIBLE DUE TO SITE CONSTRAINTS AS APPROVED BY THE CITY ENGINEER.
13. ALL POT HOLE EXCAVATIONS SHALL BE DONE WITH 6-INCH CORE VACUUM AND BACKFILLED WITH 2-SACK CONCRETE SLURRY FILLED TO EXISTING PAVEMENT SURFACE. SURFACE TO BE CAPPED WITH 3/8-INCH PG-64-10 ASPHALT TO A TOTAL THICKNESS OF 1-INCH PLUS EXISTING.
14. FIBER OPTIC CONNECTION REQUIRED FROM CONTROLLER CABINET TO CONTROLLER CABINET WITHOUT SPLICES. CONTRACTOR RESPONSIBLE TO ENSURE ADEQUATE FIBER OPTIC AVAILABLE OR PROVIDE NEW IF NECESSARY.

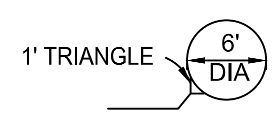
MAST ARM MOUNTED STREET NAME SIGN LEGEND





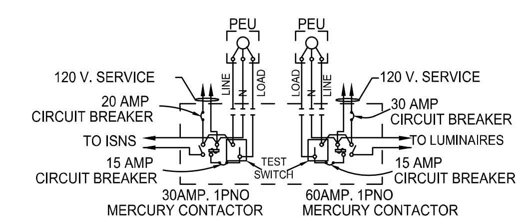
LOOP DETECTOR PLACEMENT DETAIL

NTS



TYPE E LOOP DETECTOR SAWCUT DETAIL.

NTS



DUAL PEC WIRING DIAGRAM

"AS BUILT"

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Engineer of work ______ Date ______

RCE ______ EXP. ______

SEAL:

Know what's **below.** **Call** before you dig.

BENCH MARK:

RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163 3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE

BRIAN STEPHENSON, P.E., T.E. ______ DATE
PLAN CHECK FIRM–RICK ENGINEERING COMPANY

CITY OF MURRIETA
R.C.E. NO. 69471
EXP. 6/30/18

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

PREPARED BY ______ DATE

–

R.C.E NO. – ______ EXP. DATE –

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 22

CITY OF MURRIETA
ENGINEERING DEPARTMENT

SHEETS 39

TRAFFIC SIGNAL PLAN
TITLE SHEET
MURRIETA HOT SPRINGS ROAD

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK: ______

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

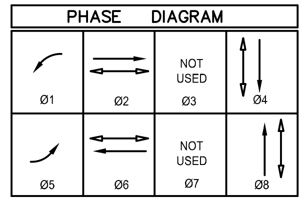
CONDUCTOR SCHEDULE

AWG SIZE OR CABLE TYPE	POLE OR CIRCUIT	CONDUIT RUN 1	2	3	4	5	6	7	8
12 CONDUCTOR CABLE		1	2	1	2	3	4	5	8
3 CONDUCTOR CABLE		1	2	1	2	3	4	5	8
DLC TYPE B	Ø1 DETECTOR			2	2	2	2	2	2
	Ø2 DETECTOR							5	5
	Ø3 DETECTOR								
	Ø4 DETECTOR					2	2	2	2
	Ø5 DETECTOR							2	2
	Ø6 DETECTOR			5	5	5	5	5	5
	Ø7 DETECTOR								
	Ø8 DETECTOR		3						3
	TOTAL		3	7	7	9	9	16	19
#10	LUMINAIRE	2	2		2	2	2	2	
	TOMAR CABLE	1	1	1	1	2	2	3	4
	CONDUIT SIZE	3"	3"	3"	3	3"	3.5"	4"	2–4"

INSTALL ALL NEW CONDUCTORS

X INSTALL NEW CONDUIT RUN

X EXISTING CONDUIT TO REMAIN

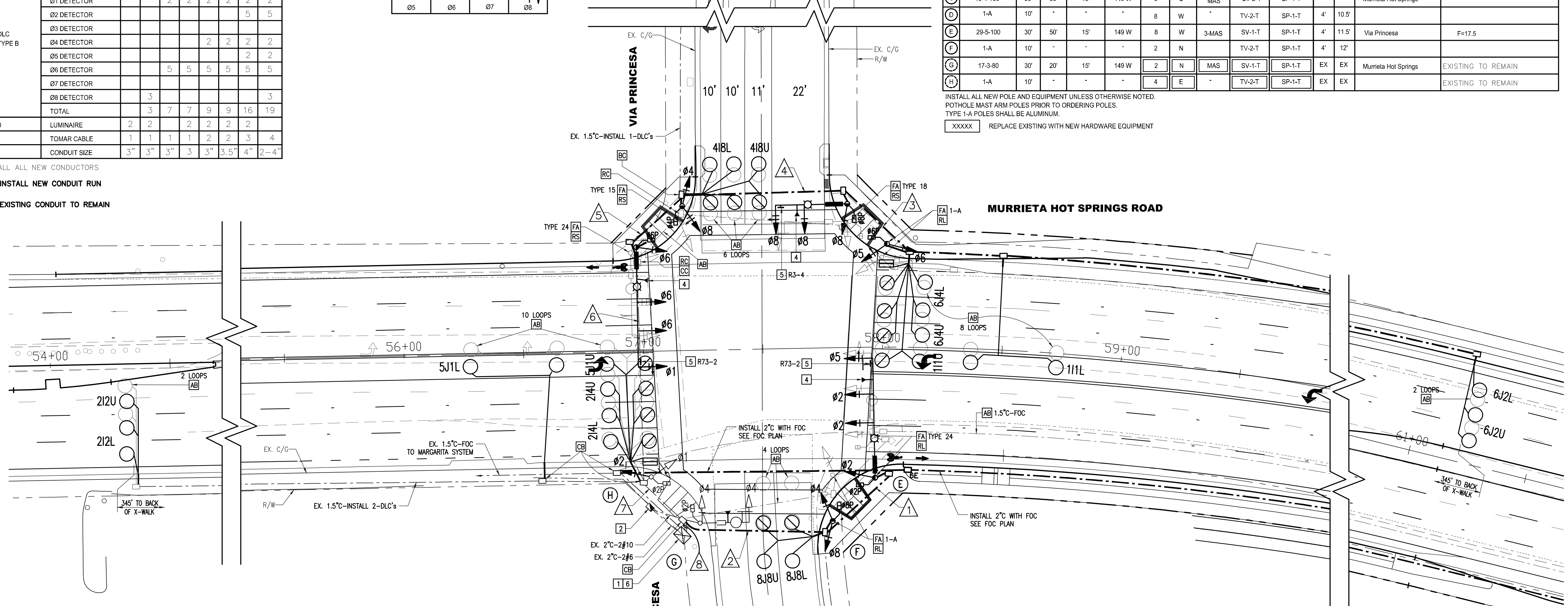


POLE SCHEDULE

POLE	STANDARD TYPE	STANDARD HEIGHT	MAST ARM LENGTH SIGNAL	MAST ARM LENGTH LUMINAIRE	L.E.D. LUMINAIRE	PPB PHASE	PPB QUAD	SIGNAL MOUNTINGS MA	SIGNAL MOUNTINGS POLE	SIGNAL MOUNTINGS PED	LOC A	LOC B	R.S.N.S. LEGEND	REMARKS
A	29-5-100	30'	50'	15'	149 W	4	E	3-MAS	SV-1-T	SP-1-T	4'	9.5'	VIa Princesa	F=17.5
B	1-A	10'	-	-	-	6	S	-	TV-2-T	SP-1-T	4'	12'		
C	19-4-100	30'	30'	15'	149 W	6	S	MAS	SV-2-T	SP-1-T	4'	12'	Murrieta Hot Springs	
D	1-A	10'	-	-	-	8	W	-	TV-2-T	SP-1-T	4'	10.5'		
E	29-5-100	30'	50'	15'	149 W	8	W	3-MAS	SV-1-T	SP-1-T	4'	11.5'	Via Princesa	F=17.5
F	1-A	10'	-	-	-	2	N		TV-2-T	SP-1-T	4'	12'		
G	17-3-80	30'	20'	15'	149 W	$\boxed{2}$	$\boxed{N}$	$\boxed{MAS}$	$\boxed{SV-1-T}$	$\boxed{SP-1-T}$	EX	EX	Murrieta Hot Springs	EXISTING TO REMAIN
H	1-A	10'	-	-	-	$\boxed{4}$	$\boxed{E}$	-	$\boxed{TV-2-T}$	$\boxed{SP-1-T}$	EX	EX		EXISTING TO REMAIN

INSTALL ALL NEW POLE AND EQUIPMENT UNLESS OTHERWISE NOTED.
POTHOLE MAST ARM POLES PRIOR TO ORDERING POLES.
TYPE 1-A POLES SHALL BE ALUMINUM.

XXXXX REPLACE EXISTING WITH NEW HARDWARE EQUIPMENT



CONSTRUCTION NOTES: (THIS SHEET ONLY)

1. MODIFY EXISTING TYPE 170E CONTROLLER ASSEMBLY WITHIN THE EXISTING MODEL 332 ALUMINUM CABINET FOR THE INTENDED OPERATION. FURNISH AND INSTALL McCAIN 233 MC1 PROGRAM CHIP. REMOVE EXISTING 3M OPTICOM PHASE SELECTORS, INSTALL NEW TOMAR PHASE SELECTORS .
2. EXISTING 120/240 VOLT, DUAL METERED TYPE III-CF SERVICE EQUIPMENT ENCLOSURE
3. REMOVE EXISTING OPTICOM DETECTOR, INSTALL NEW OPTICOM DETECTOR
4. INSTALL TOMAR APPROVED EQUAL EMERGENCY VEHICLE OPTICAL DETECTOR ON MAST ARM PER DETAIL SHOWN, HEREON OR AS DIRECTED BY THE INSPECTOR FOR NON MAST-ARM MOUNT.
5. FURNISH AND INSTALL SIGN (AS NOTED) PER CALTRANS STD PLAN ES-7N.

811
Know what's **below.**
Call before you dig.

"AS BUILT"

The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/ Developer of any responsibility for their accuracy.

Engineer of work ______ Date ______
RCE ______ EXP. ______

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163 3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
BRIAN STEPHENSON, P.E., T.E. DATE
PLAN CHECK FIRM–RICK ENGINEERING COMPANY
CITY OF MURRIETA
R.C.E. NO. 69471
EXP. 6/30/18

SEAL:

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

PREPARED BY DATE
–
R.C.E NO. – EXP. DATE –

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 23 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

TRAFFIC SIGNAL MODIFICATION PLAN VIA PRINCESA AT MURRIETA HOT SPRINGS ROAD

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

Feb 25, 2020 – 10:35am

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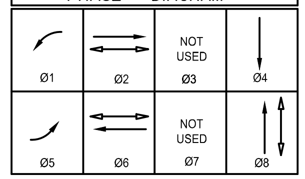
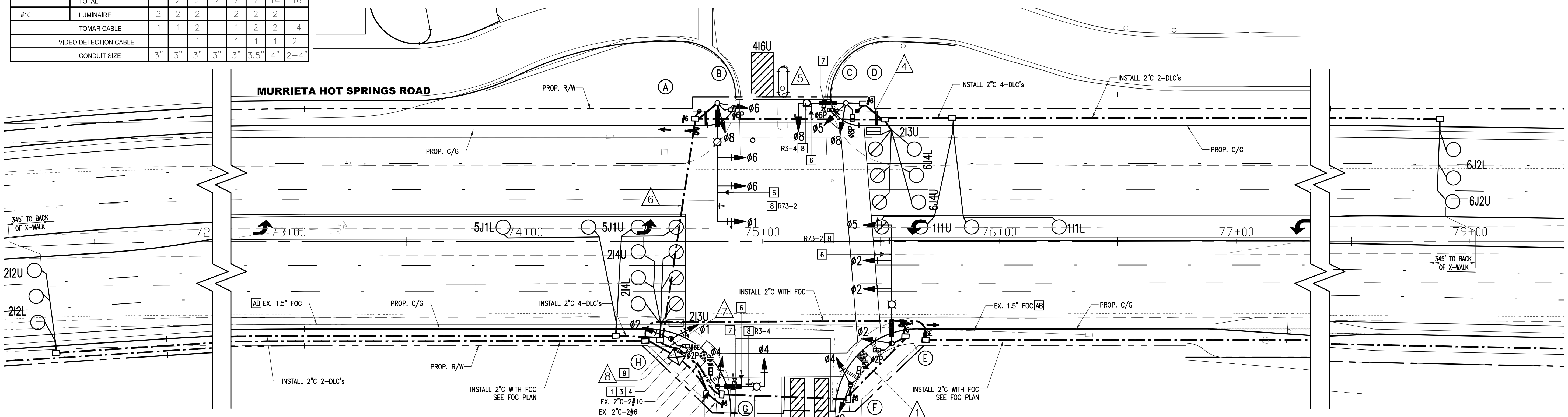
CONDUCTOR SCHEDULE									
AWG SIZE OR CABLE TYPE	POLE OR CIRCUIT	CONDUIT RUN							
		1	2	3	4	5	6	7	8
12 CONDUCTOR CABLE		1	2	3		1	2	3	6
3 CONDUCTOR CABLE		1	2	3		2	4	5	8
DLC TYPE B	Ø1 DETECTOR				2	2	2	2	2
	Ø2 DETECTOR							5	5
	Ø3 DETECTOR								
	Ø4 DETECTOR								
	Ø5 DETECTOR							2	2
	Ø6 DETECTOR				5	5	5	5	5
	Ø7 DETECTOR								
	Ø8 DETECTOR		2	2					2
	TOTAL		2	2	7	7	7	14	16
#10	LUMINAIRE	2	2	2		2	2	2	
	TOMAR CABLE	1	1	2		1	2	2	4
	VIDEO DETECTION CABLE			1		1	1	1	2
	CONDUIT SIZE	3"	3"	3"	3"	3"	3.5"	4"	2–4"

PHASE DIAGRAM



POLE SCHEDULE														
POLE	STANDARD		MAST ARM LENGTH		H.P.S.V.	PPB		SIGNAL MOUNTINGS			LOC		R.S.N.S.	REMARKS
	TYPE	HEIGHT	SIGNAL	LUMINAIRE	LUMINAIRE	PHASE	QUAD	MA	POLE	PED	A	B	LEGEND	
A	PPB-POST	XX	-	-	-	6	S	-	-	-	AS SEEN PER PLAN			
B	29-5-100	30'	50'	15'	149 W	-	-	3-MAS	SV-2-TB	SP-1-T	4.3'	7'	Calle Del Lago xxxx	F=15'
C	19-4-100	30'	20'	15'	149 W	-	-	MAS	SV-2-TB	SP-2-T	5.6'	6'	Murrieta Hot Springs xxxx	
D	PPB-POST	XX	-	-	-	6/8	S/W	-	-	-	AS SEEN PER PLAN			
E	29-5-100	30'	50'	15'	149 W	8	W	3-MAS	SV-1-T	SP-1-T	4'	11.5'	Calle Del Lago xxxx	F=15'
F	1-A	10'	-	-	-	2	N	-	TV-2-T	SP-1-T	4'	11.5'		
G	19-4-100	30'	20'	15'	149 W	2	N	MAS	SV-1-T	SP-1-T	4'	11'	Murrieta Hot Springs xxxx	
H	1-A	10'	-	-	-	4	E	-	TV-1-T	SP-1-T	4'	9.5'		

EXACT POLE LOCATION TO BE DETERMINED BY THE ENGINEER IN THE FIELD
POTHOLE MAST ARM POLES PRIOR TO ORDEING POLES.
XX = PEDESTRIAN PUSH BUTTONS WILL NEED TO MOUNTED TO THE PROPER HEIGHT PER CALTRANS STANDARD PLAN ES-7A



CONSTRUCTION NOTES (THIS SHEET ONLY)

1 – CONSTRUCT FOUNDATION PER CALTRANS STANDARD PLAN ES–3C. FURNISH AND INSTALL MODEL 170E CONTROLLER ASSEMBLY WITH McCAIN 233 MC1 PROGRAM WITHIN A MODEL 332L ALUMINUM CABINET ON CONCRETE SIDEWALK PER CALTRANS STD. PLAN ES–3C. POLICE PANEL TO BE ON STREET SIDE OF CABINET. FURNISH AND INSTALL CABLE FOR FULL 8 PHASE CABINET CAPABILITY WITH LOAD SWITCHES AND DETECTORS. CONTRACTOR SHALL PROVIDE CONFLICT MONITOR.

2 – FURNISH AND INSTALL 120/240 VOLT, DUAL METER TYPE III–CF SERVICE EQUIPMENT ENCLOSURE WITH THE FOLLOWING BREAKERS & PECS PER CALTRANS STD. PLAN ES–2F:

TC–1 METER	LS–3 METER
50A, 1P, SIGNALS	15A, 1P, SPARE
15A, 1P, OUTLET	40A, 2P, LIGHTING WITH TIME DELAY PEC & TEST SWITCH

3 – PROVIDE BATTERY BACK–UP SYSTEM AND BATTERY BACK–UP CABINET FOR TRAFFIC SIGNAL PER CALTRANS SPECIAL SPECIFICATION DATED JULY 7, 2009.

4 – FURNISH AND INSTALL (1) FIBER OPTIC PATCH PANEL, (1) DIGI CONNECT N2S–170 ETHERNET NETWORK CONTROLLER, (1) ITS–8040 8 PORT ETHERNET SWITCH WITH FIBER JUMPERS AND SFP TRANSCEIVERS INCLUDING (2) SINGLE MODE GBICS, (4) FC TO ST FIBER JUMPERS AT 6 FEET LENGTH EACH, AND (2) CAT5E 7 FEET LENGTH EACH.

5 – INSTALL 3" W/PULLROPE PER SCE STANDARD. CONTACT SCE PLANNER AT 951–928–6272

6 – INSTALL TOMAR OR APPROVED EQUAL EMERGENCY VEHICLE OPTICAL DETECTOR ON MAST ARM PER DETAIL SHOWN HEREON OR AS DIRECTED BY INSPECTOR FOR NON MAST–ARM MOUNT. INSTALL PHASE SELECTOR IN CONTROLLER CABINET.

7 – FURNISH AND INSTALL FLIR VIDEO DETECTION CAMERA OR APPROVED EQUAL ON LUMINAIRE MAST ARM AND SHELF MOUNTED PULL–OUT 15" LCD MONITOR IN CONTROLLER CABINET PER MANUFACTURER'S RECOMMENDATIONS.

8 – FURNISH AND INSTALL SIGN (AS NOTE) PER CALTRANS STD PLAN ES–7N.

9 – INSTALL 2"C – 2 FOC

SERVICE ADDRESS
XXXX MURRIETA HOT SPRINGS ROAD

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The receipt of As–Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.

Engineer of work ______ Date ______
RCE ______ EXP. ______

SEAL:

BENCH MARK:
RIV. CO. BM T 46–81 RESET 1997, ELEV. 1097.163
3–1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
BRIAN STEPHENSON, P.E., T.E. DATE
PLAN CHECK FIRM–RICK ENGINEERING COMPANY
CITY OF MURRIETA
R.C.E. NO. 69471
EXP. 6/30/18

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

PREPARED BY DATE
–
R.C.E NO. – EXP. DATE –

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 24 CITY OF MURRIETA ENGINEERING DEPARTMENT SHEETS 39

TRAFFIC SIGNAL PLAN
CALLE DEL LAGO AT
MURRIETA HOT SPRINGS ROAD

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09–XXX

DRAWING NO.

Feb 25, 2020 – 10:35am

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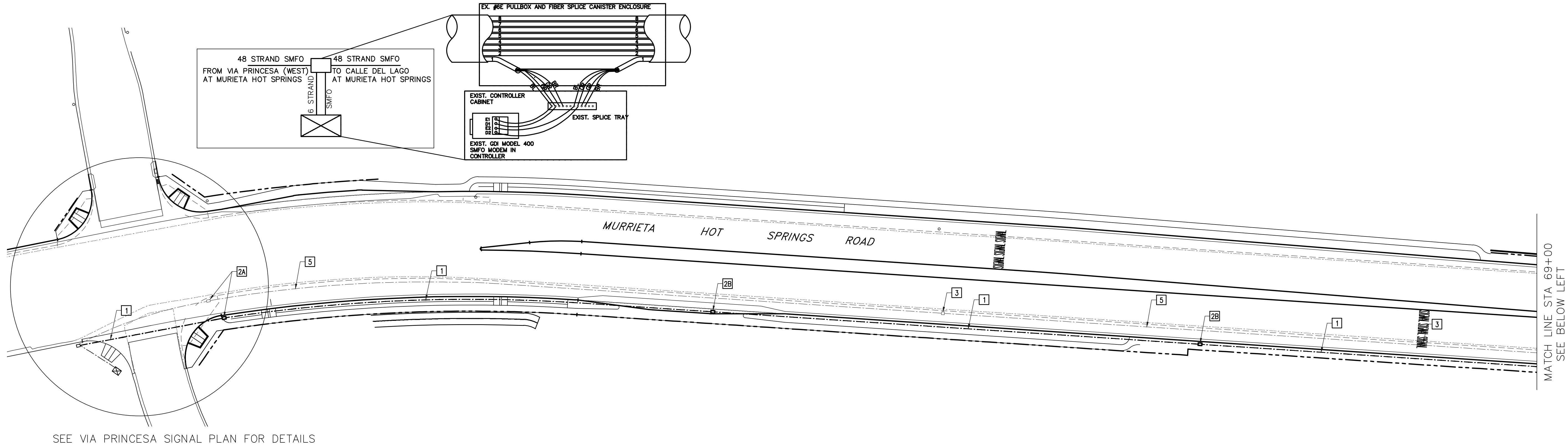

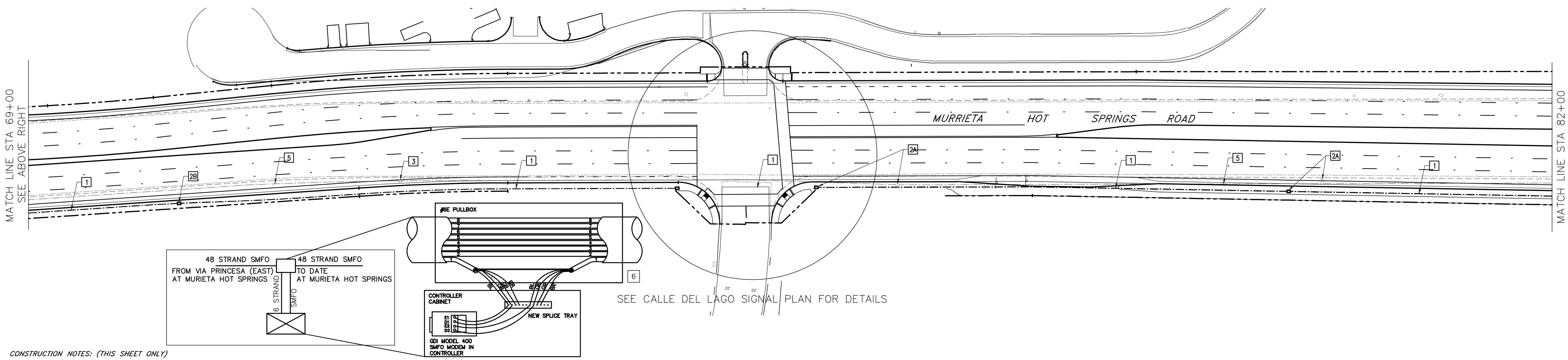

CONSTRUCTION NOTES: (THIS SHEET ONLY)

1 INSTALL 2"C – 1 REPULL FOC,1–#8 LOCATOR WIRE

2A INSTALL RELOCATE EXISTING #6E PULLBOX AND COIL ADDITIONAL 10 FEET FOC IN THE BOX

2B INSTALL #6E PULLBOX AND COIL ADDITIONAL 10 FEET FOC IN THE BOX

3 EXISTING #6E PULLBOX, SALVAGE TO CITY YARD

4 EXISTING FOC CONDUIT, INSTALL REPULL FOC

5 ABANDON EXISTING CONDUIT, CONTRACTOR TO DISCONNECT 48 STRAND SINGLE MODE FIBER AT WINCHESTER, PULL BACK TO VIA PRINCESA, AND REPULL INTO NEW CONDUIT RUN.

6 FURNISH AND INSTALL FIBER SPLICE CANISTER ENCLOSURE WITHIN NEW PULLBOX MAKE ALL CONNECTIONS PER INTERSECTION DIAGRAM.

811

Know what's **below.**
Call before you dig.

BENCH MARK:

RIV. CO. BM T 46-61 RESET 1997, ELEV. 1097.163 3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

"AS BUILT"

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Engineer of work ____________ Date ____________

RCE ____________ EXP. ____________

APPROVED FOR SIGNATURE

BRIAN STEPHENSON, P.E., T.E. ____________ DATE
PLAN CHECK FIRM–RICK ENGINEERING COMPANY

CITY OF MURRIETA
R.C.E. NO. 69471
EXP. 6/30/18

SEAL:

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

PREPARED BY ____________ DATE

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R.C.E NO. – ____________ EXP. DATE –

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 25 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

TRAFFIC SIGNAL INTERCONNECT PLAN
STA. 57+00 TO STA. 82+00

APPROVED
ROBERT K. MOEHLING ____________ DATE ____________
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09–XXX

DRAWING NO.

Feb 25, 2020 – 10:35am

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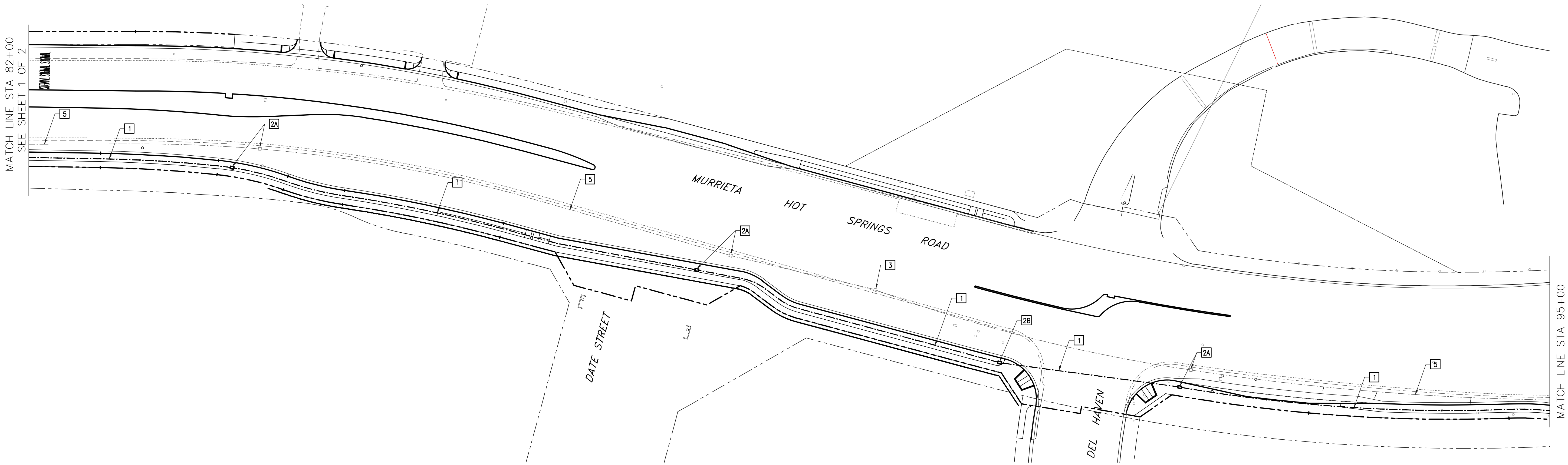
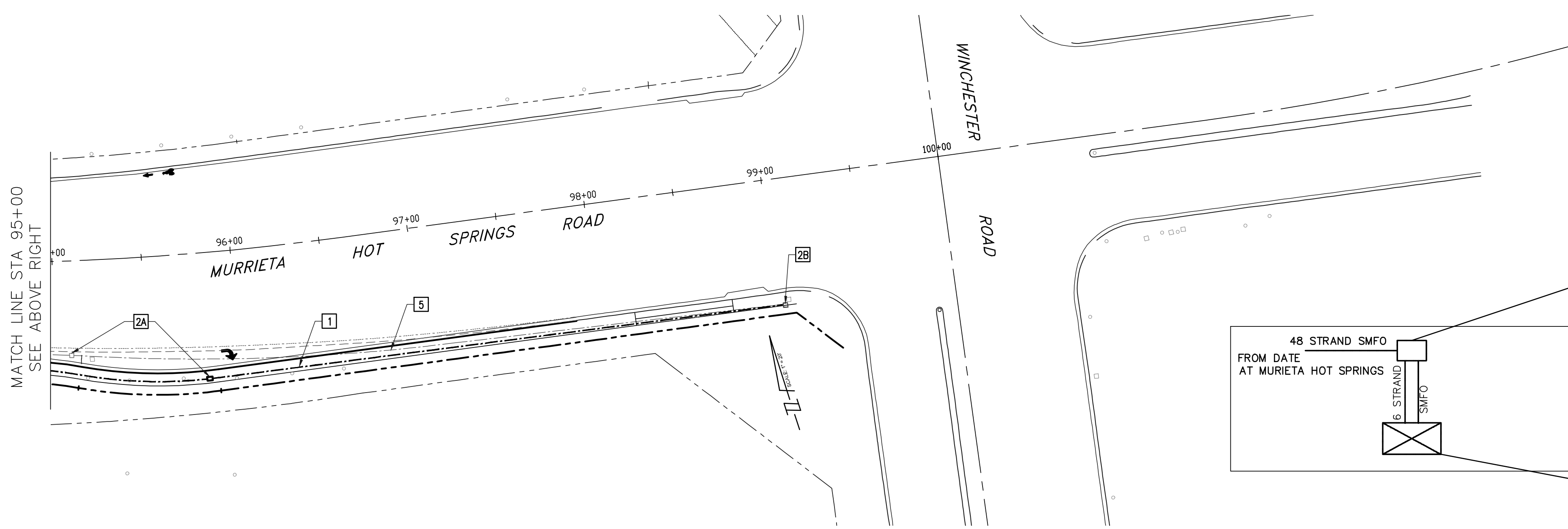
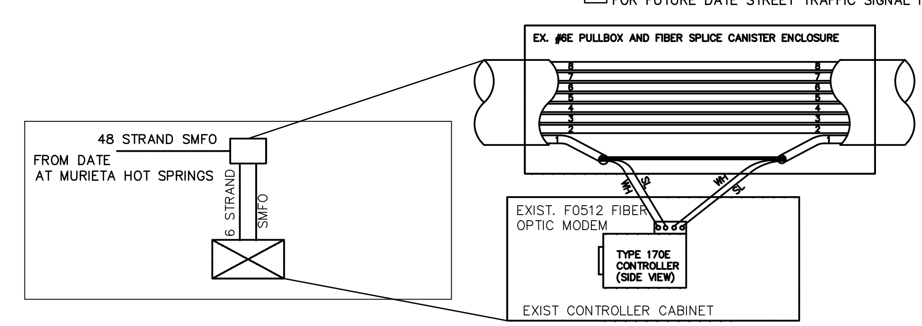




CONSTRUCTION NOTES: (THIS SHEET ONLY)

1. INSTALL 2"C – 1 REPULL FOC,1–#8 LOCATOR WIRE
2A. INSTALL RELOCATE EXISTING #6E PULLBOX AND COIL ADDITIONAL 10 FEET FOC IN THE BOX
2B. INSTALL #6E PULLBOX AND COIL ADDITIONAL 10 FEET FOC IN THE BOX
3. EXISTING FOC PULLBOX, SALVAGE TO CITY YARD
4. EXISTING FOC CONDUIT, INSTALL REPULL FOC
5. ABANDON EXISTING CONDUIT, CONTRACTOR TO DISCONNECT 48 STRAND SINGLE MODE FIBER AT WINCHESTER, PULL BACK TO VIA PRINCESA, AND REPULL INTO NEW CONDUIT RUN.
6. FURNISH AND INSTALL FIBER SPLICE CANISTER ENCLOSURE WITHIN NEW PULLBOX MAKE ALL CONNECTIONS PER INTERSECTION DIAGRAM.
7. FURNISH AND INSTALL #6 PULLBOXES AT EITHER END OF PROPOSED 3" CONDUIT FOR FUTURE DATE STREET ELECTRICAL SERVICE CONNECTION.
8. FURNISH AND INSTALL #6 PULLBOXES AT EITHER END OF PROPOSED 3" CONDUIT FOR FUTURE DATE STREET TRAFFIC SIGNAL INSTALLATION.



"AS BUILT"

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Engineer of work ____ Date ____

RCE ____ EXP. ____

SEAL:

Know what's **below.** **Call** before you dig.

BENCH MARK:

RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE

BRIAN STEPHENSON, P.E., T.E. ____ DATE
PLAN CHECK FIRM–RICK ENGINEERING COMPANY
CITY OF MURRIETA
R.C.E. NO. 69471
EXP. 6/30/18

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

PREPARED BY ____ DATE

–

R.C.E NO. – EXP. DATE –

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 26

CITY OF MURRIETA
ENGINEERING DEPARTMENT

SHEETS 39

TRAFFIC SIGNAL INTERCONNECT PLAN STA. 82+00 TO WINCHESTER ROAD

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK: ____

CIP NO. 8079
PROJECT NO. 09–XXX

DRAWING NO.

Feb 25, 2020 – 10:35am

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ATTACHMENT B NOTES

THE FOLLOWING BMPs AS OUTLINED IN, BUT NOT LIMITED TO, THE BEST MAMAGEMENT PRACTICE HANDBOOK, CALIFORNIA STORMWATER QUALITY TASK FORCE, SACRAMENTO, CALIFORNIA 2003, OR THE LATEST REVISED EDITION, MAY APPLY DURING THE CONSTRUCTION OF THIS PROJECT (ADDITIONALMEASURES MAY BE REQUIRED IF DEEMED APPROPRIATE BY CITY INSPECTORS):

EC1 – SCHEDULING
EC2 – PRESERVATION OF EXISTING VEGETATION
EC3 – HYDRAULIC MULCH
EC4 – HYDROSEEDING
EC5 – SOIL BINDERS
EC6 – STRAW MULCH
EC7 – GEOTEXTILES, PLASTIC COVERS, & EROSION CONTROL BLANKETS/MATS
EC8 – WOOD MULCHING
EC9 – EARTH DIKES/DRAINAGE SWALES & LINED DITCHES
EC10 – OUTLET PROTECTION/VELOCITY DISSIPATION DEVICES
EC11 – SLOPE DRAINS
EC12 – STREAMBANK STABILIZATION
SE1 – SILT FENCE
SE2 – SEDIMENT/DESILTING BASIN
SE3 – SEDIMENT TRAP
SE4 – CHECK DAM
SE5 – FIBER ROLLS
SE6 – GRAVEL BAG BERM
SE7 – STREET SWEEPING AND VACUUMING
SE8 – SAND BAG BARRIER
SE9 – STRAW BALE BARRIER
SE10 – STORM DRAIN INLET PROTECTION
WE1 – WIND EROSION CONTROL
TC1 – STABILIZED CONSTRUCTION ENTRANCE/EXIT
TC2 – STABILIZED CONSTRUCTION ROADWAY
TC3 – ENTRANCE/OUTLET TIRE WASH

NS1 – WATER CONSERVATION PRACTICES
NS2 – DEWATERING OPERATIONS
NS3 – PAVING AND GRINDING OPERATIONS
NS4 – TEMPORARY STREAM CROSSING
NS5 – CLEAR WATER DIVERSION
NS6 – ILLICIT CONNECTION/ILLEGAL DISCHARGE DETECTION & REPORTING
NS7 – POTABLE WATER/IRRIGATION
NS8 – VEHICLE AND EQUIPMENT CLEANING
NS9 – VEHICLE AND EQUIPMENT FUELING
NS10 – VEHICLE AND EQUIPMENT MAINTENANCE
NS11 – PILE DRIVING OPERATIONS
NS12 – CONCRETE CURING
NS13 – MATERIAL AND EQUIPMENT USE OVER WATER
NS14 – CONCRETE FINISHING
NS15 – STRUCTURE DEMOLITION/REMOVAL
WM1 – MATERIAL DELIVERY AND STORAGE
WM2 – MATERIAL USE
WM3 – STOCKPILE MANAGEMENT
WM4 – SPILL PREVENTION AND CONTROL
WM5 – SOILD WASTE MANAGEMENT
WM6 – HAZARDOUS WASTE MANAGEMENT
WM7 – CONTAMINATED SOIL MANAGEMENT
WM8 – CONCRETE WASTE MANAGEMENT
WM9 – SANITARY/SEPTIC WASTE MANAGEMENT
WM10 – LIQUID WASTE MANAGEMENT

CONSTRUCTION NOTES

1. MAINTAIN EXISTING SLOPE STABILIZATION MEASURES. STABILIZE ALL SLOPES GREATER THAN 3 FEET IN HEIGHT. INSTALL FIBER ROLLS AT 10' VERTICAL ON ALL SLOPES THAT WILL NOT BE STABILIZED BEFORE OCTOBER 1ST.
2. PROVIDE INLET PROTECTION PER DETAIL HEREON
3. INSTALL FIBER ROLLS ON MANUFACTURED SLOPES
4. INSTALL STABILIZED CONSTRUCTION ENTRY PER DETAIL HEREON
5. INSTALL GRAVEL BAGS PER DETAIL HEREON
6. INSTALL SILT FENCE PER DETAIL HEREON

LEGEND

DESCRIPTION	C.A.S.Q.A. STANDARD	SYMBOL
PROJECT BOUNDARY		
FIBER ROLL	SE-5	
GRAVEL BAGS	SE-6	
SILT FENCE	SE-1	—x—x—x—
DIRECTION OF DRAINAGE		
STABILIZED SLOPES	EC-4	
STABILIZED CONSTRUCTION ENTRY	TC-1	
*CONCRETE WASHOUT	WM-8	CW
*MATERIAL AND EQUIPMENT STORAGE AREA	WM-1	MS
*SANITARY FACILITIES	WM-9	SF
*WASTE & HAZARDOUS STORAGE AREA	WM-5 & 6	WT
*SOIL STOCKPILE	WM-3	SS
*VEHICLE MAINTENANCE, SERVICE, & FUELING	NS-9 & 10	VM
INLET INSPECTION I.D. NO.		A1
*POTENTIAL SAMPLING POINT		2

* INDICATES CONTRACTOR IS TO UPDATE S.W.P.P.P. WALL MAP (THIS EXHIBIT) TO REFLECT ACTUAL LOCATIONS.

NOTES FOR TC-1:

1. CONSTRUCT ON LEVEL GROUND WHEN POSSIBLE, ON A PAD OF COARSE AGGREGATE, GREATER THAN 75 MM (3 IN) BUT SMALLER THAN 150 MM (6 IN).

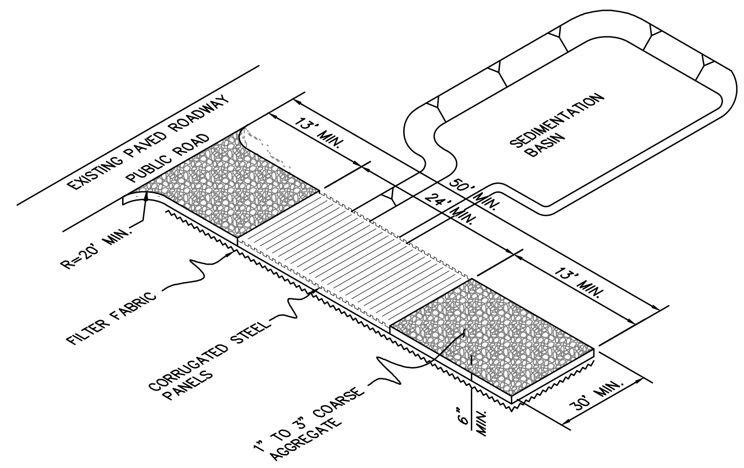
2. WASH RACK SHALL BE DESIGNED & CONSTRUCTED/MANUFACTURED FOR ANTICIPATED TRAFFIC LOADS.

3. PROVIDE A DRAINAGE DITCH THAT WILL CONVEY THE RUNOFF FROM THE WASH AREA TO A SEDIMENT SUMP DEVICE. THE DRAINAGE DITCH SHALL BE OF SUFFICIENT GRADE, WIDTH, AND DEPTH TO CARRY THE WASH RUNOFF.

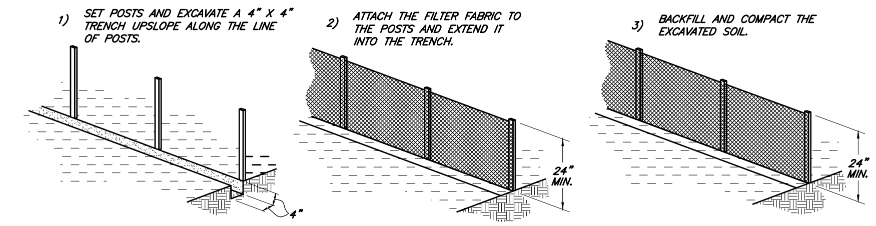
4. REQUIRE THAT ALL EMPLOYEES, SUBCONTRACTORS, AND OTHERS THAT LEAVE THE SITE WITH MUD-CAKED TIRES AND/OR UNDERCARRIAGES USE THE WASH FACILITY.

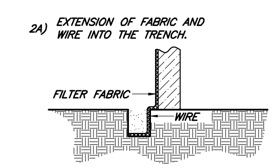
5. CONSTRUCTED/MANUFACTURED STEEL-RIBBED PLATES MAY BE USED IN LIEU OF ROCK.

6. REMOVE ACCUMULATED SEDIMENT IN WASH RACK AND/OR SEDIMENT SUMP TO MAINTAIN SYSTEM PERFORMANCE. INSPECT ROUTINELY FOR DAMAGE AND REPAIR AS NEEDED.



4 STABILIZED CONSTRUCTION ENTRANCE (TC-1)
NOT TO SCALE

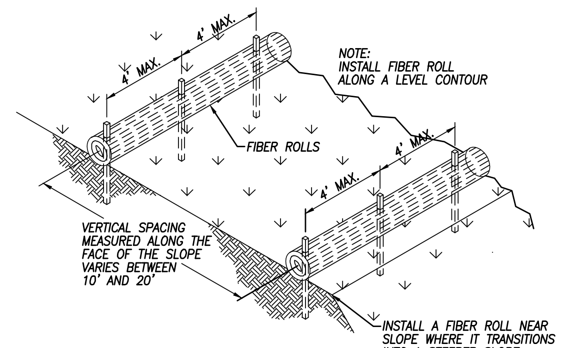




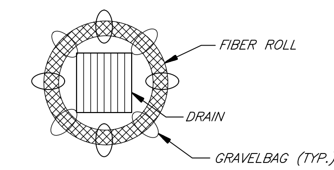
SILT FENCE NOTES:

1) POSTS FOR SILT FENCES SHALL BE EITHER 4-INCH DIAMETER WOOD OR EQUIVALENT WITH A MINIMUM LENGTH OF 5FEET. POSTS SHALL BE SPACED A MAXIMUM OF 10 FEET APART AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 12INCHES). 2" DIA. WOOD OR EQUIVALENT MAY BE USED PROVIDED POST SPACING DOES NOT EXCEED 4'. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 4 INCHES WIDE AND 4 INCHES DEEP ALONG THE LINE OF POSTS AND UPSLOPE FROM THE BARRIER.
2) THE FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE POST, AND 8 INCHES OF THE FABRIC SHALL EXTEND INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
3) THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE TOE OF THE FILTER FABRIC.

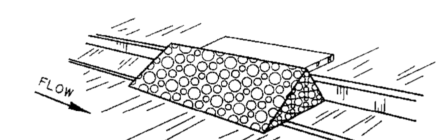
6 DETAIL OF A SILT FENCE (SE-1)
NOT TO SCALE

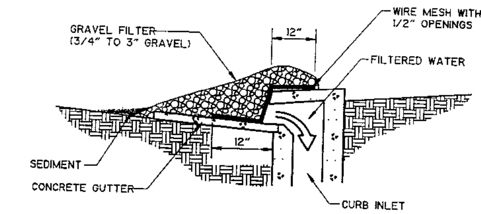


3 TYPICAL FIBER ROLL INSTALLATION (SE-5)
NOT TO SCALE



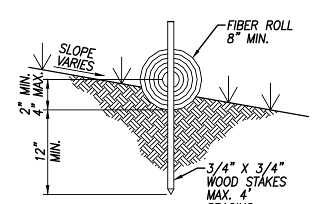
2 AREA DRAIN INLET PROTECTION
NOT TO SCALE



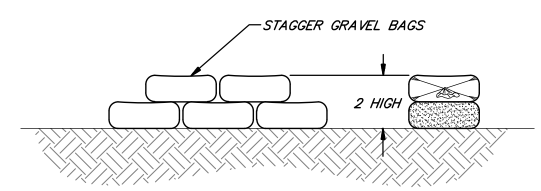


GRAVEL AND WIRE MESH FILTER FOR CURB INLET

2 CURB INLET PROTECTION
NOT TO SCALE



3 ENTRENCHMENT DETAIL (SE-5)
NOT TO SCALE



5 GRAVEL BAG STACKING DETAIL
NOT TO SCALE

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Engineer of work ______ Date ______
RCE ______ EXP. ______

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ______ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL AS NOTED
VERTICAL AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 27 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

EROSION CONTROL PLAN
MURRIETA HOT SPRINGS ROAD
EROSION CONTROL PLAN TITLESHEET

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:
CIP NO. 8079
PROJECT NO. 09-XXX
DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-EC.DWG 6/3/2020 9:16:30 AM PLOTTED BY:ROBERT FOTO

68282.10
90% SUBMITTAL

CONSTRUCTION NOTES

1. MAINTAIN EXISTING SLOPE STABILIZATION MEASURES. STABILIZE ALL SLOPES GREATER THAN 3 FEET IN HEIGHT. INSTALL FIBER ROLLS AT 10' VERTICAL ON ALL SLOPES THAT WILL NOT BE STABILIZED BEFORE OCTOBER 1ST.
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LEGEND

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PROJECT BOUNDARY		
FIBER ROLL	SE-5	
GRAVEL BAGS	SE-6	
SILT FENCE	SE-1	
DIRECTION OF DRAINAGE		
STABILIZED SLOPES	EC-4	
STABILIZED CONSTRUCTION ENTRY	TC-1	
* CONCRETE WASHOUT	WM-8	CW
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* SANITARY FACILITIES	WM-9	SF
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INLET INSPECTION I.D. NO.		A1
* POTENTIAL SAMPLING POINT		2

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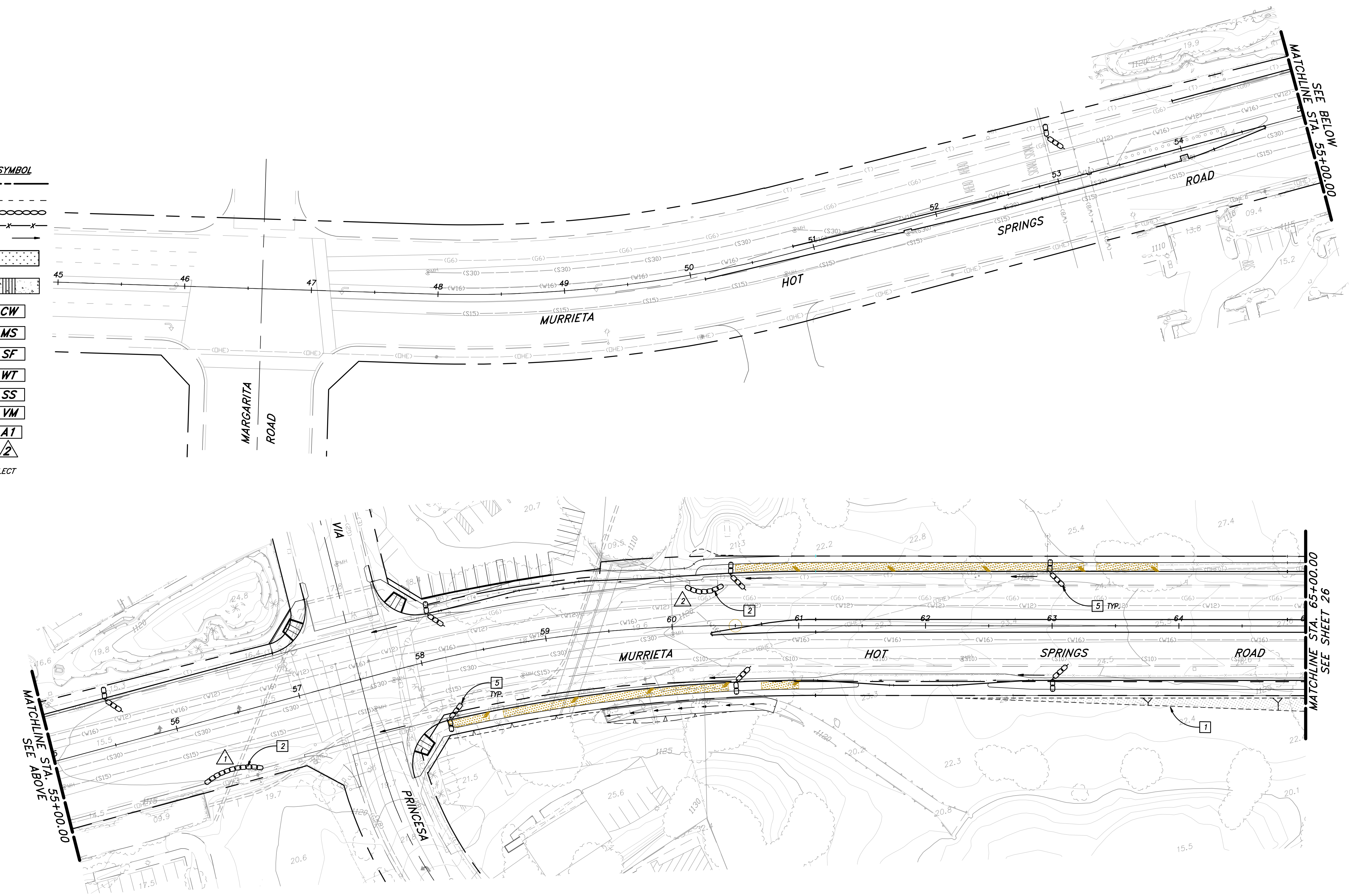

SCALE: 1" = 40'

40' 0 40' 80' 120'

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Engineer of work ____ Date ____
RCE ____ EXP. ____

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ____ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-6900
951-695-6901 Fax

PREPARED BY ____ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 28 — SHEETS 39

CITY OF MURRIETA
ENGINEERING DEPARTMENT

EROSION CONTROL PLAN
MURRIETA HOT SPRINGS ROAD
MARGARITA ROAD TO STA. 65+00.00

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-EC.DWG 6/3/2020 9:16:38 AM PLOTTED BY:ROBERT FOTO

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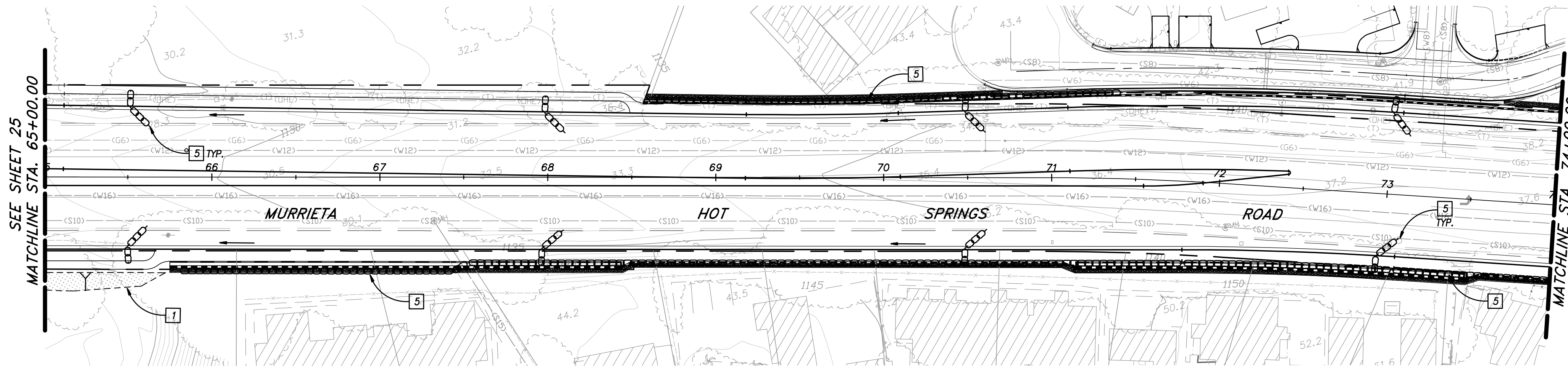

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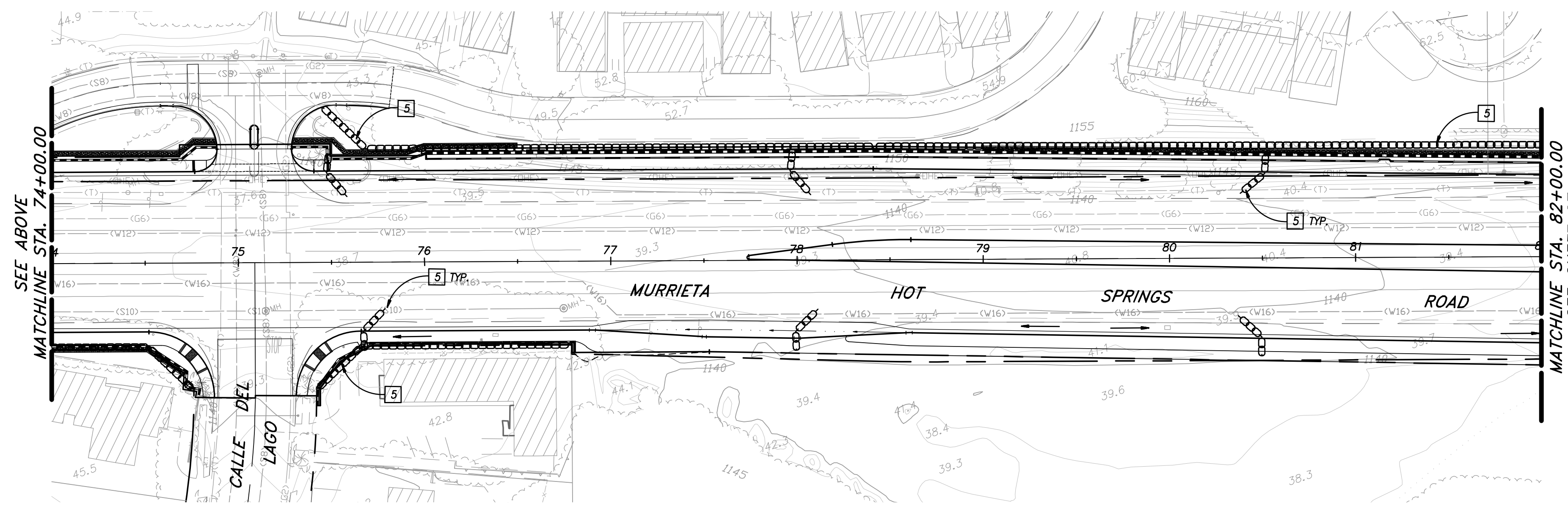

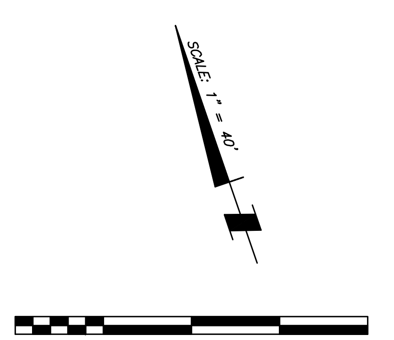

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APPROVED FOR SIGNATURE
JEFFREY J. HITCH ______ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 29 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

EROSION CONTROL PLAN
MURRIETA HOT SPRINGS ROAD
STA. 65+00.00 TO 82+00.00

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK: ______

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-EC.DWG 6/3/2020 9:16:46 AM PLOTTED BY:ROBERT FOTO

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LEGEND

DESCRIPTION	C.A.S.Q.A. STANDARD	SYMBOL
PROJECT BOUNDARY		
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INLET INSPECTION I.D. NO.		A1
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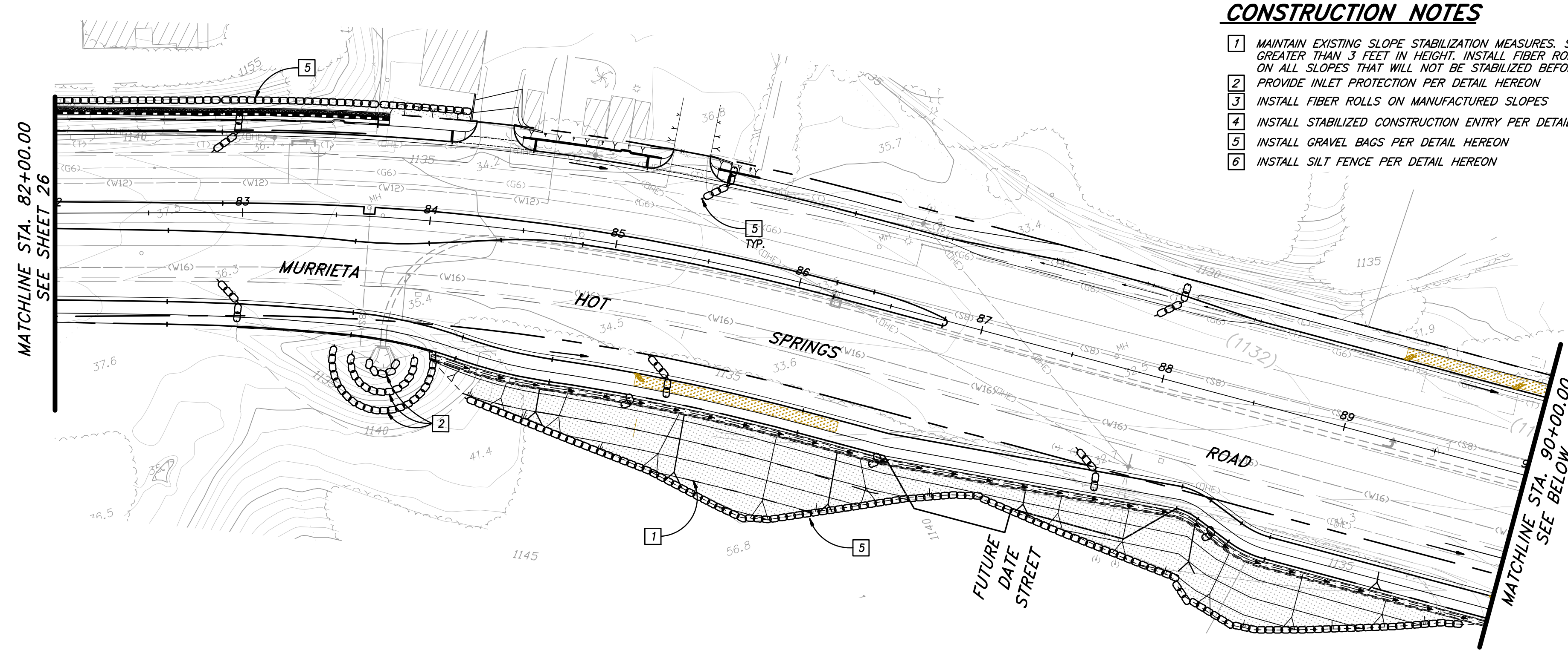

CONSTRUCTION NOTES

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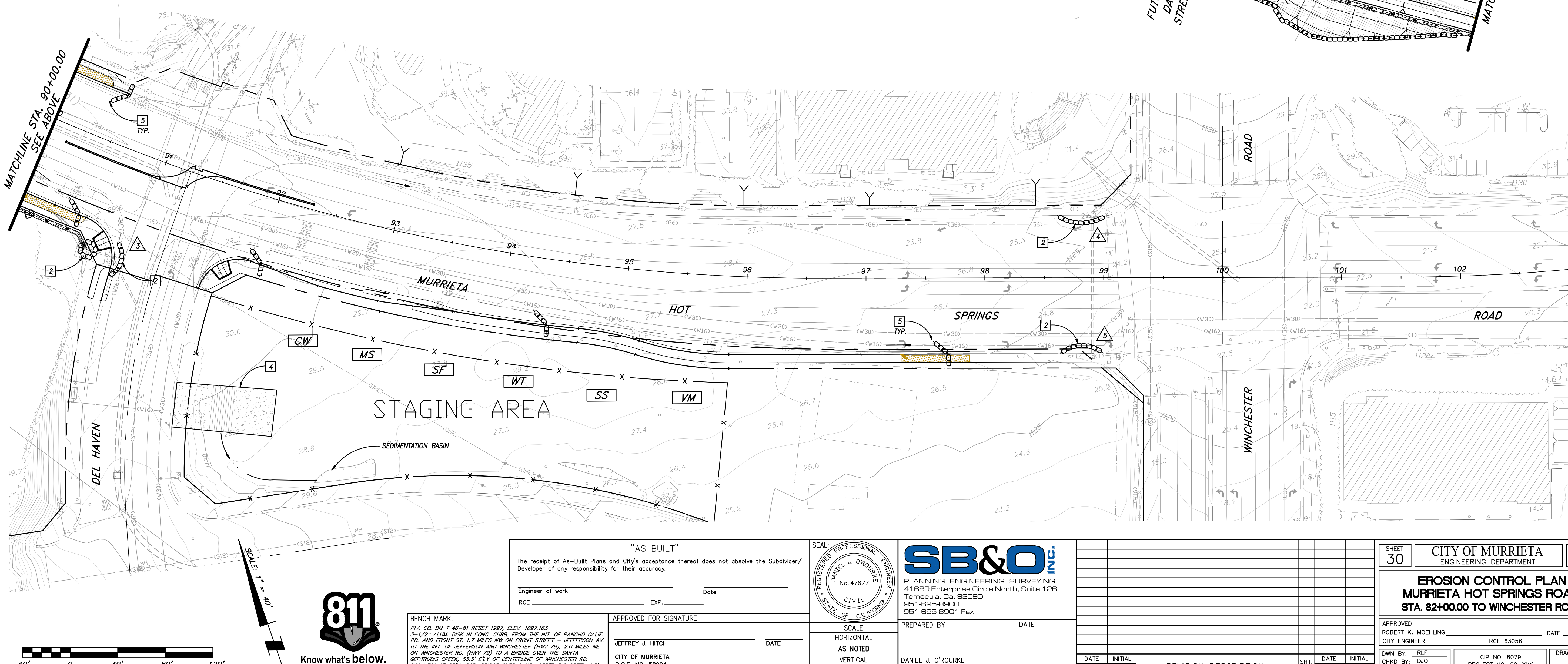

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RCE ____ EXP. ____

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CITY OF MURRIETA
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SEAL: REGISTERED PROFESSIONAL ENGINEER, DANIEL J. O'ROURKE, No. 47677, CIVIL, STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ____ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 30 — CITY OF MURRIETA, ENGINEERING DEPARTMENT — SHEETS 39

EROSION CONTROL PLAN
MURRIETA HOT SPRINGS ROAD
STA. 82+00.00 TO WINCHESTER ROAD

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

I:\68282 DATE ST & MHSRD\DWG\C-68282-EC.DWG 6/3/2020 9:16:55 AM PLOTTED BY:ROBERT FOTO

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90% SUBMITTAL

GENERAL SHORING NOTES

1. CONSTRUCTION SHALL CONFORM TO THE 2016 CALIFORNIA BUILDING CODE AND APPLICABLE REGULATING CITY OF TEMECULA REQUIREMENTS.
2. WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE 2013 EDITION OF THE STATE OF CALIFORNIA CONSTRUCTION SAFETY ORDERS (CAL-OSHA).
3. THE DESIGN OF THE PERMANENT SHORING SYSTEM IS BASED UPON RECOMMENDATIONS CONTAINED IN THE SITE INVESTIGATION, REPORT & REFERENCED UNDER "FOUNDATION NOTES"
4. THE SHORING SUB-CONTRACTOR SHALL FAMILIARIZE WITH DATA THEREIN AND A COPY OF THE SOILS REPORT AND APPLICABLE SUPPLEMENTAL LETTERS WILL BE AVAILABLE AT THE JOB SITE.
5. REFERENCE TO CIVIL PLANS FOR LOCATIONS OF EXISTING AND NEW UNDERGROUND UTILITIES. UTILITIES SHOWN ON CIVIL MAY BE APPROXIMATE ONLY & NOT ALL UTILITIES MAY BE SHOWN.
6. THE SHORING/GENERAL CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT AT 811 AT LEAST TWO WORKING DAYS BEFORE COMMENCING ANY EVACUATION.
7. HEAVY VEHICULAR TRAFFIC SURCHARGES, SUCH AS CRANES, CONCRETE TRUCKS, MATERIAL TRUCKS OR MATERIAL STORAGE LOADINGS, SHALL BE PROHIBITED WITHIN 10 FEET OF THE SOIL SIDE OF THE SHORING BULKHEAD EXCEPT FOR TEMPORARY CONSTRUCTION RAMPS AT THE FRONT SIDE OF THE SHORING BULKHEAD OR AS DESIGNATED ON PLANS.
8. DUST SHALL BE CONTROLLED AT ALL TIMES DURING SHORING INSTALLATION, EXCAVATION AND GRADING.
9. PROVIDE MEANS TO PREVENT SURFACE WATER FROM ENTERING EXCAVATION OVER TOP OF SHORING.
10. COORDINATE THESE DRAWINGS WITH THE SITE SURVEY DRAWINGS FOR SOLDIER BEAM LAYOUT. EXISTING GRADES AND BOTTOM OF THE STRUCTURE'S FOUNDATION ARE ESTIMATES ONLY AND MAY NOT REFLECT THE EXACT FIELD CONDITIONS.
11. INSTALLATION OF SHORING AND EXCAVATION SHALL BE PERFORMED UNDER THE CONTINUOUS OBSERVATION AND APPROVAL OF THE GEOTECHNICAL ENGINEER/REPRESENTATIVE.
12. NO TRENCHES OR EVACUATIONS 5 FEET OR GREATER IN DEPTH INTO WHICH A PERSON IS REQUIRED TO DESCEND SHALL BE CONSTRUCTED BEFORE OBTAINING THE NECESSARY PERMITS FROM THE STATE OF CALIFORNIA DIVISION OF INDUSTRIAL SAFETY AND PRIOR TO THE ISSUANCE OF A BUILDING OR GRADING PERMIT.
13. THE SHORING SYSTEM HAS BEEN DESIGNED IN ACCORDANCE WITH APPLICABLE CODES, THE APPROVED SOILS REPORT AND A DRAINED SOILS CONDITION.
14. FIELD VERIFY ALL EXISTING & PROPOSED STRUCTURES PRIOR TO SHORING INSTALLATION.
15. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FALL PROTECTION IN ACCORDANCE WITH CAL OSHA REGULATIONS

SOLDIER BEAM SURVEY MONITORING (BY OWNER)

1. SOLDIER BEAM SURVEY MONITORING SHALL BE CONDUCTED ON A PERIODIC BASIS UNTIL THE PERMANENT STRUCTURE IS CAPABLE OF SUPPORTING THE IMPOSED LATERAL LOADS.
2. CONTROL POINTS, INITIAL SOLDIER BEAM OFFSETS AND WEEKLY MONITORING SHALL BE PERFORMED BY A CALIFORNIA STATE LICENSED SURVEYOR.
3. A PHOTOGENIC/VIDEO SURVEY OF THE ADJACENT STREETS AND STRUCTURES SHOULD BE PERFORMED TO ESTABLISH THE PRE-EXCAVATION BASE-LINE CONDITIONS. PRIOR TO ANY EXCAVATION, SURVEY MONITORING CONTROL POINTS AND INITIAL SOLDIER BEAM OFFSETS SHALL BE ESTABLISHED TO MONITOR THE HORIZONTAL AND VERTICAL MOVEMENT OF THE SOLDIER BEAMS.
4. INITIAL AND PERIODIC READINGS SHALL BE SUBMITTED TO BUILDING & SAFETY, SHORING/GENERAL CONTRACTOR, SHORING ENGINEER, GEOTECHNICAL ENGINEER, AND CITY OF TEMECULA ENGINEERING DIVISION.
5. MONITORING READINGS SHALL BE SUBMITTED WITHIN 3 WORKING DAYS AFTER THEY ARE CONDUCTED. ADDITIONAL READINGS SHALL BE OBTAINED WHEN REQUESTED.
6. CONTROL POINTS SHALL BE ESTABLISHED OUTSIDE THE AREA OF INFLUENCE OF THE SHORING SYSTEM TO ENSURE THE ACCURACY OF THE MONITORING READINGS.
7. THE PERIODIC BASIS FOR SHORING MONITORING SHALL BE AS FOLLOWS:

A. INITIAL MONITORING SHALL BE PERFORMED PRIOR TO ANY EXCAVATION.

B. ONCE EXCAVATION HAS BEGUN, PERIODIC READINGS SHALL BE PERFORMED WEEKLY UNTIL THE EXCAVATION HAS REACHED THE PROJECT'S ESTIMATED SUBGRADE AND PERMANENT WALL FOUNDATION IS COMPLETED. AT THIS TIME THE SHORING ENGINEER SHALL EVALUATE THE PERFORMANCE OF THE SYSTEM TO DETERMINE FUTURE MONITORING REQUIREMENTS.

C. IF THE PERFORMANCE OF THE SHORING SYSTEM IS WITHIN ACCEPTABLE GUIDELINES, AS ESTABLISHED BY THIS SPECIFICATION (SEE ITEMS NO 8 AND 9), THE SHORING ENGINEER, WITH THE CONCURRENCE OF THE CITY OF TEMECULA, MAY PERMIT THE PERIODIC READINGS TO BE PERFORMED ON A BI-WEEKLY BASIS. ONCE INITIATED BI-WEEKLY READINGS SHALL CONTINUE UNTIL THE STREET LEVEL FLOOR IS COMPLETED AND CAPABLE OF TRANSMITTING LATERAL LOADS TO THE PERMANENT STRUCTURE.

8. IF ANY HORIZONTAL OR VERTICAL MOVEMENT OF THE SOLDIER BEAMS REACHES ONE INCH (ONE HALF INCH ADJACENT TO EXISTING STRUCTURES), THE GEOTECHNICAL ENGINEER, AND SHORING ENGINEER SHALL EVALUATE SUCH MOVEMENTS AND RECOMMEND CORRECTIVE MEASURES, IF NECESSARY, BEFORE EXCAVATION CONTINUES.
9. IF THE MAGNITUDE OF ANY HORIZONTAL OR VERTICAL MOVEMENT OF SOLDIER BEAMS REACHES TWO INCHES SUPPLEMENTAL SHORING SHALL BE DEVISED TO ELIMINATE ALL FURTHER MOVEMENT AND CITY OF TEMECULA SHALL APPROVE THE SUPPLEMENTAL SHORING EXCAVATION CONTINUES.

SOLDIER BEAM INSTALLATION PROCEDURE

1. SEE TYPICAL PLAN SECTION FOR LOCATION TOLERANCES. BEAM TOLERANCES ARE +/- 1 INCH AT THE TOP OF BEAMS AND +/- 1:120 FOR VERTICAL PLUMBNESS.
2. DRILL SHAFTS. SHAFTS SHALL NOT BE DRILLED ADJACENTLY; A TWO-PHASE SEQUENCE IS REQUIRED (UNLESS OTHERWISE DIRECTED BY THE GEOTECHNICAL ENGINEER). DRILLED SHAFTS ARE NOT PERMITTED TO BE LEFT OPEN OVER-NIGHT UNLESS WELL SECURED, COVERED WITH PLYWOOD AND APPROVAL FROM THE GEOTECHNICAL ENGINEER.
3. PLACE SOLDIER BEAMS IN SHAFT. FILL SHAFT WITH 2500 PSI CONCRETE IN THE EMBEDMENT DEPTHS AS SPECIFIED ON SCHEDULE. FILL BALANCE OF SHAFT WITH LEAN SAND-CEMENT MIXTURE (SLURRY: 1.5 SACKS OF CEMENT PER CUBIC YARD OF SAND).
4. TAKE INITIAL MONITORING READINGS. SEE SOLDIER BEAM SURVEY MONITORING FOR REQUIREMENTS.
5. LAGGING BETWEEN SOLDIER BEAMS IS REQUIRED.
6. TIMBER LAGGING SHALL BE TREATED FOR GROUND CONTACT. SEE THE MATERIAL SPECIFICATION, TIMBER FOR REQUIREMENTS.
7. CAREFUL INSTALLATION OF THE LAGGING WILL BE NECESSARY TO ACHIEVE FULL BEARING AGAINST THE RETAINED EARTH. FILL VOIDS BEHIND LAGGING WITH SAND SLURRY TO INSURE BEARING OF SOIL ALONG THE FULL LENGTH OF LAGGING. LIFTS ARE NOT TO EXCEED 5 FEET.
8. CONTINUE WITH THE EXCAVATION AND LAGGING INSTALLATION (FROM THE TOP DOWN) UNTIL SUB-GRADE IS REACHED. LAGGING MAY BE REQUIRED TO BE INSTALLED TO BOTTOM OF PROPOSED FOOTINGS OR SUB-DRAIN OR SPECIFIED OVER-EXCAVATION DEPTH. THE GENERAL CONTRACTOR SHALL BE CONSULTED FOR EXACT LAGGING REQUIREMENTS.

MATERIAL SPECIFICATION

SHAFTS

1. SHAFTS ARE TO BE MACHINE DRILLED. SHAFTS ARE TO BE ACCURATELY LOCATED SO THAT THE SOLDIER BEAMS ARE IN PROPER RELATION TO THE PROPERTY LINES AND PROPOSED BASEMENT WALLS.
2. PROVIDE PROTECTION AGAINST SLOUGHING OR CAVING AS REQUIRED.
3. SHAFTS SHALL NOT BE DRILLED ADJACENTLY; A MINIMUM 2-PHASE SEQUENCE IS REQUIRED UNLESS OTHERWISE DIRECTED BY THE GEOTECHNICAL ENGINEER.
4. CONCRETE @ SHAFTS TO BE PER "CONCRETE FOR SOLDIER PILES" NOTES BELOW

TIMBER:

1. WOOD LAGGING SHALL BE ROUGH SAWN DOUGLAS-FIR NO. 1.
2. WOOD LAGGING SHALL BE PRESSURE TREATED IN ACCORDANCE WITH AWPA U1 USE CATEGORY 4A. TREAT CUT ENDS WITH WATER REPELLENCY COPPER CARE WOOD PRESERVATIVES, INC. "TENINO COPPER NAPHTENATE" (CONTAINING NO ARSENIC OR CHROMIUM). CONTRACTOR TO APPLY GENEROUS AMOUNT TO COVER THE CUT END COMPLETELY OR DIP ENDS IN SOLUTION FOR 12 MINUTES MINIMUM.

REINFORCING STEEL:

1. CONCRETE COVER FOR REBAR SHALL BE:
   - A. CONCRETE POURED AGAINST EARTH: 3"
   - B. CONCRETE EXPOSED TO WEATHER:
     - 1. #5 AND SMALLER: 1½"
     - 2. #6 AND LARGER: 2"
   - C. CONCRETE NOT EXPOSED TO WEATHER:
     - 1. #11 AND SMALLER: ¾"
     - 2. #14 AND LARGER: 1½"
2. REBAR DETAILING AND PLACEMENT SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICE" BY THE REINFORCING STEEL INSTITUTE.
3. VERTICAL BARS SHALL BE TIED IN PLACE AT THE TOP, BOTTOM AND INTERMEDIATE POINTS PER CBC CHAPTERS 19 AND 21.
4. ALL REBAR, ANCHOR BOLTS, DOWELS AND INSERTS SHALL BE WELL SECURED IN POSITION PRIOR TO PLACING CONCRETE.
5. CONTRACTOR SHALL SUBMIT REINFORCING STEEL SHOP DRAWINGS FOR REVIEW BEFORE FABRICATION AND INSTALLATION.
6. WELDING OF REINFORCING BARS SHALL CONFORM TO AWS D1.4-05. E90XX ELECTRODES SHALL BE USED FOR BAR TO BAR & E70XX ELECTRODES SHALL BE USED FOR REINFORCING TO STRUCTURAL STEEL.

SLURRY:

1. CEMENT SHALL BE ASTM C-150 TYPE II/V.
2. AGGREGATES SHALL BE NATURAL SAND CONFORMING TO ASTM C-33.
3. SLURRY SHALL CONTAIN 1.5-SACKS OF CEMENT PER CUBIC YARD OF SAND.

CONCRETE FOR SOLDIER PILES:

1. MINIMUM STRENGTH OF CONCRETE SHALL BE 3500 PSI @ 28 DAYS.
2. CEMENT SHALL BE ASTM C-150, TYPE II/V.
3. AGGREGATES SHALL BE NATURAL SAND AND ROCK CONFORMING TO ASTM C-33
4. REFERENCE TO "CONCRETE NOTES" ON SHEET 9 OF 10 FOR ADDITIONAL REQUIREMENTS

STRUCTURAL STEEL (CBC CHAPTER 22)

1. WORKMANSHIP AND MATERIALS FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS SHALL CONFORM TO THE 13th EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION.
2. MATERIALS:

WIDE FLANGE:	ASTM A-992	GRADE 50
CHANNELS:	ASTM A-36	GRADE 36
ANGLES, PLATES & RODS:	ASTM A-36	GRADE 36 (UON)
HSS (TUBES):	ASTM A-500	GRADE B (FY= 46 KSI)
MACHINE BOLTS:	ASTM A-307	GRADE A
NUTS:	ASTM A-563	HEX, GRADE A
TYPICAL ANCHOR BOLTS:	ASTM F-1554	GRADE 36
HIGH STRENGTH ANCHOR BOLTS:	ASTM F-1554	(GRADE PER DETAILS)
NUTS:	ASTM A-563	HEAVY HEX, GRADE A
HIGH STRENGTH BOLTS:	ASTM A-325	
NUTS:	ASTM A-563	HEAVY HEX, GRADE C
HARDENED WASHERS:	ASTM F-436	
HEADED STUDS:	ASTM A-108	
NON-SHRINK GROUT:	ASTM C-1107 7000 PSI	

3. ROLLED STRUCTURAL SHAPES SHALL BEAR MILL IDENTIFICATION MARKS IN CONFORMANCE WITH ASTM A6-96. HSS (TUBES AND ROUNDS) SHALL BEAR MILL IDENTIFICATION IN ACCORDANCE WITH ASTM A-500 AND HSS (PIPES) IN ACCORDANCE WITH ASTM A-53.
4. WHEN FABRICATING BEAMS, PLACE NATURAL CAMBER UP.
5. PROVIDE HARDENED WASHERS AS REQUIRED PER THE SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.
6. BOLT HOLES:
   - A. TYPICAL STEEL TO STEEL CONNECTIONS: BOLT DIAMETER + 1/16 INCH
   - B. ANCHOR BOLTS (RODS): BOLT DIAMETER + 3/16 INCH
7. HEADED AND THREADED ANCHORS: NELSON SELF-FLUXED ANCHORS.
8. NON- SHRINK GROUT SHALL BE INSTALLED IMMEDIATELY AFTER COLUMN IS PLUMBED. CONTRACTOR SHALL NOT LOAD COLUMN ANCHOR BOLTS BEFORE PLACEMENT OF NON-SHRINK GROUT WITHOUT TAKING MEASURES TO PREVENT BUCKLING OF ANCHOR BOLTS UNDER CONSTRUCTION LOAD.
9. ALL WELDING SHALL BE DONE BY THE FLUX-CORE PROCESS USING APPROVED ELECTRODES PER AWS SPECIFICATION E70XX (LOW HYDROGEN ELECTRODES). WELDING SHALL CONFORM TO THE LATEST EDITION OF AWS D1.1 AND AWS D1.4 AND SHALL BE PERFORMED BY CERTIFIED WELDERS QUALIFIED UNDER THE PROCEDURES CONTAINED THEREIN.
10. WHERE WELD LENGTH IS NOT SHOWN, IT SHALL BE THE FULL LENGTH OF THE JOINT.
11. WHERE MINIMUM AISC FILLET WELD THICKNESS REQUIREMENT EXCEEDS WELDS SHOWN ON DETAILS, PROVIDE MINIMUM AISC WELD.
12. WELDS IDENTIFIED AS REQUIRING CONTINUOUS OR PERIODIC SPECIAL INSPECTION NEED NOT HAVE SPECIAL INSPECTION WHEN THE WELDING IS DONE IN AN APPROVED FABRICATOR'S SHOP. HOWEVER, THE APPROVED FABRICATOR MUST SUBMIT A CERTIFICATE OF COMPLIANCE IN ACCORDANCE WITH IBC SECTION 1704.2.2.
13. ALL FULL PENETRATION GROOVE WELDS SHALL BE ULTRASONICALLY INSPECTED BY AN APPROVED TESTING AGENCY AND SHALL CONFORM TO LATEST EDITION OF AWS D1.1, SECTIONS 5 AND 6.
14. ALL FLANGE STIFFENER PLATES AND CAP PLATES USED IN MOMENT CONNECTIONS SHALL BE ORIENTED SO THAT THE ROLLING DIRECTION OF THE PLATE IS PARALLEL WITH THE DIRECTION OF PRINCIPAL STRESS.
15. HIGH STRENGTH BOLTING:
   A. ALL STEEL TO STEEL CONNECTIONS SHALL HAVE A325 HIGH STRENGTH BOLTS (A325N DESIGN VALUES).
   B. ALL CONNECTIONS ALONG CHORD AND DRAG LINES, AS SHOWN ON PLANS, ARE "SLIP CRITICAL" CONNECTIONS. (A325SC DESIGN VALUES WITH SPECIAL INSPECTION)C. ALL BOLTS IN OVERSIZED OR SLOTTED HOLES ARE "SLIP CRITICAL" CONNECTIONS UNLESS OTHERWISE NOTED.
16. STAIRS SHALL BE DESIGNED IN ACCORDANCE WITH DETAILS PROVIDED AND IBC LOAD AND DEFLECTION CRITERIA. CALCULATIONS AND DRAWINGS SIGNED BY A CALIFORNIA REGISTERED CIVIL ENGINEER SHALL BE SUBMITTED TO AND REVIEWED BY THE ENGINEER AND BUILDING DEPARTMENT BEFORE FABRICATION.
17. STRESSES OCCURRING DURING FABRICATION, SHIPMENT, AND ERECTION SHALL BE TEMPORARY AND NOT EXCESSIVE. STRESSES AT ALL TIMES SHALL BE LESS THAN DESIGN AND ALLOWABLE STRESSES. THE FULL DESIGN AND LOAD CARRYING CAPACITY OF THE STEEL WORK SHALL NOT BE IMPAIRED DUE TO FABRICATION, SHIPMENT, OR ERECTION PROCEDURES. THROUGHOUT THE COMPLETE PROCESS, THE STABILITY OF INDIVIDUAL MEMBERS AND ASSEMBLIES SHALL BE MAINTAINED.
18. ALL ADDITIONAL STEEL REQUIRED FOR ERECTION PURPOSES SHALL BE PROVIDED AT NO ADDITIONAL COST AND SHALL BE REMOVED UNLESS APPROVED BY THE OWNER IN WRITING.
19. CERTIFICATIONS FROM THE STEEL FABRICATOR SHALL BE PROVIDED TO THE CITY BUILDING DIVISION FOR ALL STEEL DELIVERED TO THE JOB SITE PRIOR TO REQUESTING INSPECTIONS FOR STEEL FRAME, FLOOR SHEATHING, OR ROOF SHEATHING INSPECTION, WHICHEVER OCCURS FIRST.
20. STRUCTURAL STEEL SHOP DRAWINGS SHALL BE SUBMITTED TO AND REVIEWED BY THE ENGINEER BEFORE FABRICATION.

SPECIAL INSPECTION GENERAL NOTES:

1. THE OWNER OR THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT SHALL EMPLOY ONE OR MORE SPECIAL INSPECTORS TO PROVIDE INSPECTION DURING CONSTRCUTION ON THE TYPES OF WORK LISTED IN THE STATEMENT OF SPECIAL INSPECTIONS. THE SPECIAL INSPECTOR SHALL BE A QUALIFIED PERSON WHO SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE BUILDING OFFICIAL, FOR INSPECTION OF THE PARTICUAL TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION
2. THE CONSTRUCTION INSPECTIONS LISTED ARE IN ADDITION TO THE CALLED INSPECTIONS REQUIRED BY CHAPTER 17 OF THE BUILDING CODE. SPECIAL INSPECTION IS IN ADDITION TO, NOT A SUBSTITUE FOR, INSPECTION REQUIRED TO BE PERFORMED BY A CITY BUILDING INSPECTOR.
3. WHEN MORE THAN ONE CATEGORY OF WORK REQUIRING SPECIAL INSPECTION IS PERFORMED SIMULTANEOUSLY, OR THE LOCATION OF THE WORK IS SUCH THAT IT CANNOT BE OBSERVED PER THE STATEMENT OF INSPECTIONS AND SECTION 1705 OF THE BUILDING CODE, IT SHALL BE THE AGENCY'S RESPONSIBILITY TO EMPLOY A SUFFICIENT NUMBER OF INSPECTORS TO ASSURE THAT THE REQUIRED INSPECTIONS ARE PROVIDED.
4. THE SPECIAL INSPECTOR MUST BE CERTIFIED BY THE LOCAL JURISDICTION, DEVELOPMENT SERVICES, IN THE CATEGORY OF WORK REQUIRED TO HAVE SPECIAL INSPECTION. EXCEPTIONS:
   A. SOILS INSPECTION SHALL BE PROVIDED BY THE GEOTECHNICAL ENGINEER OF RECORD
   B. SMOKE CONTROL SYSTEM INSPECTIONS SHALL BE PERFORMED BY MECHANICAL ENGINEER OF RECORD
   C. WHEN THIS REQUIREMENT IS WAIVED BY THE BUILDING OFFICIAL
5. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE SPECIAL INSPECTOR OR INSPECTION AGENCY AT LEAST ONE WORKING DAY PRIOR TO PERFORMING ANY WORK THAT REQUIRES SPECIAL INSPECTION. ALL WORK INSTALLED, PERFORMED, OR COVERED WITHOUT REQUIRED SPECIAL INSPECTION IS SUBJECT TO REMOVAL OR EXPOSURE.
6. A PROPERTY OWNER'S FINAL REPORT FORM FOR WORK REQUIRED TO HAVE SPECIAL INSPECTIONS, AND STRUCTURAL OBSERVATIONS MUST BE COMPLETED BY THE PROPERTY OWNER, PROPERTY OWNER'S AGENT OF RECORD. ARCHITECT OF RECORD OR, ENGINEER OF RECORD AND SUBMITTED TO THE INSPECTION SERVICES DIVISION.
7. THE CONSTRUCTION MATERIALS TESTING LABORATORY MUST BE APPROVED BY THE LOCAL JURISDICTION, DEVELOPMENT SERVICES, FOR TESTING MATERIALS, SYSTEMS, COMPONENTS AND, EQUIPMENTS.
8. FABRICATOR MUST BE REGISTERED AND APPROVED BY THE LOCAL JURISDICTION, DEVELOPMENT SERVICES FOR THE FABRICATIONS OF MEMBERS AND ASSEMBLIES ON THE PREMISES OF THE FABRICATOR'S SHOP. FABRICATOR SHALL SUBMIT AN "APPLICATION TO PERFORM OFF-SITE FABRICATION" TO THE INSPECTION SERVICES DIVISION PRIOR TO COMMENCEMENT OF FABRICATION, FABRICATOR SHALL SUBMIT A "CERTIFICATE OF COMPLIANCE FOR OFF-SITE FABRICATION" TO THE INSPECTION SERVICES DIVISION PRIOR TO ERECTION OF FABRICATED ITEMS AND ASSEMBLIES.
9. WHERE MATERIALS OF ASSEMBLIES ARE REQUIRED BY THE BUILDING CODE TO BE LABELED, SUCH MATERIALS AND ASSEMBLIES SHALL BE LABELED BY AN AGENCY APPROVED BY LOCAL JURISDICTION IN ACCORDANCE WITH SECTION 1703. PRODUCTS AND MATERIALS TO BE LABELED SHALL BE TESTED, INSPECTED AND LABELED IN ACCORDANCE WITH THE PROCEDURES SET FORTH IN SECTIONS 1703.5.1 THROUGH 1703.5.3.
10. A CERTIFICATE OF SATISFACTORY COMPLETION OF WORK REQUIRING SPECIAL INSPECTION MUST BE COMPLETED AND SUBMITTED TO THE FIELD INSPECTION DIVISION OF THE APPROVING MUNICIPALITY

FOUNDATION NOTES

1. SOILS REPORT BY: LEIGHTON CONSULTING INC.
   SOILS REPORT NUMBER: 602804-002
   DATE OF REPORT: SEPT. 7, 2012
2. DESIGN SOIL PRESSURE: 2000 PSF
3. FOOTING DEPTH
   BELOW BUILDING PAD: 18"
   BELOW EXERIOR GRADE: 18"
4. SUBGRADE PREPARATION AND COMPACTION SHALL BE IN ACCORDANCE WITH THE SOILS REPORT UNDER THE SUPERVISION OF THE GEOTECHNICAL ENGINEER.
5. FOOTING EXCAVATIONS SHALL BE KEPT FREE FROM LOOSE MATERIAL AND STANDING WATER. EXCAVATIONS SHALL BE CHECKED AND APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACING CONCRETE TO ASSURE COMPLIANCE WITH THE SOILS REPORT.
6. FOUNDATIONS MAY BE POURED AGAINST STABLE SOIL.
7. METHOD OF SUPPORTING REINFORCING PIPE SLEEVES MUST BE APPROVED BY THE STRUCTURAL ENGINEER.
8. CONTRACTOR SHALL PROTECT ALL UTILITIES ENCOUNTERED DURING EXCAVATION AND BACKFILLING.
9. CONTRACTOR SHALL BRACE OR PROTECT FROM LATERAL LOADS ALL RETAINING WALLS UNTIL RESTRAINING FLOORS OR SLABS ARE IN PLACE AND HAVE ATTAINED FULL STRENGTH.
10. ALL HOLDOWNS SHALL BE TIED IN PLACE PRIOR TO FOUNDATION INSPECTION.
11. ANCHOR BOLTS SHALL BE ⅝"ϕ W/ 7" MINIMUM EMBEDMENT INTO CONCRETE W/ ¼"x3"x3" PLATE WASHERS.
12. MINIMUM ATTACHMENT FOR EXTERIOR WALLS SHALL BE ⅝"ϕ ANCHOR BOLTS @ 60" O.C. UON ON PLANS. MINIMUM ATTACHMENT FOR INTERIOR WALLS SHALL BE 7/32"ϕ ITW RAMSET/REDHEAD SHOTPIN (ICC-ESR 2690) @ 32" O.C. OR .157" PDPA SIMPSON SHOT PINS (ICC-ESR 2138) UON ON PLANS.

STATEMENT OF SPECIAL INSPECTIONS

MATERIAL, SYSTEM, COMPONENT AND WORK REQUIRED TO HAVE SPEC. INSP.	TYPE OF SPEC. INSP. CONTINUOUS	TYPE OF SPEC. INSP. PERIODIC	INSPECTION NOTES
MASONRY (LEVEL 1):			
AS MASONRY CONSTRUCTION BEGINS, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE:			
A. PROPORTIONS OF SITE-PREPARED MORTAR		X	
B. CONSTRUCTION OF MORTAR JOINTS		X	
C. LOCATION OF REINF.		X	
THE INPECTION PROGRAM SHALL VERIFY:			
A. SIZE AND LOCATION OF THE STRUCTURAL ELEMENTS		X	
B. TYPE, SIZE AND LOCATION OF ANCHORS		X	
C. SPECIFIED SIZE, GRADE AND TYPE OF REINFORCING		X	
D. WELDING OF REINF.	X		
E. PRETECTION OF MASONRY FROM HOT OR COLD		X	
PRIOR TO GROUTING THE FOLLOWING SHALL BE VERIFIED:		X	
A. GROUT SPACE IS CLEAN		X	
B. PLACEMENT OF REINFORCING		X	
C. PROPORTIONS OF SITE-PREPARED GROUT		X	
D. CONSTRUCTION OF MORTAR JOINTS		X	
GROUT PLACEMENT SHALL BE VERIFIED TO ENSURE COMPLIANCE WITH CODE AND CONSTRUCTION DOCUMENT PROVISIONS.	X		
PREPARATION OF ANY REQUIRED GROUT SPECIMENS, MORTAR SPECIMENS AND/OR PRISMS SHALL BE OBSERVED.	X		
COMPLIANCE WITH REQUIRED INSPECTION PROVISIONS OF THE CONSTRUCTION DOCUMENTS AND THE APPROVED SUBMITTALS SHALL BE VERIFIED.		X	
MASONRY FOUNDATION WALLS	NOT REQUIRED		CONSTRUCTED IN ACCORDANCE WITH TABLE 1805.5(1), 1805.5(2), 1805.5(3) OR 1805.5(4).
CONCRETE:			
FOUNDATIONS WITH f'c ≤ 2500 PSI	NOT REQUIRED		
INSPECTION OF REINF. STEEL, INCLUDING PRESTRESSING TENDONS, AND PLACEMENT		X	ACI 318: 3.5, 7.1-7.7
VERIFYING USE OF REQUIRED DESIGN MIX		X	ACI 318: CHAPTER 4, 5.2-5.4
TAKING TEST SAMPLES	X		ACI 318: 5.6, 5.8
INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT	X		ACI 318: 5.9, 5.10
INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMP. AND TECHNIQUE		X	ACI 318: 5.9, 5.10
APPLICATION OF PRESTRESSING FORCES	X		ACI 318: 18.20
GROUTING OF BONDED PRESTRESSING TENDONS IN THE SEISMIC FORCE RESISTING SYSTEM	X		ACI 318: 18.18.4
ERECTION OF PRECAST MEMBERS		X	ACI 318: CHAPTER 16
VERIFICATION OF IN-SITU CONCRETE STRENGTH PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.		X	ACI 318: 6.2
INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.		X	ACI 318: 6.1.1
SOILS:			
VERIFY MATERIAL BELOW FOOTINGS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY		X	
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL		X	
PERFORM CLASSIFICATION AND TESTING OF CONTROLLED FILL MATERIALS		X	
VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF CONTROLLED FILL	X		
PRIOR TO PLACEMENT OF CONTROLLED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY		X	
PIER FOUNDATIONS:			
PLACEMENT OF REINFORCING		X	
PLACEMENT OF CONCRETE	X		
OBSERVE DRILLING OPERATIONS AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH ELEMENT.	X		
VERIFY PLACEMENT LOCATIONS AND PLUMBNESS, CONFIRM ELEMENT DIAMETERS, BELL DIAMETERS (IF APPLICABLE), LENGTHS, EMBEDMENT INTO BEDROCK (IF APPLICABLE) AND ADEQUATE END-BEARING STRATA CAPACITY, RECORD CONCRETE OR GROUT VOLUMES.	X		
TIMBER LAGGING:			
VERIFY USE OF PROPER MATERIALS (SUCH AS WOOD GRADE 4X12 NO 1 OR BETTER, APPROPRIATE PRESSURE TREATMENT, APPLICATION WATER REPELLENCY AT FIELD CUT ENDS & 1" MINIMUM LAP LENGTHS WITH SOLDIER BEAMS).	X		

HTK STRUCTURAL ENGINEERS, LLP
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(858) 679-8989 • WWW. HTKSE.COM • Fax (858) 679-8959

SEAL: REGISTERED PROFESSIONAL ENGINEER HELMAND M. KUSHAKI No. 4326 Expires 12/31/21 STRUCTURAL STATE OF CALIFORNIA

"AS BUILT"

The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.

Engineer of work ____________ Date ________

RCE ____________ EXP. ________

DIG ALERT!! TWO WORKING DAYS BEFORE DIG
ALL EXISTING UTILITIES MAY NOT BE SHOWN ON THESE PLANS.
DIG ALERT & GENERAL CONTRACTOR SHALL LOCATE & POTHOLE (AS NEEDED), ALL EXISTING UTILITIES BEFORE SHORING WALL CONSTRUCTION BEGINS

STATE OF CALIFORNIA
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
TRENCH / EXCAVATION PERMIT NO. ____________

811

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET - JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ____ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No.47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ____ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 31 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

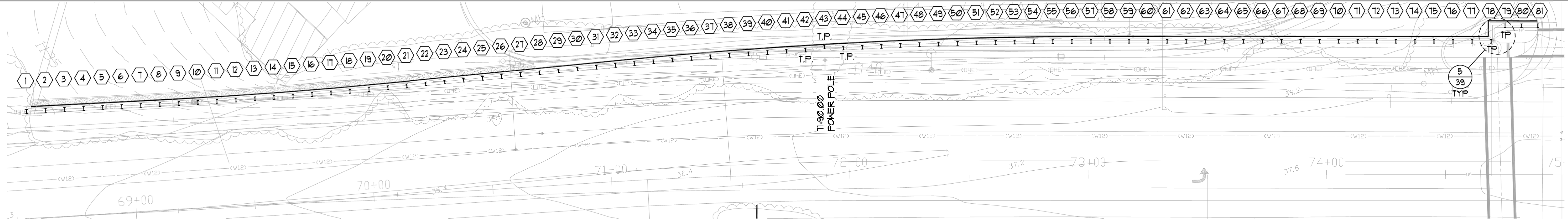
STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL PLAN

APPROVED
ROBERT K. MOEHLING ____________ DATE ______
CITY ENGINEER RCE 63056

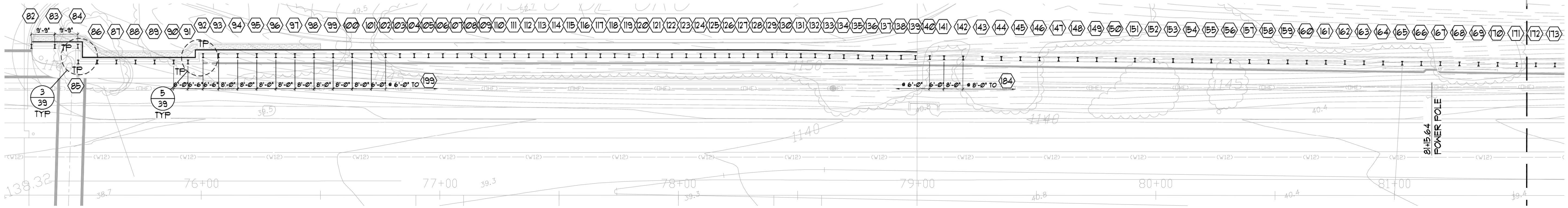
DWN BY: ______
CHKD BY: ______
FIELD BK: ______

CIP NO. 8079
PROJECT NO. 09-XXX

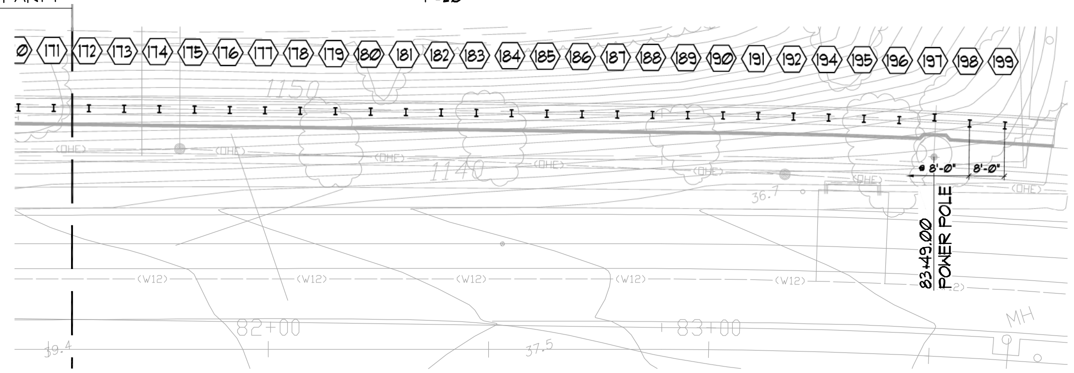
DRAWING NO.



NORTH WALL SEGMENT 1
1"=20'



NORTH WALL SEGMENT 2 (PART 1)
1"=20'



NORTH WALL SEGMENT 2 (PART 2)
1"=20'

NORTH WALL SEGMENT 1

PILE NUMBER	RETAINED (*) HEIGHT "H"	SHAFT DIAMETER	BEAM SECTION	PILE SPACING	EMBED DEPTH "D"	TOTAL (*) DEPTH "H"+"D"
1-5	6'-0"	24"	W10x22	8'-0"	8'-0"	14'-0"
6-9	7'-0"	24"	W14x22	8'-0"	9'-0"	16'-0"
10-12	9'-0"	24"	W16x26	8'-0"	11'-0"	20'-0"
13	10'-0"	24"	W16x50	8'-0"	16'-0"	26'-0"
14-45	12'-0"	24"	W16x89	8'-0"	18'-0"	30'-0"
46-52	10'-0"	24"	W16x50	8'-0"	16'-0"	26'-0"
53-63	9'-0"	24"	W16x40	8'-0"	14'-0"	23'-0"
64-73	8'-0"	24"	W16x36	8'-0"	12'-0"	20'-0"
74-81	5'-0"	24"	W12x19	8'-0"	7'-0"	12'-0"

(*): HEIGHT INDICATED DOES NOT COVER HEIGHT OF WALL ABOVE RETAINING HEIGHT CONTRACTOR TO ACCOUNT FOR ADDITIONAL BEAM LENGTH AS REQUIRED.

NORTH WALL SEGMENT 2

PILE NUMBER	RETAINED (*) HEIGHT "H"	SHAFT DIAMETER	BEAM SECTION	PILE SPACING	EMBED DEPTH "D"	TOTAL (*) DEPTH "H"+"D"
82-84	7'-6"	24"	W16x26	8'-0"	11'-0"	18'-6"
85-90	9'-0"	24"	W16x36	8'-0"	12'-0"	21'-0"
91-93	10'-0"	24"	W16x26	8'-0"	12'-0"	22'-0"
94-96	12'-0"	24"	W16x89	8'-0"	18'-0"	30'-0"
97-101	14'-0"	30"	HP18x135 OR W21x93	8'-0"	18'-0"	32'-0"
102-107	16'-0"	30"	HP18x181 OR W21x147	8'-0"	21'-0"	37'-0"
108-141	18'-0"	30"	HP21x166	8'-0"	22'-0"	40'-0"
142-148	17'-0"	30"	HP18x181 OR W21x83	8'-0"	21'-0"	38'-0"
149-184	15'-0"	30"	HP18x135 OR W21x93	8'-0"	20'-0"	35'-0"
185-190	14'-0"	30"	W21x73	8'-0"	17'-0"	31'-0"
191-193	12'-0"	24"	W16x50	8'-0"	15'-0"	27'-0"
194-196	10'-0"	24"	W16x36	8'-0"	12'-0"	22'-0"
197-198	8'-0"	24"	W16x31	8'-0"	10'-0"	18'-0"
199	5'-0"	24"	W12x15	8'-0"	7'-0"	12'-0"

(*): HEIGHT INDICATED DOES NOT COVER HEIGHT OF WALL ABOVE RETAINING HEIGHT CONTRACTOR TO ACCOUNT FOR ADDITIONAL BEAM LENGTH AS REQUIRED.

LEGEND

I :INDICATES SHORING BEAM

——— :INDICATES CMU WALL

T.P. :INDICATES TURNING POINT

THESE PLANS ARE PROVIDED FOR REFERENCE. FOR TOP OF WALL (T.O.W.), BOTT. OF WALL (B.O.W.) & ALL OTHER INFORMATION REF TO CIVIL PLANS

20' 0 20' 40' 60'

DIG ALERT!! TWO WORKING DAYS BEFORE DIG

ALL EXISTING UTILITIES MAY NOT BE SHOWN ON THESE PLANS.
DIG ALERT & GENERAL CONTRACTOR SHALL LOCATE & POTHOLE (AS NEEDED), ALL EXISTING UTILITIES BEFORE SHORING WALL CONSTRUCTION BEGINS

STATE OF CALIFORNIA
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
TRENCH / EXCAVATION PERMIT NO. ______

811

HTK STRUCTURAL ENGINEERS, LLP
14288 Danielson Street • Suite #200 • Poway, CA 92064-8819
(858) 679-8989 • WWW. HTKSE.COM • Fax (858) 679-8959

SEAL: REGISTERED PROFESSIONAL ENGINEER HELMAND M. KUSHKAKI No. 4326 Expires 12/31/21 STRUCTURAL STATE OF CALIFORNIA

"AS BUILT"

The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/ Developer of any responsibility for their accuracy.

Engineer of work ______ Date ______

RCE ______ EXP. ______

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
JEFFREY J. HITCH DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 32 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

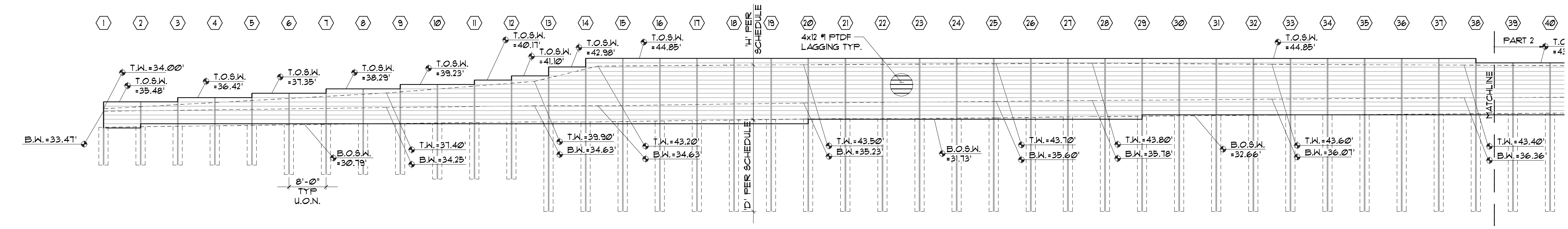
STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL PLAN

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: ______
CHKD BY: ______
FIELD BK: ______

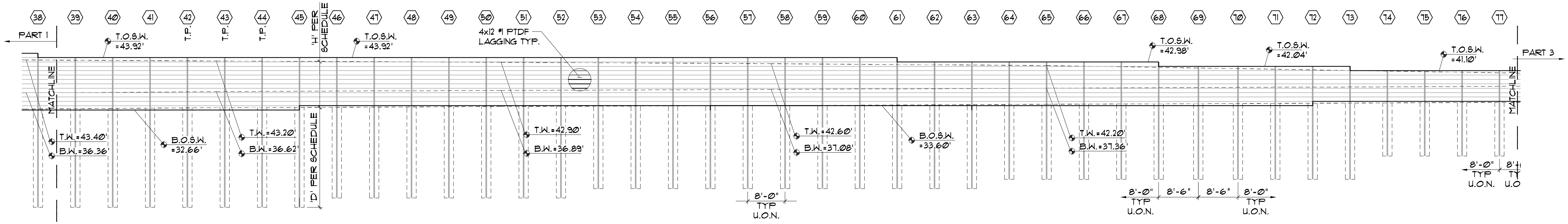
CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.



1 NORTH WALL SEGMENT 1 ELEVATION (PART 1)

1"=10'-0"



1 NORTH WALL SEGMENT 1 ELEVATION (PART 2)

1"=10'-0"

LEGEND

T.W. : INDICATES TOP OF WALL PER CIVIL (VERIFY)

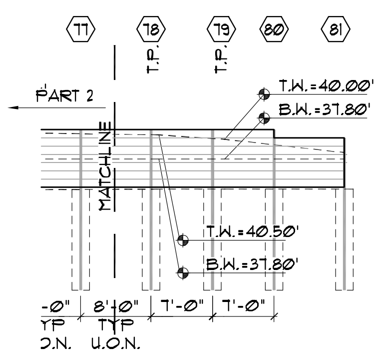
B.W. : INDICATES BOTTOM OF WALL PER CIVIL (VERIFY)

(#) : INDICATES BOTTOM OF OVER EXCAVATED IS ESTIMATED TO BE 3.42' BELOW BOTTOM OF WALL ELEVATION PER CIVIL

T.P. : INDICATES TURNING POINT. REFERENCE PLAN FOR PILE LOCATION

B.O.S.W. : INDICATES BOTTOM OF SHORING WALL

U.O.N. : UNLESS OTHERWISE NOTED



1 NORTH WALL SEGMENT 1 ELEVATION (PART 3)

1"=10'-0"

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STATE OF CALIFORNIA
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
TRENCH / EXCAVATION PERMIT NO. ____________

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SEAL: REGISTERED PROFESSIONAL ENGINEER HELMAND M. KOSHKI No. 4326 Expires 12/31/21 STRUCTURAL STATE OF CALIFORNIA

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Engineer of work ____________ Date ____________
RCE ____________ EXP. ____________

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APPROVED FOR SIGNATURE
JEFFREY J. HITCH ____________ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ____________ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 33 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL PLAN

APPROVED
ROBERT K. MOEHLING ____________ DATE ____________
CITY ENGINEER RCE 63056

DWN BY:
CHKD BY:
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

Jun 02, 2020 - 8:28am

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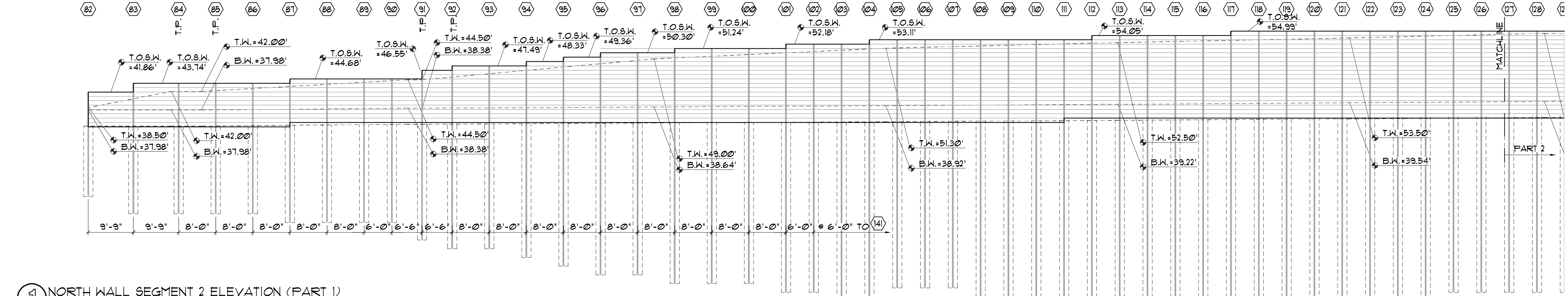
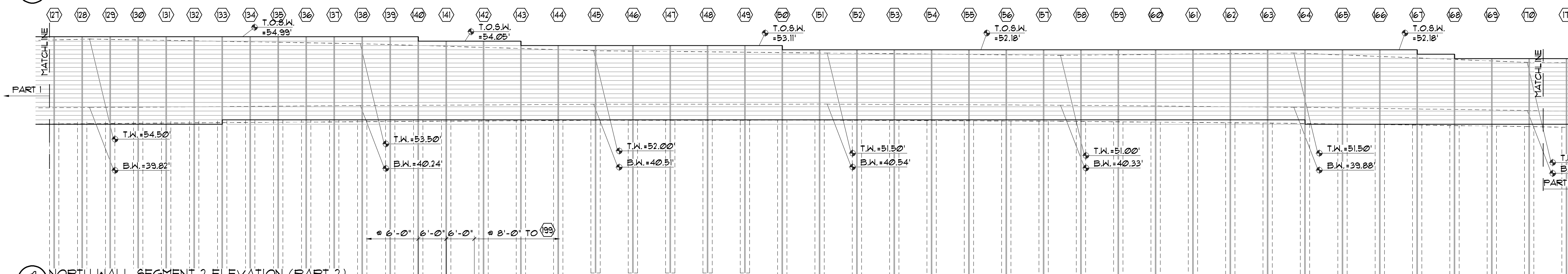
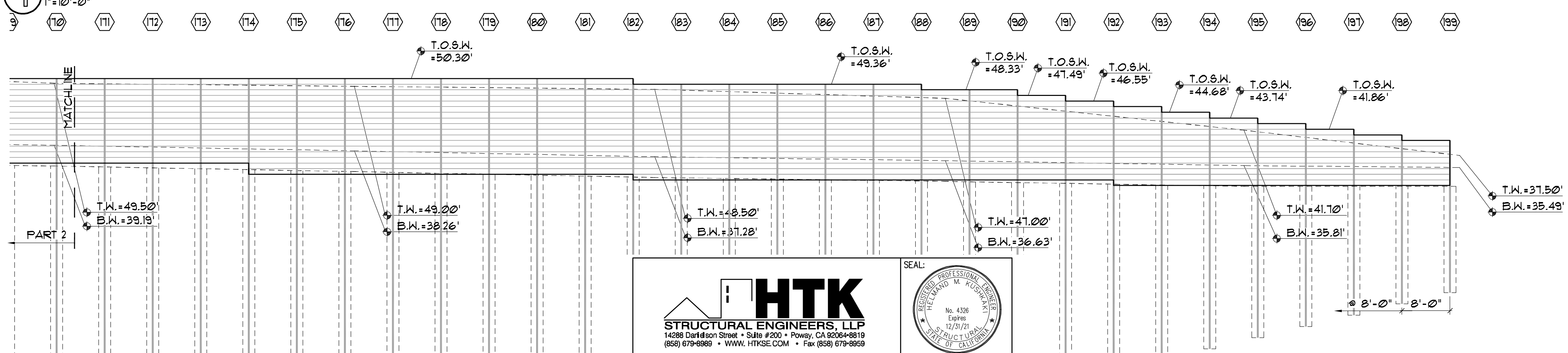
68282.10
90% SUBMITTAL



1 NORTH WALL SEGMENT 2 ELEVATION (PART 1)
1"=10'-0"



1 NORTH WALL SEGMENT 2 ELEVATION (PART 2)
1"=10'-0"



1 NORTH WALL SEGMENT 2 ELEVATION (PART 3)
1"=10'-0"

LEGEND

T.W.	: INDICATES TOP OF WALL PER CIVIL (VERIFY)
B.W.	: INDICATES BOTTOM OF WALL PER CIVIL (VERIFY)
#	: INDICATES BOTTOM OF OVER EXCAVATED IS ESTIMATED TO BE 3.42' BELOW BOTTOM OF WALL ELEVATION PER CIVIL
T.P.	: INDICATES TURNING POINT, REFERENCE PLAN FOR PILE LOCATION
TO.S.W.	: INDICATES TOP OF SHORING WALL
U.O.N.	: UNLESS OTHERWISE NOTED

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STATE OF CALIFORNIA
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
TRENCH / EXCAVATION PERMIT NO. ____________

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Engineer of work ____________ Date ____________
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APPROVED FOR SIGNATURE
JEFFREY J. HITCH ____________ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 CIVIL STATE OF CALIFORNIA

SCALE	
HORIZONTAL	AS NOTED
VERTICAL	AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ____________ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 34 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL PLAN

APPROVED
ROBERT K. MOEHLING ____________ DATE ____________
CITY ENGINEER RCE 63056

DWN BY:
CHKD BY:
FIELD BK:

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

Jun 02, 2020 – 8:28am
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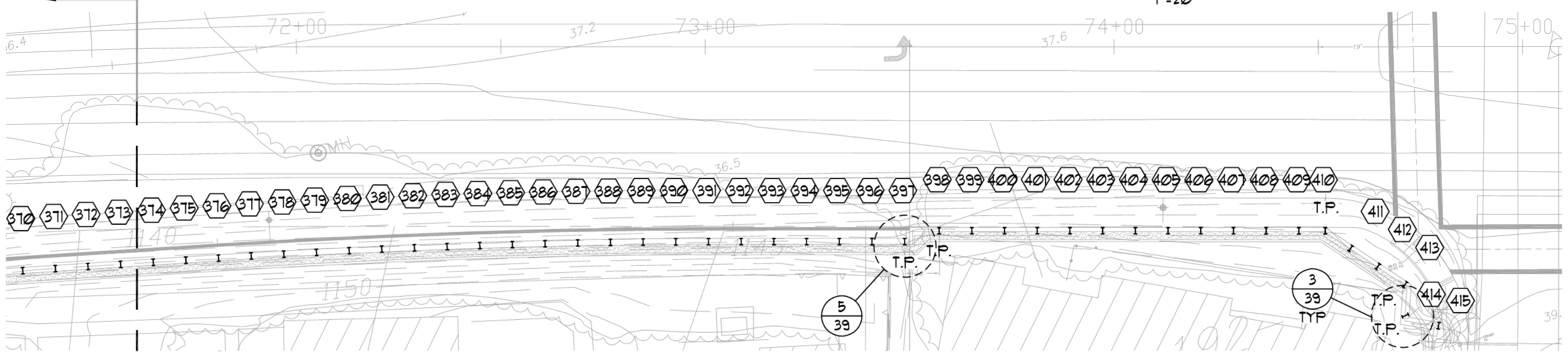
68282.10
90% SUBMITTAL

SOUTH WALL SEGMENT 1 (PART 1)

1"=20'



SOUTH WALL SEGMENT 1 (PART 2)

1"=20'

SOUTH WALL SEGMENT 1						
PILE NUMBER	RETAINED (*) HEIGHT "H"	SHAFT DIAMETER	BEAM SECTION	PILE SPACING	EMBED DEPTH "D"	TOTAL (*) DEPTH "H"+"D"
300-301	16'-0"	24"	W10x12	8'-0"	8'-0"	14'-0"
302-303	10'-0"	24"	W16x26	8'-0"	12'-0"	22'-0"
304-323	12'-0"	24"	W16x77	8'-0"	18'-0"	28'-0"
324-340	14'-0"	30"	HP18x135 OR W21x93	8'-0"	20'-0"	34'-0"
341-354	12'-0"	30"	W18x71	8'-0"	18'-0"	30'-0"
355-367	11'-0"	24"	W16x67	8'-0"	15'-0"	26'-0"
368-398	14'-0"	30"	HP18x135 OR W21x93	8'-0"	20'-0"	34'-0"
399-403	11'-0"	24"	W16x67	8'-0"	15'-0"	26'-0"
404-410	9'-6"	24"	W16x40	8'-0"	14'-0"	23'-6"
411-413	5'-0"	24"	W14x22	8'-0"	10'-0"	18'-0"
414-415	4'-0"	24"	W12x19	8'-0"	6'-0"	10'-0"

(*): HEIGHT INDICATED DOES NOT COVER HEIGHT OF WALL ABOVE RETAINING HEIGHT CONTRACTOR TO ACCOUNT FOR ADDITIONAL BEAM LENGTH AS REQUIRED.

SOUTH WALL SEGMENT 2						
PILE NUMBER	RETAINED (*) HEIGHT "H"	SHAFT DIAMETER	BEAM SECTION	PILE SPACING	EMBED DEPTH "D"	TOTAL (*) DEPTH "H"+"D"
416-417	5'-0"	24"	W10x12	±9'-0"	7'-0"	12'-0"
418-421	5'-0"	24"	W16x26	10'-0" MAX.	11'-0"	16'-0"
422-431	7'-0"	24"	W16x26	8'-0"	11'-0"	18'-0"
432-434	5'-0"	24"	W10x12	6'-0"	7'-0"	12'-0"

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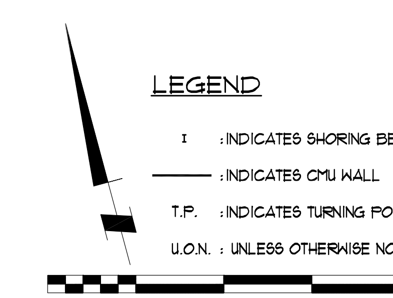
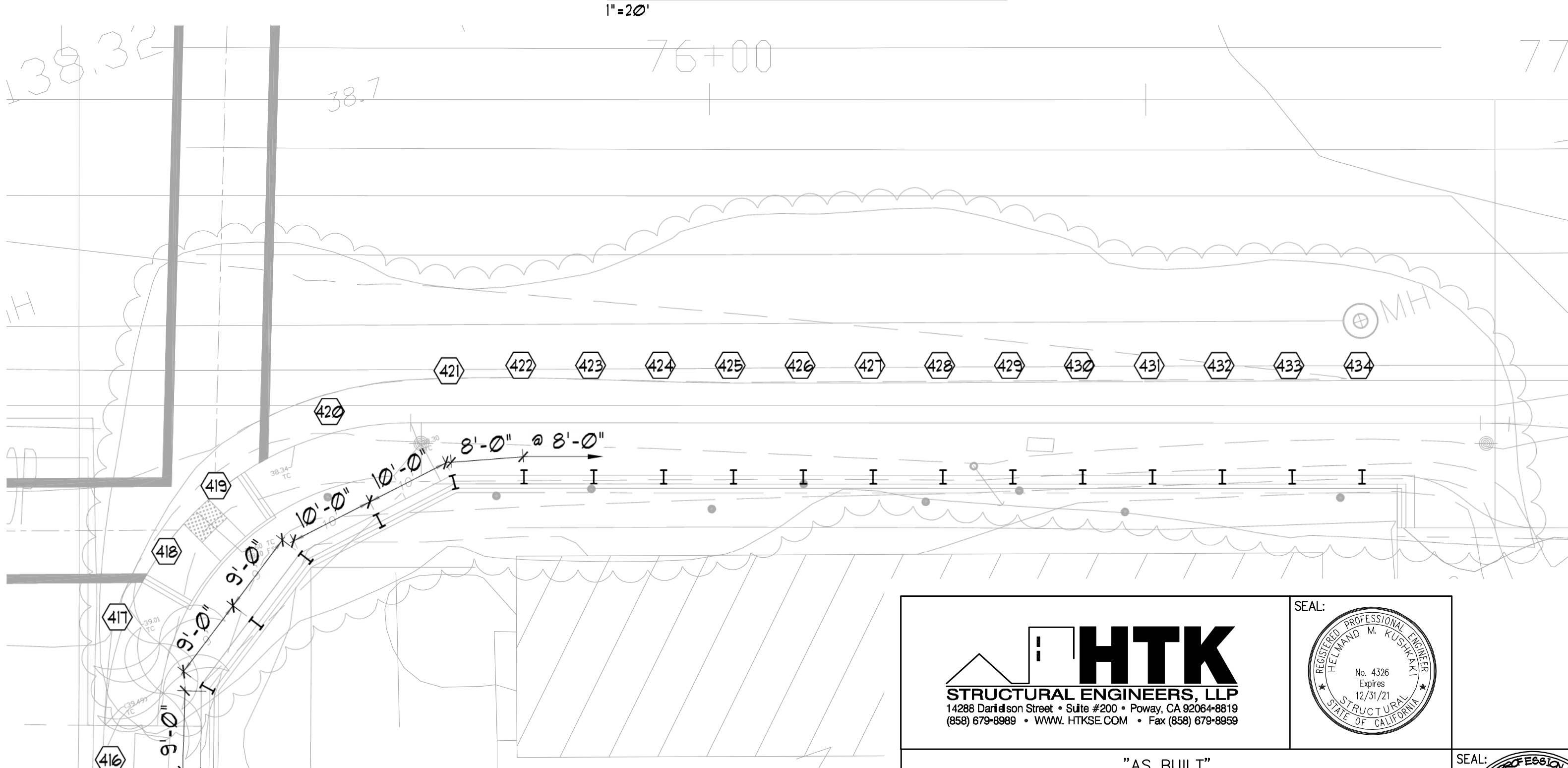


LEGEND

- I : INDICATES SHORING BEAM
- ——— : INDICATES CMU WALL
- T.P. : INDICATES TURNING POINT
- U.O.N. : UNLESS OTHERWISE NOTED



SOUTH WALL SEGMENT 2

1"=10'

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL PLAN

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SCALE
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ENGINEER OF WORK				CITY APPROVAL	

SHEET 34 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

APPROVED
ROBERT K. MOEHLING ____________ DATE ____________
CITY ENGINEER RCE 63056

DWN BY: ____
CHKD BY: ____
FIELD BK: ____

CIP NO. 8079
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DRAWING NO.

Jun 02, 2020 – 8:28am

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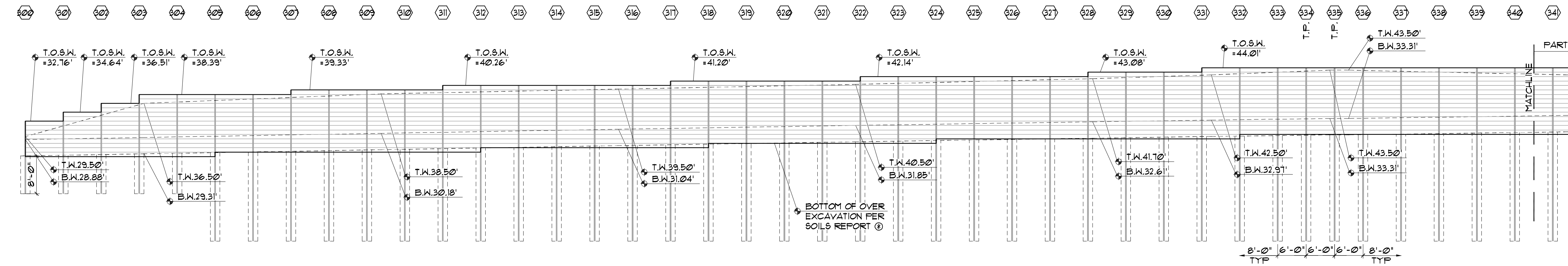
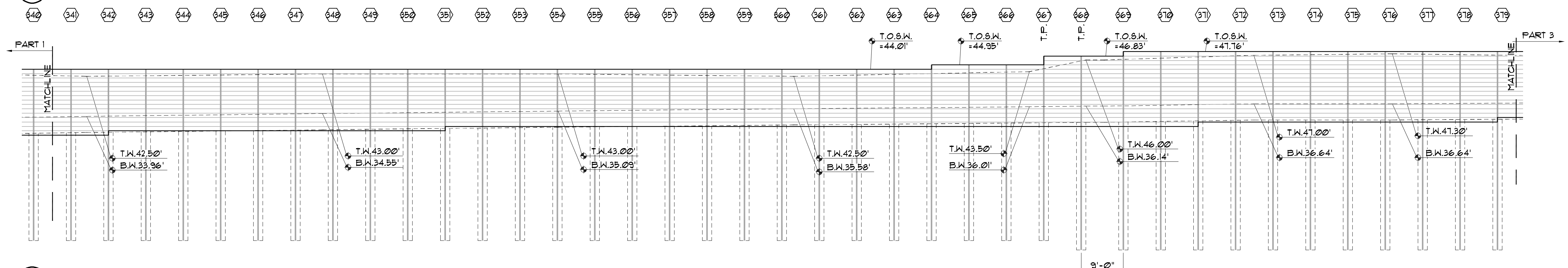
68282.10
90% SUBMITTAL



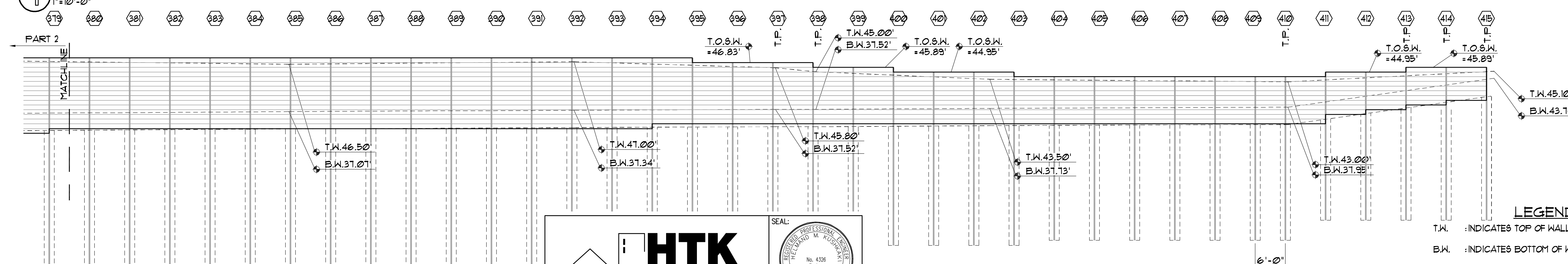
1 SOUTH WALL SEGMENT 1 ELEVATION (PART 1)

1"=10'-0"



1 SOUTH WALL SEGMENT 1 ELEVATION (PART 2)

1"=10'-0"



LEGEND

T.W. :INDICATES TOP OF WALL PER CIVIL (VERIFY)

B.W. :INDICATES BOTTOM OF WALL PER CIVIL (VERIFY)

(*) :INDICATES BOTTOM OF OVER EXCAVATION IS ESTIMATED TO BE 3.42' BELOW BOTTOM OF WALL ELEVATION PER CIVIL

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1"=10'-0"

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SEAL: REGISTERED PROFESSIONAL ENGINEER HELMAND M. KUSHKAKI No. 4326 Expires 12/31/21 STRUCTURAL STATE OF CALIFORNIA

"AS BUILT"

The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.

Engineer of work ____________ Date ____________
RCE ____________ EXP. ____________

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163 3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ____________ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/21

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No.47677 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ____________ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 36 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL PLAN

APPROVED
ROBERT K. MOEHLING ____________ DATE ____________
CITY ENGINEER RCE 63056

DWN BY: ____________
CHKD BY: ____________
FIELD BK: ____________

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

Jun 02, 2020 - 8:28am

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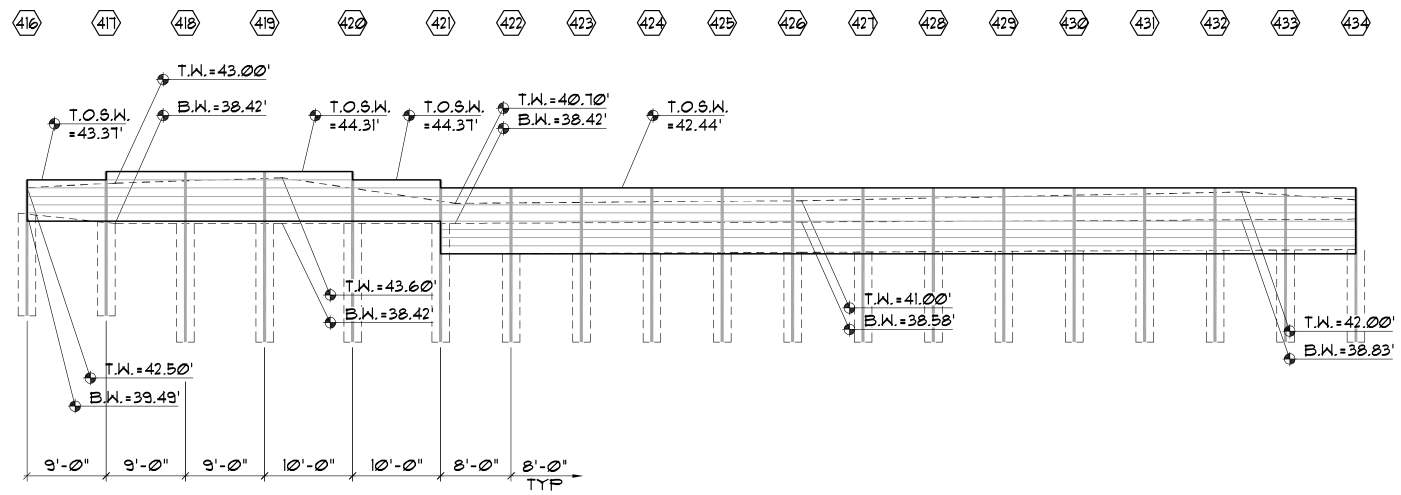

① SOUTH WALL SEGMENT 2 ELEVATION
1"=10'-0"

HTK STRUCTURAL ENGINEERS, LLP
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Engineer of work ______ Date ______
RCE ______ EXP. ______

DIG ALERT!! TWO WORKING DAYS BEFORE DIG

ALL EXISTING UTILITIES MAY NOT BE SHOWN ON THESE PLANS.
DIG ALERT & GENERAL CONTRACTOR SHALL LOCATE & POTHOLE (AS NEEDED), ALL EXISTING UTILITIES BEFORE SHORING WALL CONSTRUCTION BEGINS

STATE OF CALIFORNIA
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
TRENCH / EXCAVATION PERMIT NO. ______

811

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET – JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

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JEFFREY J. HITCH DATE
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SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

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Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 37 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL PLAN

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: ______
CHKD BY: ______
FIELD BK: ______

CIP NO. 8079
PROJECT NO. 09-XXX

DRAWING NO.

Jun 02, 2020 – 8:28am

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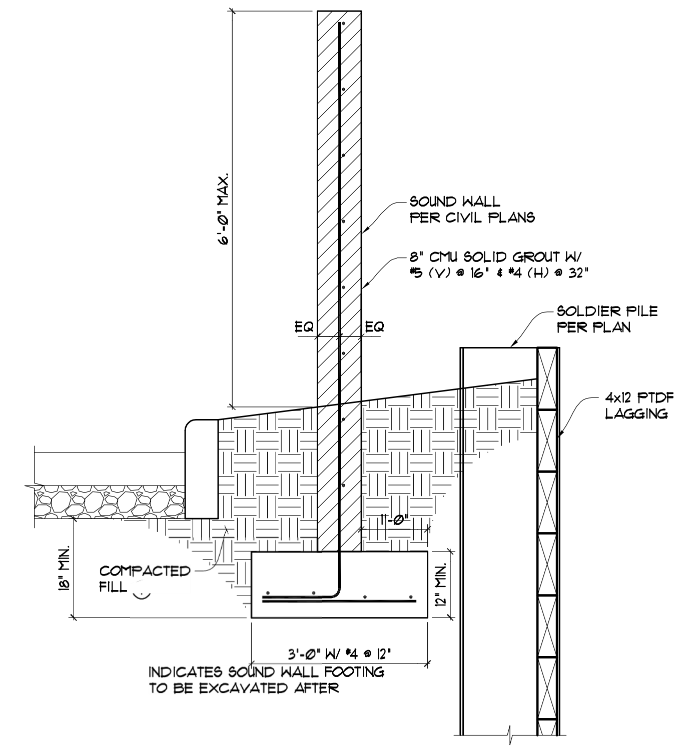

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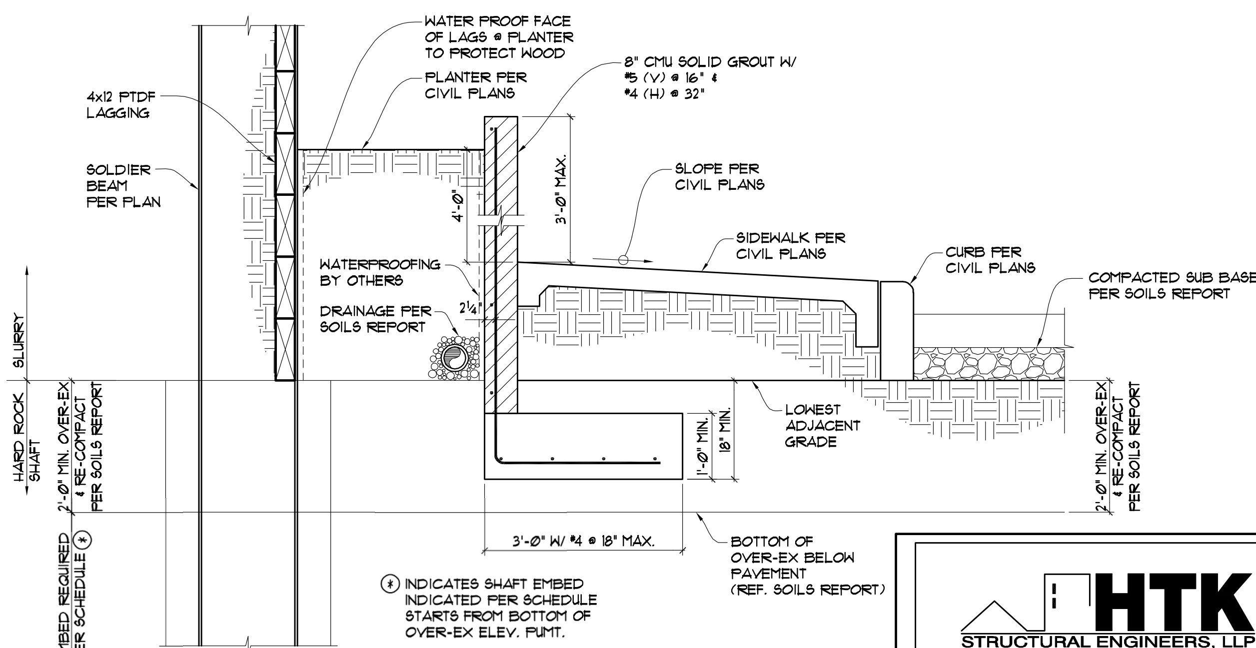

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STRUCTURAL ENGINEERS, LLP
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(858) 679-8989 • WWW. HTKSE.COM • Fax (858) 679-8959

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HELMAND M. KUSHKAKI
No. 4326
Expires 12/31/21
STRUCTURAL
STATE OF CALIFORNIA

DIG ALERT!! TWO WORKING DAYS BEFORE DIG
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TRENCH / EXCAVATION PERMIT NO. ______

811

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Engineer of work ______ Date ______

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No. 47677
CIVIL
STATE OF CALIFORNIA

SCALE
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VERTICAL
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PREPARED BY ______ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 38 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL PLAN

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: ______
CHKD BY: ______
FIELD BK: ______

CIP NO. 8079
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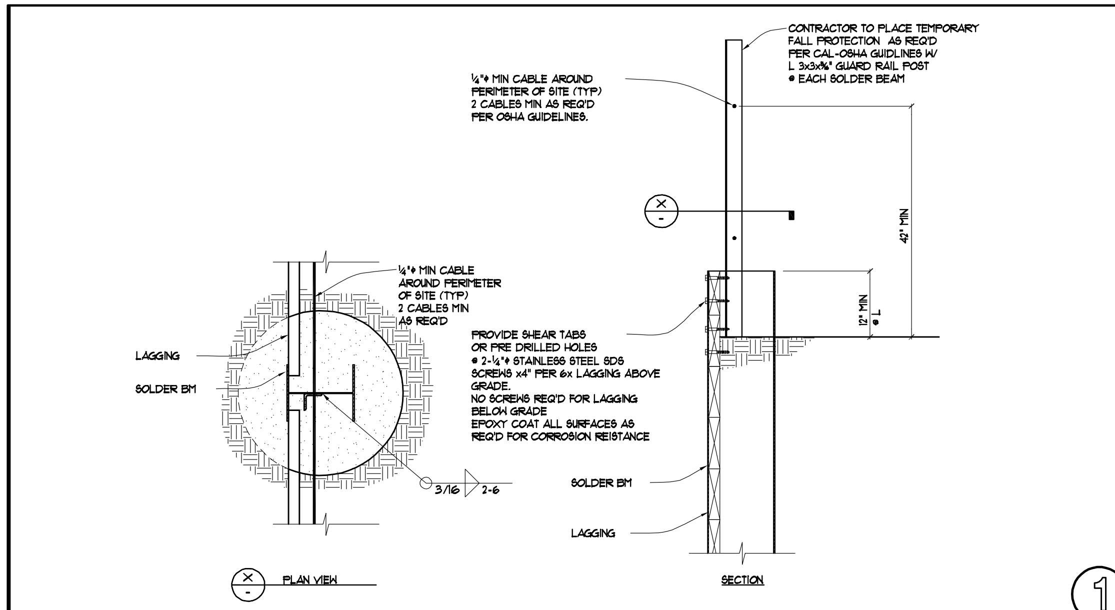

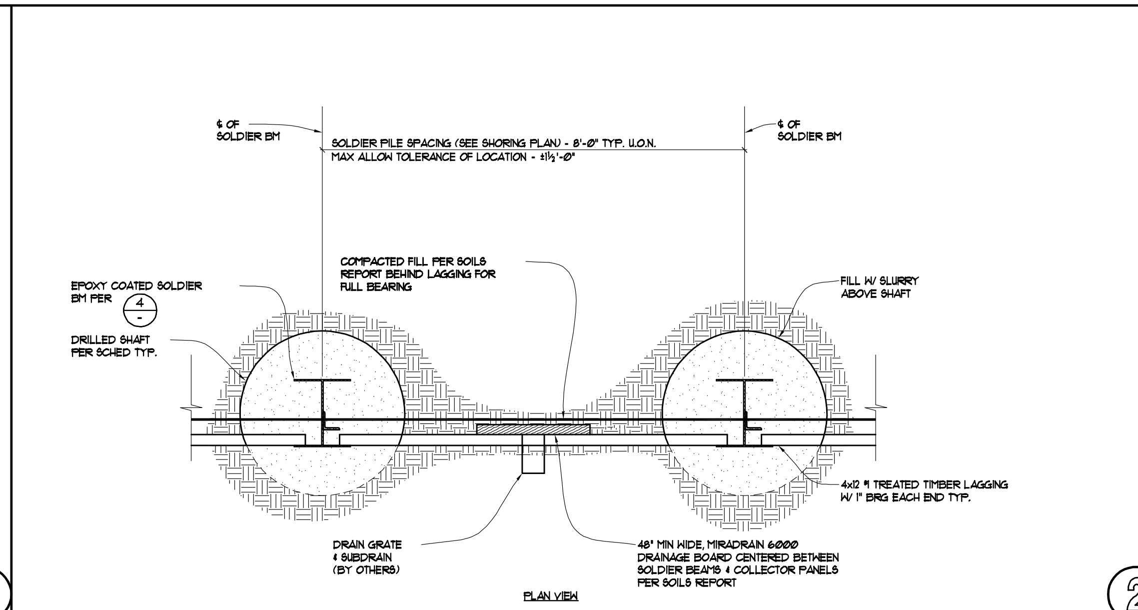

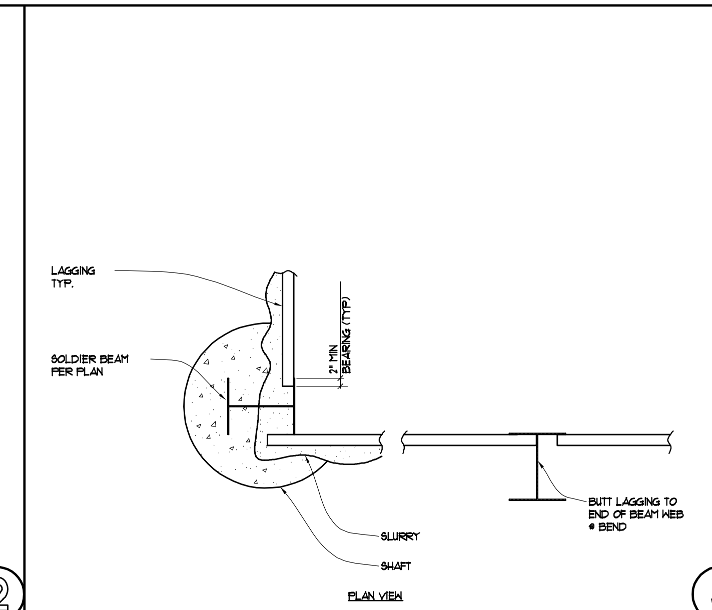

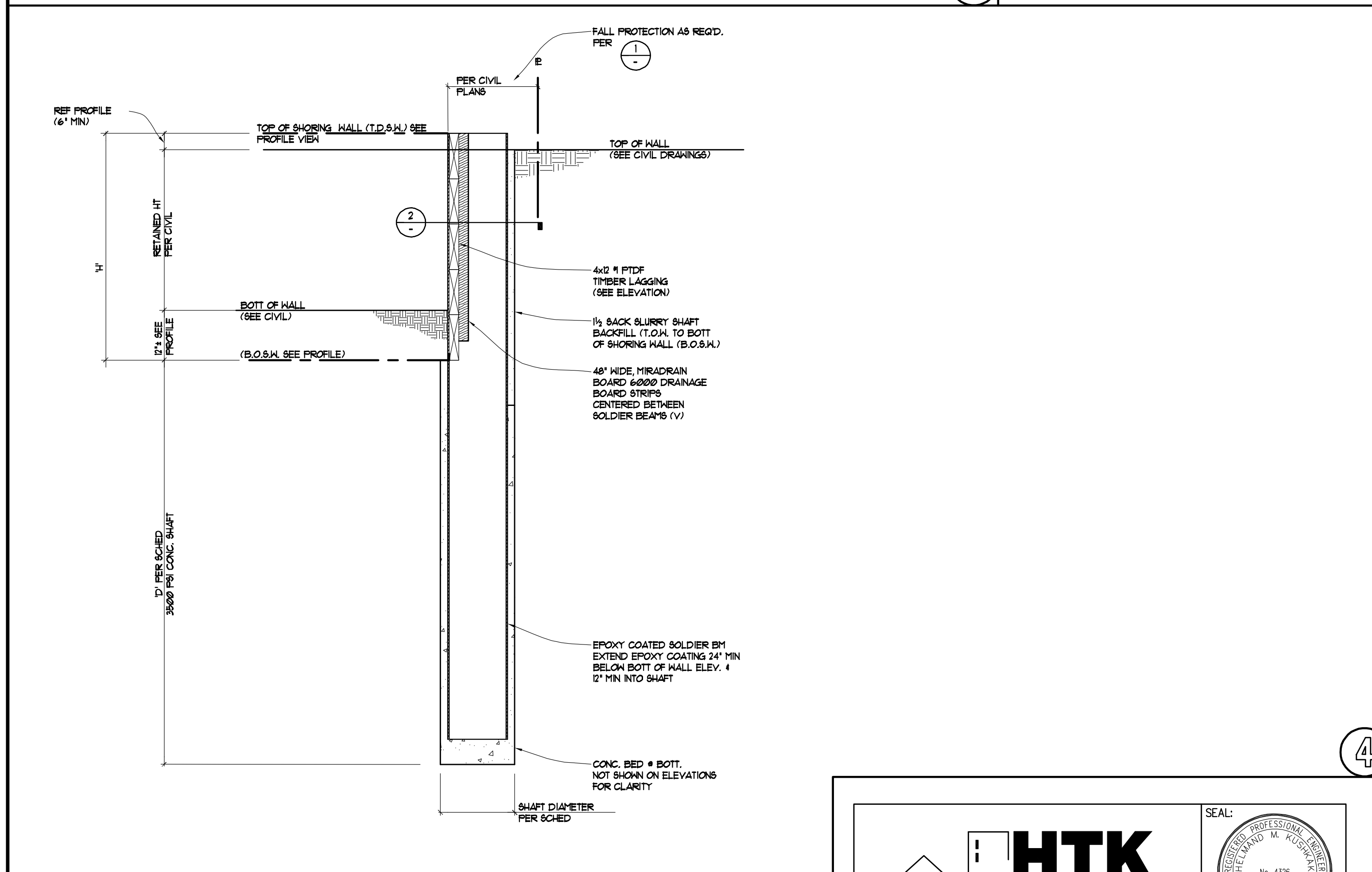

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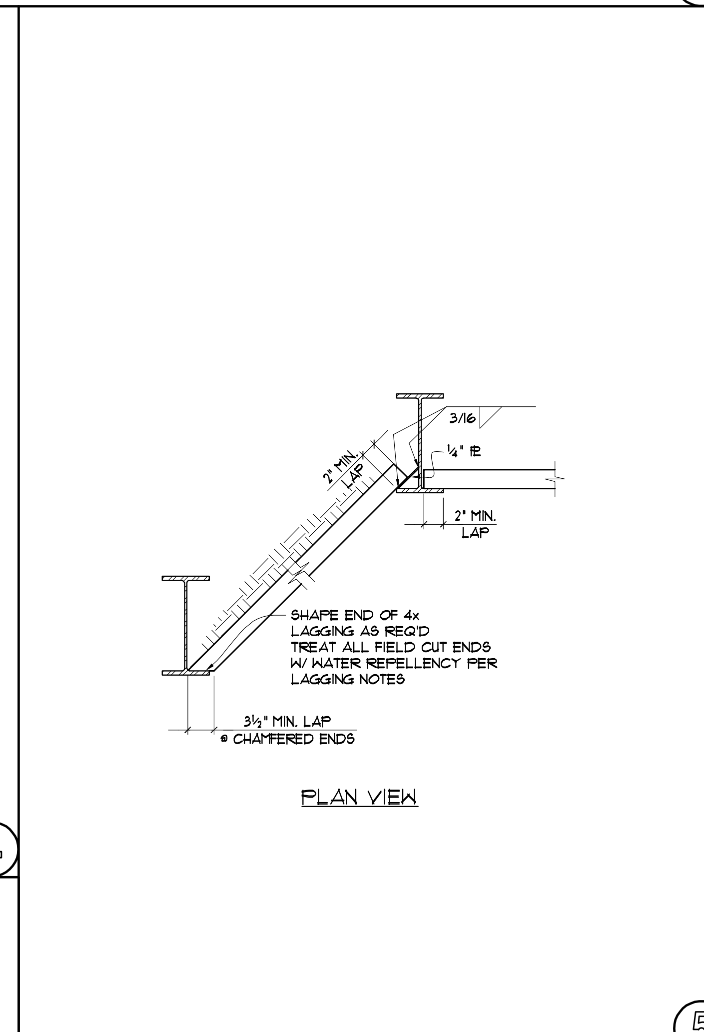

PLAN VIEW

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CITY OF MURRIETA
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HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

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951-695-8901 Fax

PREPARED BY DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-21

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 39 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 39

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
RETAINING WALL PLAN

APPROVED
ROBERT K. MOEHLING ____________ DATE ______
CITY ENGINEER RCE 63056

DWN BY:
CHKD BY:
FIELD BK:
CIP NO. 8079
PROJECT NO. 09-XXX
DRAWING NO.

Jun 02, 2020 - 8:28am
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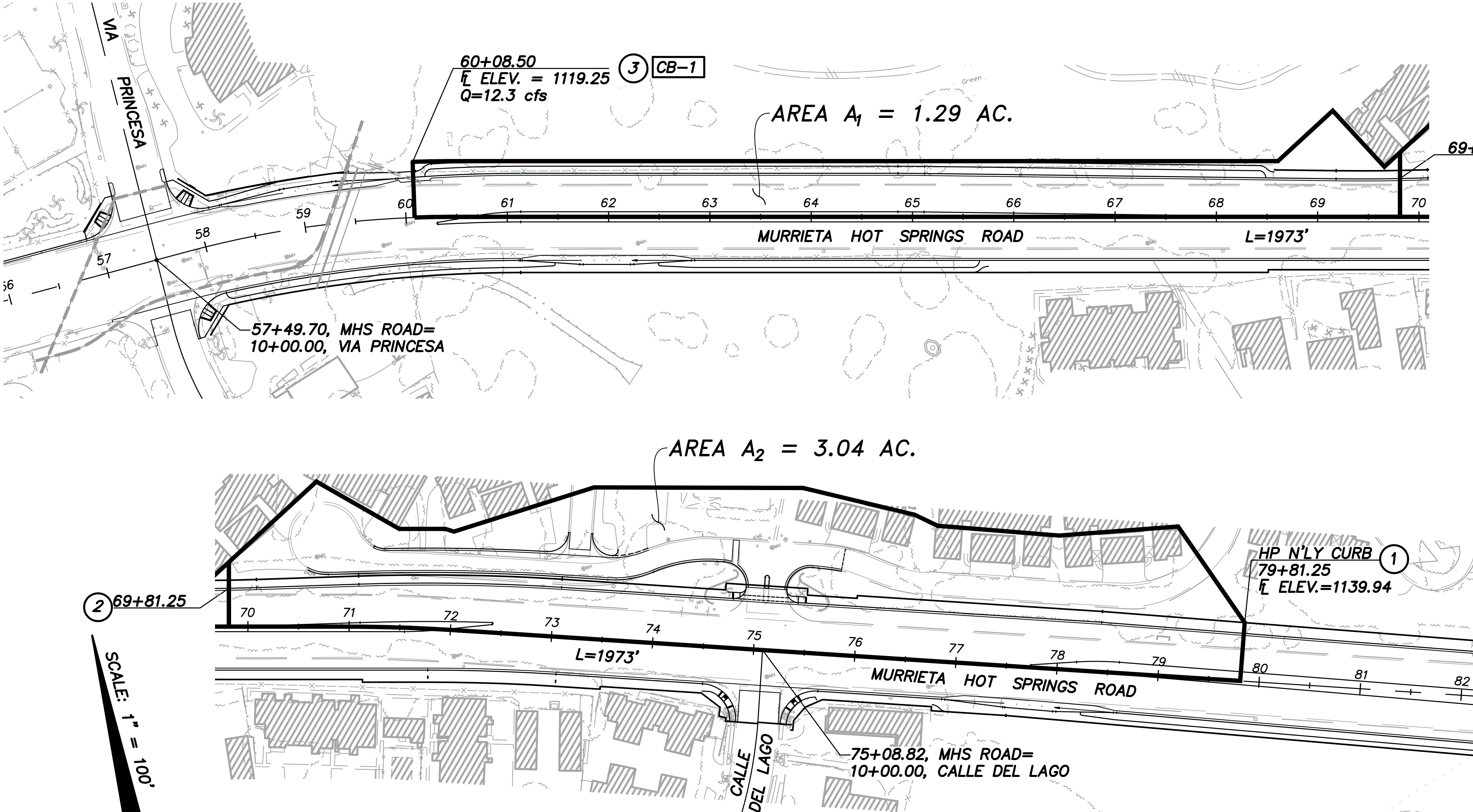

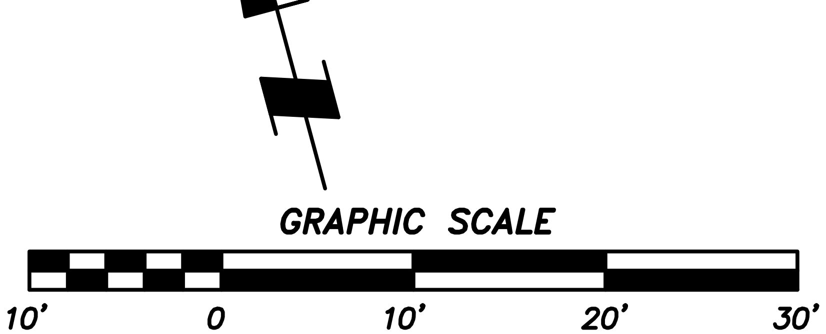

SHEET 1

CITY OF MURRIETA
ENGINEERING DEPARTMENT

SHEETS 4

HYDROLOGY MAP
MURRIETA HOT SPRINGS ROAD
AREA A

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. O'ROURKE
No. 47677
CIVIL
STATE OF CALIFORNIA

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
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951-695-8901 Fax

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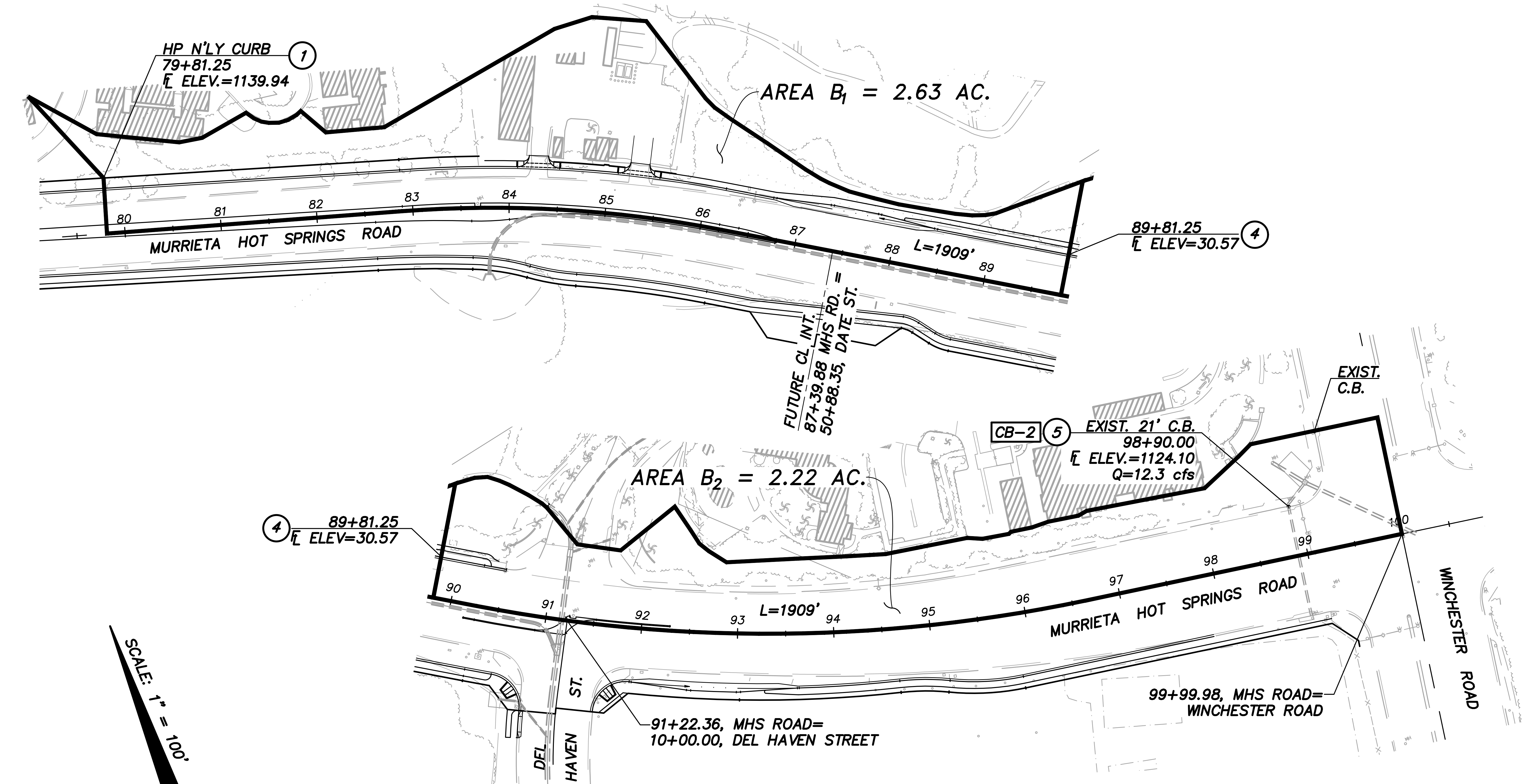

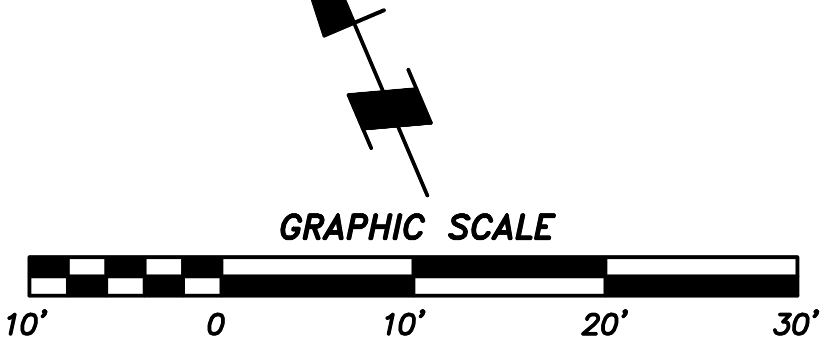

SHEET		SHEETS
2	CITY OF MURRIETA ENGINEERING DEPARTMENT	4

HYDROLOGY MAP
MURRIETA HOT SPRINGS ROAD
AREA B

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. O'ROURKE
No. 47677
CIVIL
STATE OF CALIFORNIA

SB&O INC.
PLANNING ENGINEERING SURVEYING
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951-695-8900
951-695-8901 Fax

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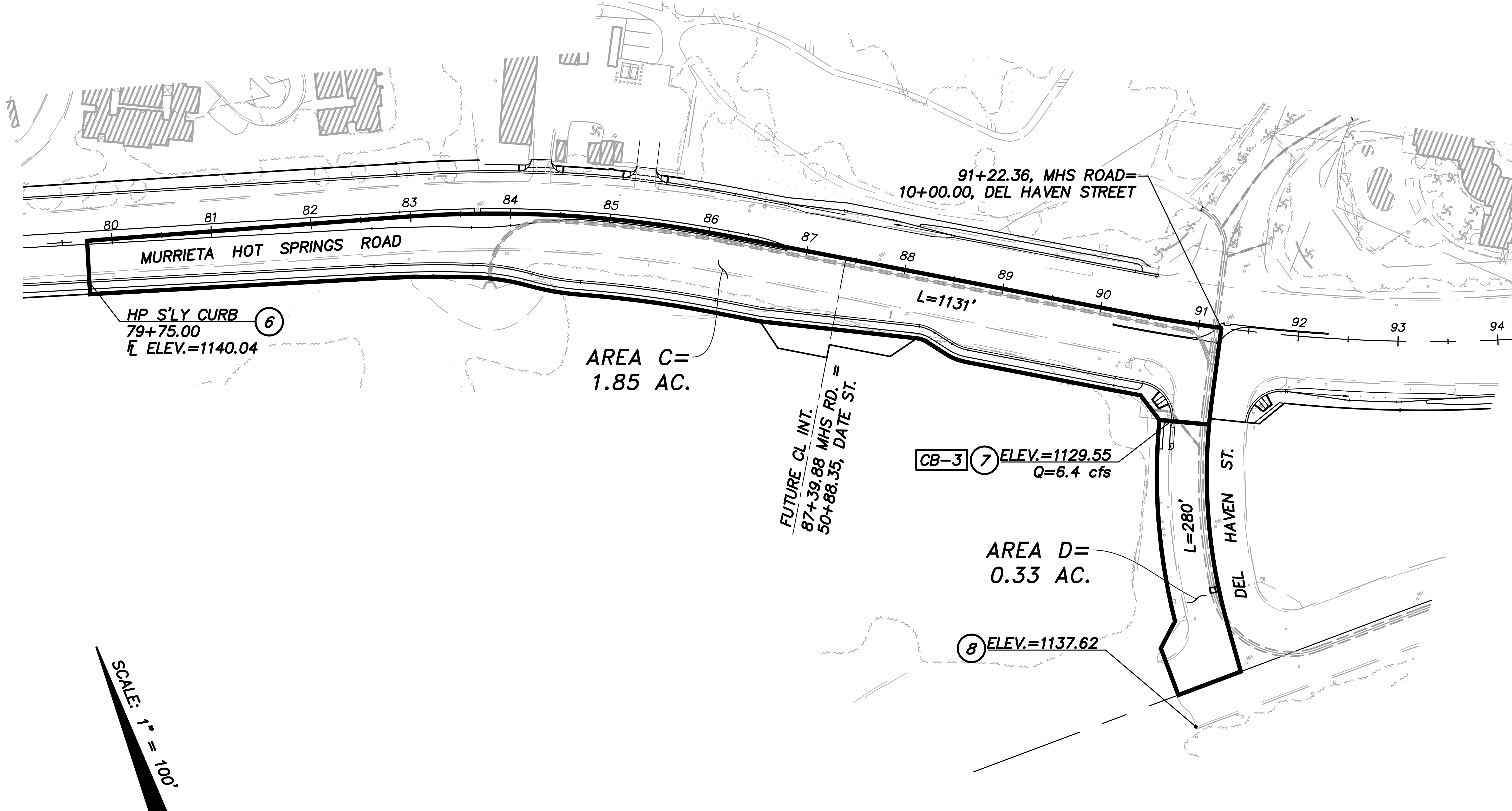

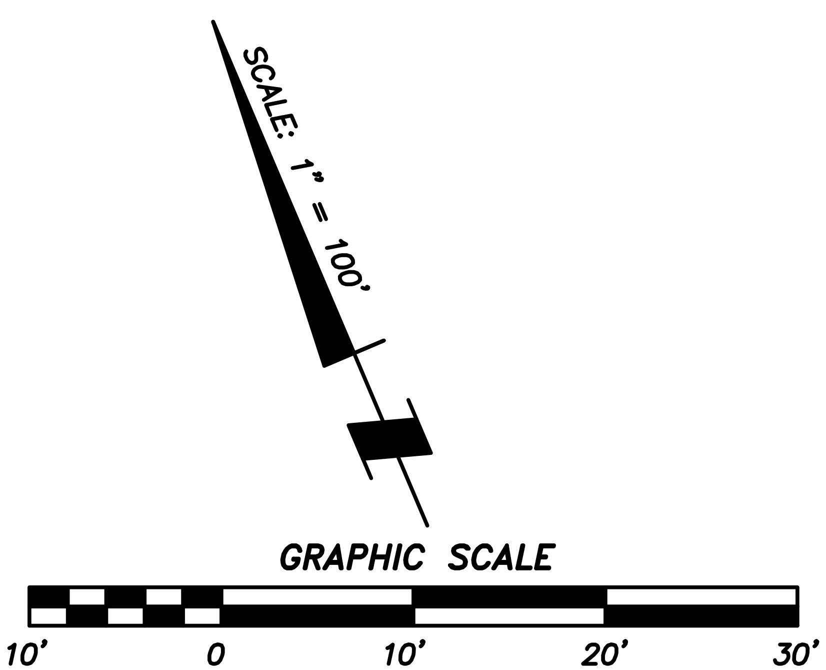

SHEET 3	CITY OF MURRIETA ENGINEERING DEPARTMENT	SHEETS 4

HYDROLOGY MAP
MURRIETA HOT SPRINGS ROAD
AREA C & D

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. O'ROURKE
No. 47677
CIVIL
STATE OF CALIFORNIA

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

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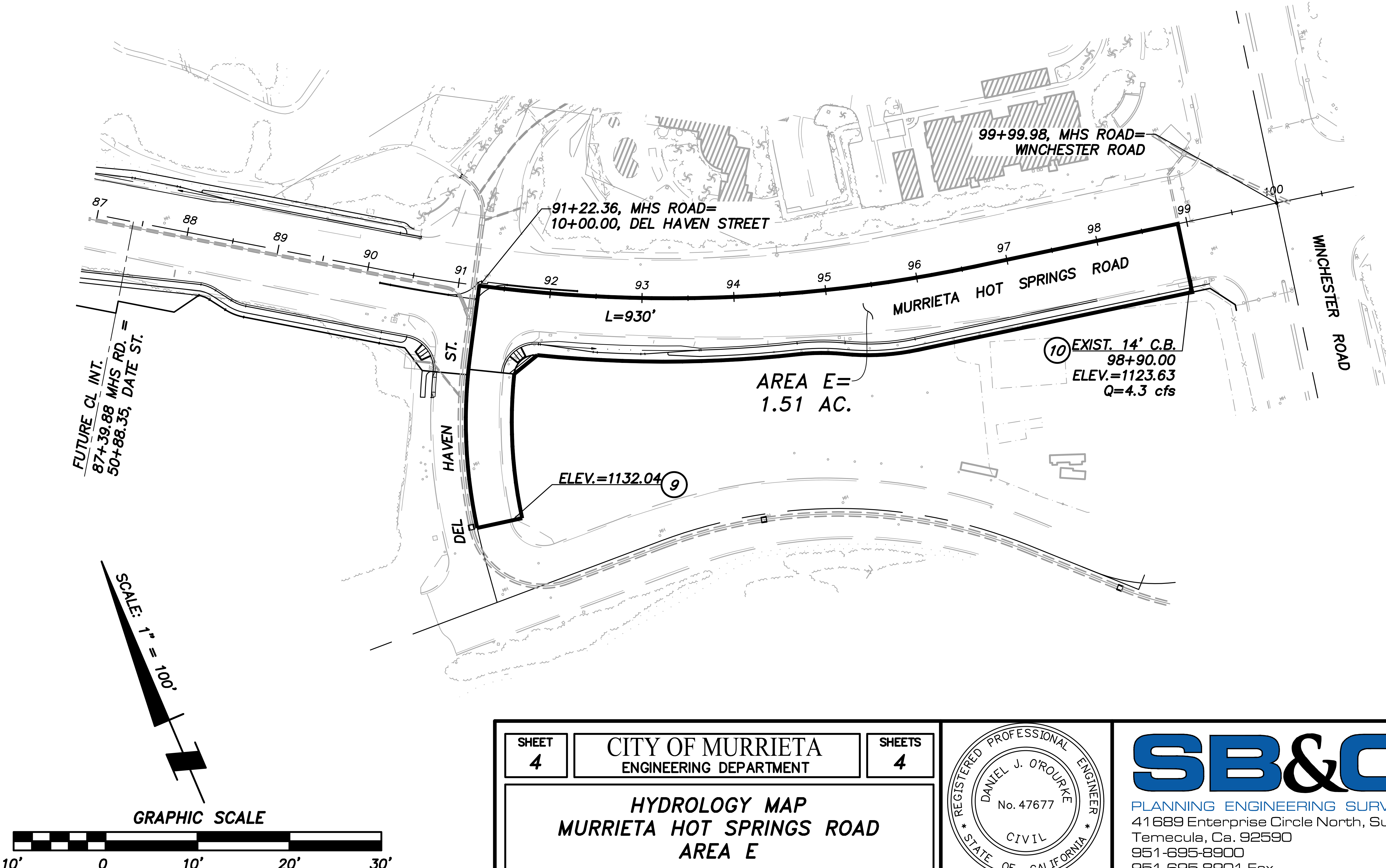

SHEET 4

CITY OF MURRIETA
ENGINEERING DEPARTMENT

SHEETS 4

HYDROLOGY MAP
MURRIETA HOT SPRINGS ROAD
AREA E

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. O'ROURKE
No. 47677
CIVIL
STATE OF CALIFORNIA

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
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68102.25

LANDSCAPE IMPROVEMENT PLANS

City of Murrieta, Ca.

MURRIETA HOT SPRINGS RD WIDENING FROM VIA PRINCESSA RD TO WINCHESTER RD

OWNER:

CITY OF MURRIETA
1 TOWN SQUARE
MURRIETA, CA 92562
(951) 461-6076 PH (951) 461-6049 FAX
CONTACT: MR. JEFF HITCH

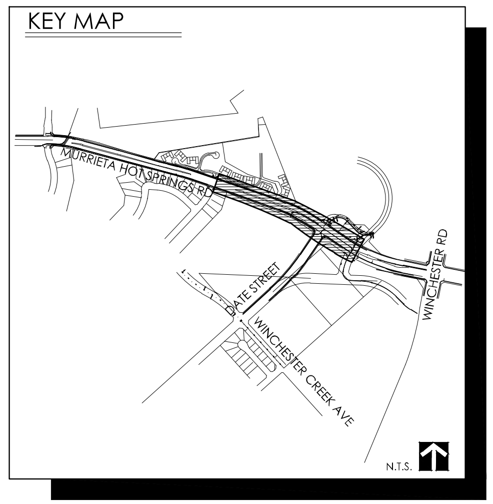
CIVIL ENGINEER:

SB & O INC.
41689 ENTERPRISE CIRCLE N. SUITE. 126
TEMECULA, CA 92590
(951) 695-8900 PH (951) 695-8901 FAX
CONTACT: MR. DAN O'ROURKE

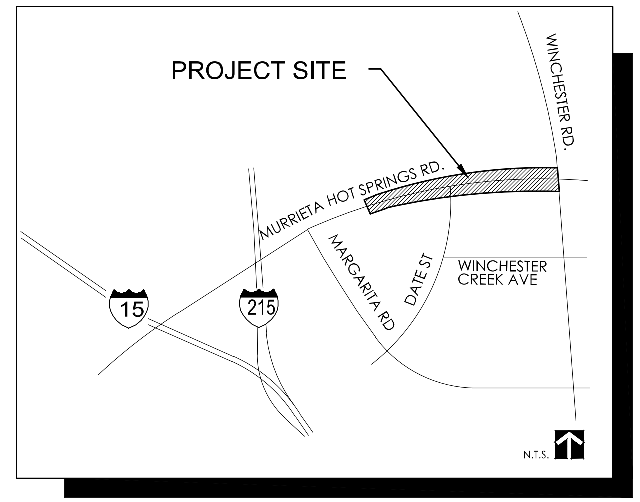
LANDSCAPE ARCHITECT:

DAVID NEAULT ASSOCIATES, INC.
41877 ENTERPRISE CIRCLE NORTH, SUITE 140
TEMECULA, CALIFORNIA 92590
(951) 296-3430 PH (951) 296-3431 FAX
CONTACT: MR. BRYAN LOVE

PROJECT KEY MAP



PROJECT VICINITY



MCSD SITE APPROVAL PROCESS

1. IF PLAN REVIEW APPROVAL HAS BEEN AUTHORIZED, THE OWNER / DEVELOPER MAY PROCEED WITH INSTALLATION. NO INSTALLATION CONSTRUCTION MAY BEGIN WITHOUT GRANTED APPROVAL. LANDSCAPE CONTRACTOR / DEVELOPER IS RESPONSIBLE FOR NOTIFYING THE MCSD SUPERVISOR IN ADVANCE FOR THE FOLLOWING IRRIGATION AND PLANTING INSPECTIONS, ACCORDING TO THE TIME INDICATED: (951) 461-6124

A. PRE-JOB CONFERENCE: 7 CALENDAR DAYS NOTICE REQUIRED.
A. PRESSURE MAINLINE INSTALLATION (PRIOR TO BACKFILLING OF TRENCHES) AND PRESSURE TESTING: 48 HOURS NOTICE REQUIRED.
B. SYSTEM LAYOUTS: 48 HOURS NOTICE REQUIRED.
C. COVERAGE TESTS: 48 HOURS NOTICE REQUIRED.
D. FINAL IRRIGATION INSPECTION: 48 HOURS NOTICE REQUIRED.
E. PLANT MATERIAL INSPECTION: 48 HOURS NOTICE REQUIRED.
F. PRIOR TO HYDROSEEDING: 48 HOURS NOTICE REQUIRED.
G. AT THE FINAL INSPECTION OF INSTALLATION AND PRIOR TO THE COMMENCEMENT OF THE 90 DAY MAINTENANCE PERIOD: 7 CALENDAR DAYS NOTICE REQUIRED.
H. A SCHEDULED WALKTHROUGH EVERY 30 DAYS DURING THE MAINTENANCE PERIOD.
I. PRIOR TO THE FINAL ACCEPTANCE OF THE 90-DAY MAINTENANCE PERIOD: 7 CALENDAR DAYS NOTICE REQUIRED.

2. PRIOR TO THE PRE-JOB MEETING, A SOIL REPORT SHALL BE PROVIDED.

A. LANDSCAPE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AN AGRONOMIC SOIL REPORT WITH SOIL PREPARATION RECOMMENDATIONS FOR THIS MEETING.
B. SOIL ANALYSIS MUST BE REPRESENTATIVE OF SITE SOILS.
C. LANDSCAPE ARCHITECT WILL MAKE SOIL AMENDMENT RECOMMENDATIONS BASED ON REPORT RECEIVED FROM LANDSCAPE CONTRACTOR, PRIOR TO COMMENCEMENT OF CONSTRUCTION.

3. BEFORE ANY FINAL INSPECTION TAKES PLACE, AS-BUILT DRAWINGS MUST SUBMITTED TO THE MCSD OFFICE AS FOLLOWS:

A. ALL PROJECT AS-BUILT DRAWINGS NEED TO BE SUBMITTED PRIOR TO ACCEPTANCE, AND PRIOR TO START OF MCSD SITE INSPECTION PERIOD.
B. ALL AS-BUILT DRAWINGS ARE TO BE COMPILED USING A GLOBAL POSITIONING SYSTEM (GPS) DATA COLLECTION PROCESS. THE AS-BUILT DRAWINGS SHALL BE PREPARED AS DESCRIBED IN THE ATTACHED SPECIFICATIONS. A FIRM SPECIFICALLY ENGAGED IN THE BUSINESS OF GPS/GIS DATA COLLECTION SHALL COLLECT THE DATA.

C. AS-BUILT DRAWINGS SHALL INCLUDE ALL OF THE INFORMATION IDENTIFIED IN THE IRRIGATION SPECIFICATIONS AS WELL AS THE MEASURED AREA OF COVERAGE OF EACH CONTROL VALVE ON THE MCSD LANDSCAPE AREA. THIS INFORMATION SHALL BE USED FOR CONTROLLER SCHEDULING AND WATER USE BUDGETS SO ACCURATE INFORMATION MUST BE PROVIDED.

D. ALL AS-BUILT DRAWINGS SHALL BE SUBMITTED TO THE MCSD AS AUTOCAD 2000 DIGITAL FILES ON A COMPACT DISC, AS SEPIA MYLAR PLOTS FOR THE RECORD SET, AND AS TWO (2) SETS OF BLUELINE COPIES FOR SITE INSPECTION.

E. TWO REDUCED SIZE (11" X 17") COPIES OF THE AS-BUILT DRAWINGS AND CONTROLLER CHARTS OF THE SAME SIZE SHALL BE SUBMITTED TO THE MCSD PRIOR TO START OF THE FINAL INSPECTION. BOTH THE REDUCED AS-BUILT DRAWING AND THE CONTROLLER CHARTS SHALL BE LAMINATED USING A CLEAR PLASTIC MATERIAL OF A MINIMUM THICKNESS OF 10MM. CONTROLLER CHARTS SHALL BE COLOR CODED, USING A MINIMUM OF FIVE COLORS, PER VALVE STATION AND SHALL BE BASED ON THE AS-BUILT DRAWINGS.

4. THESE INSPECTIONS ARE FOR INSTALLATION CONFORMANCE TO MCSD STANDARDS. IN NO WAY DOES THE INSPECTION RELIEVE THE LANDSCAPE ARCHITECT, LANDSCAPE CONTRACTOR, OR OWNER / DEVELOPER OF ANY LIABILITIES THAT MAY BE INCURRED. FINAL SITE MAINTENANCE APPROVAL WILL NOT BE GRANTED UNTIL THE LANDSCAPE PROJECT MEETS ALL OF MCSD STANDARD SPECIFICATIONS. A LETTER WILL BE SENT TO THE OWNER / DEVELOPER AFTER EACH SITE INSPECTION, EXPLAINING THE SITE MAINTENANCE REVIEW.

5. AFTER ALL INSPECTIONS HAVE BEEN COMPLETED, AND THE PROPERTY HAS BEEN ACCEPTED FOR THE QUALITY OF LANDSCAPING INSTALLED, THE MCSD OFFICE WILL SUBMIT THE PLANS AND LEGAL INFORMATION TO THE NECESSARY DEPARTMENTS / PERSONNEL TO BEGIN THE TRANSFER PROCESS.

6. ALL LANDSCAPE AND IRRIGATION WORK SHALL BE SUPERVISED BY THE LANDSCAPE ARCHITECT. UPON COMPLETION OF THE PROJECT, THE MCSD WILL CERTIFY THAT THE WORK HAS BEEN COMPLETED IN ACCORDANCE WITH THE APPROVED PLANS. CONTACT THE CITY OF MURRIETA C.S.D. BEFORE COMMENCING WORK.

GENERAL NOTES

1. CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT (800) 422-4133 BEFORE START OF CONSTRUCTION (2 WORKING DAYS OR 48 HOURS).
2. CONTRACTOR SHALL VERIFY EXISTING LOCATION OF UTILITIES AS NECESSARY TO IDENTIFY LOCATION. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES, SERVICES, STRUCTURES, AND FEATURES PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR SHALL REPAIR, AT HIS OWN EXPENSE ALL DAMAGE RESULTING FROM HIS OPERATIONS.
3. CONTRACTORS ON THE JOB SHALL CARRY INSURANCE SATISFACTORY TO THE CITY AND PROVIDE PROOF OF CERTIFICATION UPON REQUEST. THIS POLICY SHALL NOT LAPSE OR BE CANCELED AT ANYTIME DURING PROJECT CONSTRUCTION.
4. THE CONTRACTOR AGREES TO HOLD THE CITY AND THE MCSD HARMLESS FROM ANY CLAIMS ARISING OUT OF HIS OPERATIONS OR THE OPERATIONS OF ANY OF HIS SUB CONTRACTORS, MATERIALS, SUPPLIERS OR AGENTS.
5. THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED CONSTRUCTION PRODUCT BUT DOES NOT INDICATE ALL METHODS, PROCEDURES, OR SEQUENCE OF CONSTRUCTION.
6. ALL LOCAL, MUNICIPAL, AND STATE LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE CONSIDERED TO BE INCORPORATED INTO AND MADE A PART OF THESE DRAWINGS AND SPECIFICATIONS.
7. LANDSCAPE CONSTRUCTION MEETING WITH MCSD REQUIRED PRIOR TO START OF CONSTRUCTION.
8. REFER TO CIVIL ENGINEER STREET IMPROVEMENT PLANS FOR ALL GRADING AND DRAINAGE SPECIFICATIONS.

SHEET INDEX

FOR PLANTING AND IRRIGATION SPECIFICIATIONS PLEASE REFER TO 'THE PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS FOR LANDSCAPE IMPROVEMENTS OF MURRIETA HOT SPRINGS AND DATE STREET

MCSD P.O.C. QUANTITIES:

POC A - 17,680 s.f.
POC B - 32,650s.f.

MCSD LANDSCAPE QUANTITIES:

TOTAL MCSD AREA-	50,330 SQ.FT.
TOTAL MCSD. AREA-	1.15 ACRES
TOTAL R.O.W. AREA-	38,160 SQ.FT.
TOTAL R.O.W. AREA-	.87 ACRES
TOTAL TREES IN MCSD ROW BY SIZE:	
24" BOX TREES -	65
36" BOX TREES -	-
15 GAL. TREES -	-
TOTAL SHRUB AREA-	50,330 SQ.FT.

QUANTITY ESTIMATES SHOWN ON THESE PLANS ARE FOR PLAN CHECK PURPOSES ONLY. CONTRACTOR SHALL VERIFY THE EXACT QUANTITIES PRIOR TO CONSTRUCTION. ANY DISCREPANCIES FOUND MUST BE DIRECTED TO THE ENGINEER IMMEDIATELY, SO ADJUSTMENT CAN BE MADE.

NOTE:
THE SPECIAL PROVISIONS SPECIFICATIONS BOOK COMPLETES THE CONTRACT DOCUMENTS AND SHALL TAKE PRECEDENCE OVER THE APPROVED LANDSCAPE PLANS. SHOULD A DISCREPANCY OCCUR BETWEEN ANY NOTES, SPECIFICATIONS, DETAILS, SITE CONDITIONS, OR OTHER SITUATION REGARDING THE CONSTRUCTION OF THESE PLANS, THE MURRIETA COMMUNITY SERVICE DISTRICT LANDSCAPE SPECIFICATIONS AND STANDARDS MANUAL SHALL TAKE PRECEDENCE AND ALL DECISIONS MADE BY THE MCSD SHALL BE FINAL. MCSD PHONE 1-951-461-6124.

HOLD HARMLESS AND INDEMNIFICATION CLAUSE

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMETED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, AND THE LANDSCAPE ARCHITECT HARMLESS FROM ANY AND ALL LIABILITY REAL OR ELLEGED, IN CONNECTION WITH THE PERFROMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLEGENCE OF THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, OR THE LANDSCAPE ARCHITECT.

CITY OF MURRIETA PLAN REVIEW

THESE PLANS HAVE BEEN REVIEWED AND ARE FOUND TO BE IN SUBSTANTIAL COMPLIANCE WITH THE APPLICABLE CODES ADOPTED BY ORDINANCES. APPROVAL IS RECOMMENDED FOR LANDSCAPE CONSTRUCTION PENDING APPROVAL BY ALL APPLICABLE CITY DEPARTMENTS AND AGENCIES. NO CHANGES, MODIFICATIONS, NOR ALTERATIONS SHALL BE PERMITTED WITHOUT PRIOR AUTHORIZATION FROM THE PLANNING DEPARTMENT.

THE PERMITTEE SHALL ENSURE THAT ALL PLANS, SPECIFICATIONS AND CONSTRUCTION CONDUCTED HEREUNDER SHALL COMPLY IN ALL RESPECTS TO THE APPLICABLE CODES, ORDINANCES, AND THESE APPROVED PLANS. BY COMMENCING CONSTRUCTION THEREUNDER, THE CONTRACTOR AGREES TO RELEASE AND INDEMNIFY THE CITY OF MURRIETA AND ITS CONSULTANTS FROM AND AGAINST ANY CODE VIOLATIONS, ERRORS, OMISSIONS, AND DEVIATIONS IN THE COMPLETED WORK.

THE ISSUANCE OR GRANTING OF A PERMIT BASED ON APPROVAL OF THESE PLANS SHALL NOT ALLOW NOR APPROVE ANY VIOLATION OF THE APPLICABLE CODES OR ORDINANCES. NO PERMIT PRESUMED TO GIVE AUTHORITY TO VIOLATE OR CANCEL THE PROVISIONS OF SUCH CODES OR ORDINANCE SHALL BE VALID.

BY:______________________ DATE:____________

*ALL REVISIONS OF APPROVED PLANS ARE REQUIRED TO BE RESUBMITTED TO THE CITY OF MURRIETA.

NOTE:
ALL AS-BUILTS WILL BE GPS AS PER MCSD SPECIFICATIONS.

"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD ______________________ Date ____________

SEAL: LICENSED LANDSCAPE ARCHITECT David S. Neault No. 2884 Signature 06-30-2020 Renewal Date 04-06-2020 Date STATE OF CALIFORNIA

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.-JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

GEORGE MORING MCSD ______________________ DATE
PARKS MAINTENANCE SUPERINTENDENT

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

landscape architecture
planning
golf course architecture
David NEAULT ASSOCIATES Inc.
41877 enterprise
circle north suite 140
temecula, ca. 92590
951 296 3430
www.dnassociates.com

PREPARED BY: R.L.A. NO. 2884
DAVID S. NEAULT DATE:

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 1.1 | CITY OF MURRIETA PLANNING DEPARTMENT | SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
TITLE SHEET

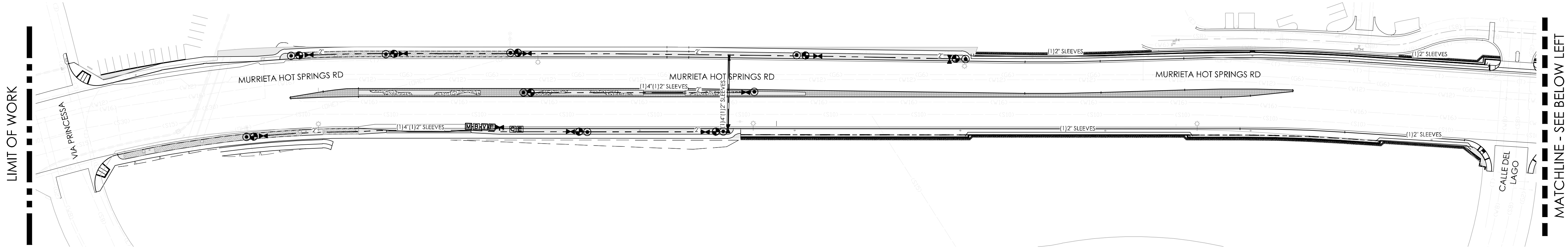
APPROVED
ROBERT K. MOEHLING ______________________ DATE ________
CITY ENGINEER RCE 63056

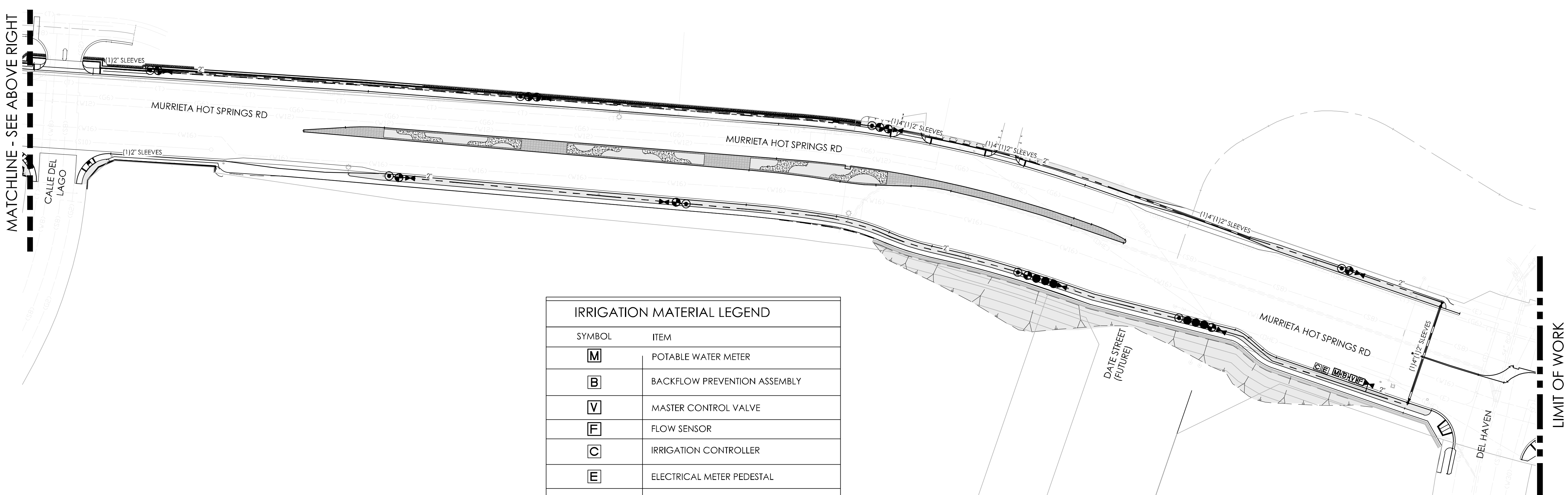
DWN BY: ________
CHKD BY: ________
FIELD BK: ________

CIP PROJECT NO. 07-310

DRAWING NO.

4/6/20

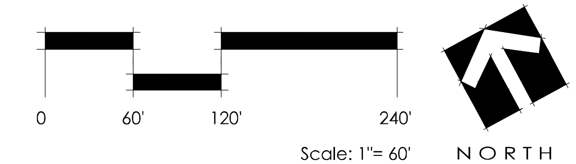




IRRIGATION MATERIAL LEGEND

SYMBOL	ITEM
M	POTABLE WATER METER
B	BACKFLOW PREVENTION ASSEMBLY
V	MASTER CONTROL VALVE
F	FLOW SENSOR
C	IRRIGATION CONTROLLER
E	ELECTRICAL METER PEDESTAL
	ISOLATION VALVE
	QUICK COUPLER VALVE
	DRIP REMOTE CONTROL VALVE ASSEMBLY
	SPRAY REMOTE CONTROL VALVE ASSEMBLY
	IRR. MAINLINE
	SLEEVE LOCATIONS

FOR FULL IRRIGATION LEGEND SEE SHEET L2.1



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"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD ____________ Date ____________

SEAL: LICENSED LANDSCAPE ARCHITECT David S. Neault No. 2884 Signature 06-30-2020 Renewal Date 04-06-2020 Date STATE OF CALIFORNIA

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DISTRICT APPROVAL

GEORGE MORING MCSD ____________ DATE
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PREPARED BY: R.L.A. NO. 2884
DAVID S. NEAULT DATE:

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 1.2
CITY OF MURRIETA
PLANNING DEPARTMENT
SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
IRRIGATION INDEX

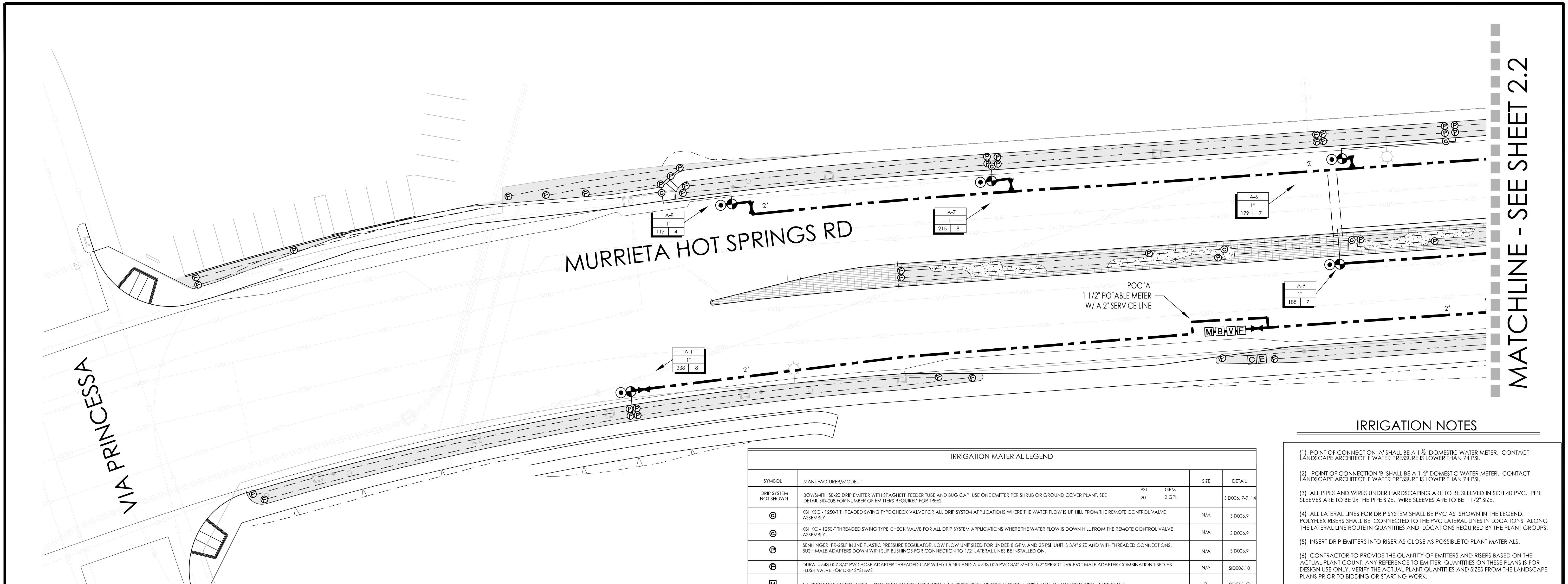
APPROVED
ROBERT K. MOEHLING ____________ DATE ____________
CITY ENGINEER RCE 63056

DWN BY: ____________
CHKD BY: ____________
FIELD BK: ____________

CIP PROJECT NO. 07-310

DRAWING NO.

4/6/20



IRRIGATION MATERIAL LEGEND

SYMBOL	MANUFACTURER/MODEL #	SIZE	DETAIL
DRIP SYSTEM NOT SHOWN	BOWSMITH SB-20 DRIP EMITTER WITH SPAGHETTI FEEDER TUBE AND BUG CAP, USE ONE EMITTER PER SHRUB OR GROUND COVER PLANT, SEE DETAIL SID-008 FOR NUMBER OF EMITTERS REQUIRED FOR TREES. PSI 20 GPM 2 GPH		SID006, 7-9, 14
Ⓒ	KBI KSC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS UP HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
Ⓒ	KBI KC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS DOWN HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
Ⓟ	SENNINGER PR-25LF INLINE PLASTIC PRESSURE REGULATOR, LOW FLOW UNIT SIZED FOR UNDER 8 GPM AND 25 PSI, UNIT IS 3/4" SIZE AND WITH THREADED CONNECTIONS, BUSH MALE ADAPTERS DOWN WITH SLIP BUSHINGS FOR CONNECTION TO 1/2" LATERAL LINES BE INSTALLED ON.	N/A	SID006,9
Ⓕ	DURA #548-007 3/4" PVC HOSE ADAPTER THREADED CAP WITH O-RING AND A #533-005 PVC 3/4" MHT X 1/2" SPIGOT UVR PVC MALE ADAPTER COMBINATION USED AS FLUSH VALVE FOR DRIP SYSTEMS	N/A	SID006,10
M	1 1/2" POTABLE WATER METER - DOMESTIC WATER METER WITH A 1 1/2" SERVICE LINE FROM STREET. VERIFY ACTUAL LOCATION WITH UTILITY PLANS.	2"	SID015, C
B	FEBCO 825YA SERIES, BACKFLOW PREVENTION ASSEMBLY. INSTALL WILKINS 100YSBR WYE STTRAINER AS PART OF ASSEMBLEY. ALL PIPING BETWEEN METER AND BACKFLOW DEVICE SHALL BE RED BRASS. SET IN V.I.T. STRONGBOX SBBC-30SS & CR WITH A 'POLAR BEARIER'INSULATED COVER ON POURED IN PLACE CONCRETE PAD.	2 1/2"	SID016
V	HUNTER ICV-201G-AS (2 1/2") PLASTIC MASTER CONTROL VALVE WITH "ACCU-SET" PRESSURE REGULATOR	2 1/2"	SID022
F	CALSENSE FM-2B BRASS (2") FLOW SENSOR, INSTALL ON BASKET STRAINER ASSEMBLY INSIDE OF BACKFLOW ENCLOSURE PER DETAIL	2 1/2"	SID022
C	CALSENSE C3 IRRIGATION CONTROLLER WITH LOCAL RADIO ANTENNA, WITH TRANSIENT AND LINE PROTECTION DEVICES. INSTALL CONTROLLER INSIDE OF A STAINLESS STEEL ENCLOSURE. INSTALL CALSENSE COMMUNICATIONHUB PRIOR TO TURNOVER OF ANY POC WITHIN PROJECT LIMITS. NO FINAL TURNOVER OF ANY INDIVIDUAL POC WILL BE ALLOWED WITHOUT APPROVAL OF EQUIPMENT BEING CONNECTED TO HUB BY MCSD REPRESENTATIVE. FINAL CONNECTIONS SHALL BE DETERMINED AND CONFIRMED BY CALSENSE RADIO TECHNICIAN AND MCSD APPROVAL.	N/A	SID043, 50, 51
E	ELECTRICAL METER PEDESTAL, VERIFY LOCATION IN FIELD	N/A	N/A
⋈	NIBCO T-585 BRASS & STAINLESS BALL TYPE, FULL PORT ISOLATION VALVE, LINE SIZE PER MAINLINE SIZE OR WHERE USED IN A REMOTE CONTROL VALVE MANIFOLD ASSEMBLY, SIZE PER THE LARGEST RCV IN THE MANIFOLD. INSTALL WITH A STAINLESS STEEL HANDLE.	LINE SIZE	SID023
⦿	RAINBIRD 44LRC POTABLE WATER QUICK COUPLER VALVE, 1" SIZE	LINE SIZE	SID026
●	HUNTER ICV-101G-AS (1") SERIES PRESSURE REGULATED DRIP REMOTE CONTROL VALVE ASSEMBLY, SIZE AS SHOWN. INSTALL A NIBCO T-560 ISOLATION VALVE AND A AMIAD #1-1201 WYE FILTER WITH 120 MESH DISC ELEMENT WITH A KING BROTHERS KSC-125OT SWING CHECK VALVE AS PART OF THE DRIP SYSTEM CONTROL VALVE ASSEMBLY. INSTALL ALL DRIP SYSTEM CONTROL VALVES WITHIN A VALVE MANIFOLD AS DESCRIBED FOR THE RCV ABOVE. ICV-101G-AS-R (1") SERIES PRESSURE REGULATED PLASTIC REMOTE CONTROL VALVE, SIZE AS SHOWN INSTALL WITHIN VALVE MANIFOLD (SIZE MANIFOLD TO MATCH LARGEST LATERAL LINE IN MANIFOLD) WITH NIBCO BALL VALVE (SIZE BALL VALVE TO MATCH LARGEST RCV IN MANIFOLD)	PLAN SIZE	SID030,31,33, 34,43,53
— - - —	PACIFIC PLAST. IRR. MAINLINE - DEPTH AS PER DETAIL, 2"" SHALL BE SOLVENT WELD SCH. 40 W/ SCH.80 SOLVENT WELD FITTINGS - 2 1/2" SHALL BE BRASS W/ BRASS FITTINGS	PLAN SIZE 2" MIN.	SID035-37, 43
Ⓕ	MAINLINE FLUSH VALVE - INSTALL A NIBCO T-585 BALL VALVE INSIDE VALVE BOX AT THE END OF EVERY MAINLINE RUN. FLUSH LINES ONLY WITH MCSD REP. PRESENT	3/4"	SID035-37, 43
———	PACIFIC PLAST. PVC PIPE 1/2"-1 1/4" SCH. 40 AS LATERAL LINES 4" BELOW GRADE (UVR PIPE FOR ON GRADE APPLICATION)	PLAN SIZE	SID035-37, 43
— — —	HYDRORAIN 3/4" BLU-LOCK FLEXIBLE RECYCLED PIPE BLP-075-CR-3X AT 2" BELOW GRADE AND SECURED WITH METAL STAPLES AT EACH EMITTER PER DETAILS BLU-LOCK (PURPLE FOR RECYCLED PIPING) (1") AND FITTINGS (BLACK FOR RECYCLED) TO BE USED IN DRIP LAYOUT PER CITY DETAIL SID020	3/4"	SID019, SID020, SID021, SID022, SID023
═ ═ ═	SLEEVE LOCATIONS (THESE SLEEVES ARE SHOWN DIAGRAMMATICALLY, REFER TO AS BUILT PLANS PROVIDED BY CITY ENGINEER FOR ACTUAL LOCATION)	PLAN SIZE	SID035-37, 43
NOT SHOWN	PAIGE CABLE - UF RATED CONTROL WIRE, 12 GA COMMON, 14 GA PILOT; USE DBY-6 WIRE CONNECTORS FOR USE ON ALL WIRE CONNECTIONS	12/14 GA	SID035-37, 43
DURA	DURA - PVC PIPE FITTINGS 'DEEP SOCKET' SCH. 80 FOR MAINLINE AND SCH. 40 FOR NON PRESSURIZED LATERAL LINES.	12/14 GA	SID035-37, 43

A-1 — VALVE NUMBER
1" — VALVE SIZE
12 — QTY. OF EMITTERS
100 — TOTAL G.P.M.

IRRIGATION NOTES

(1) POINT OF CONNECTION 'A' SHALL BE A 1 ½" DOMESTIC WATER METER. CONTACT LANDSCAPE ARCHITECT IF WATER PRESSURE IS LOWER THAN 74 PSI.

(2) POINT OF CONNECTION 'B' SHALL BE A 1 ½" DOMESTIC WATER METER. CONTACT LANDSCAPE ARCHITECT IF WATER PRESSURE IS LOWER THAN 74 PSI.

(3) ALL PIPES AND WIRES UNDER HARDSCAPING ARE TO BE SLEEVED IN SCH 40 PVC. PIPE SLEEVES ARE TO BE 2x THE PIPE SIZE. WIRE SLEEVES ARE TO BE 1 1/2" SIZE.

(4) ALL LATERAL LINES FOR DRIP SYSTEM SHALL BE PVC AS SHOWN IN THE LEGEND. POLYFLEX RISERS SHALL BE CONNECTED TO THE PVC LATERAL LINES IN LOCATIONS ALONG THE LATERAL LINE ROUTE IN QUANTITIES AND LOCATIONS REQUIRED BY THE PLANT GROUPS.

(5) INSERT DRIP EMITTERS INTO RISER AS CLOSE AS POSSIBLE TO PLANT MATERIALS.

(6) CONTRACTOR TO PROVIDE THE QUANTITY OF EMITTERS AND RISERS BASED ON THE ACTUAL PLANT COUNT. ANY REFERENCE TO EMITTER QUANTITIES ON THESE PLANS IS FOR DESIGN USE ONLY. VERIFY THE ACTUAL PLANT QUANTITIES AND SIZES FROM THE LANDSCAPE PLANS PRIOR TO BIDDING OR STARTING WORK.

(7) DUE TO THE SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS, SLEEVES, ETC. WHICH MAY BE REQUIRED. THE CONTRACTOR SHALL CAREFULLY INVESTIGATE THE STRUCTURAL AND FINISHED CONDITIONS AFFECTING ALL OF HIS WORK AND PLAN HIS WORK ACCORDINGLY, FURNISHING SUCH FITTINGS, ETC. AS MAY BE REQUIRED TO MEET SUCH CONDITIONS. DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATIVE OF THE WORK TO BE INSTALLED. THE WORK SHALL BE INSTALLED IN SUCH A MANNER AS TO AVOID CONFLICTS BETWEEN IRRIGATION SYSTEMS, PLANTING, AND ARCHITECTURAL FEATURES.

(8) ALL WORK CALLED FOR ON THE DRAWINGS BY NOTES OR DETAILS SHALL BE FURNISHED AND INSTALLED WHETHER OR NOT SPECIFICALLY MENTIONED IN THE SPECIFICATIONS. WHEN AN ITEM IS SHOWN ON THE PLANS BUT NOT SHOWN ON THE SPECIFICATIONS OR VICE VERSA, IT SHALL BE DEEMED TO BE AS SHOWN ON BOTH. THE LANDSCAPE ARCHITECT SHALL HAVE FINAL AUTHORITY FOR CLARIFICATION.

(9) THE CONTRACTOR SHALL NOT WILLFULLY INSTALL THE IRRIGATION SYSTEM AS SHOWN ON THE DRAWINGS WHEN IT IS OBVIOUS IN THE FIELD THAT OBSTRUCTIONS, GRADE DIFFERENCES OR DISCREPANCIES IN AREA DIMENSIONS EXIST THAT MIGHT NOT HAVE BEEN CONSIDERED IN ENGINEERING. SUCH OBSTRUCTIONS OR DIFFERENCES SHOULD BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT AS SOON AS DETECTED. IN THE EVENT THIS NOTIFICATION IS NOT PERFORMED, THE IRRIGATION CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY REVISION NECESSARY.

0 20' 40' 80'

Scale: 1"= 20'

NORTH

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LATERAL PIPE SIZE

DIAMETER	SCHEDULE 40
3/4"	0-5 GPM
1"	6-9 GPM
1 1/4"	10-13 GPM
1 1/2"	14-23 GPM
2"	24-39 GPM
2 1/2"	40-59 GPM

"AS BUILT"
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MCSD Date

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CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

GEORGE MORING MCSD DATE
PARKS MAINTENANCE SUPERINTENDENT

SEAL:
LICENSED LANDSCAPE ARCHITECT
David S. Neault No. 2884
Signature
06-30-2020
Renewal Date
04-06-2020
Date
STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
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landscape architecture
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David NEAULT ASSOCIATES Inc.
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PREPARED BY:
R.L.A. NO. 2884
DATE:
DAVID S. NEAULT

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 2.1
CITY OF MURRIETA
PLANNING DEPARTMENT
SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
IRRIGATION PLAN

APPROVED
ROBERT K. MOEHLING DATE
CITY ENGINEER RCE 63056

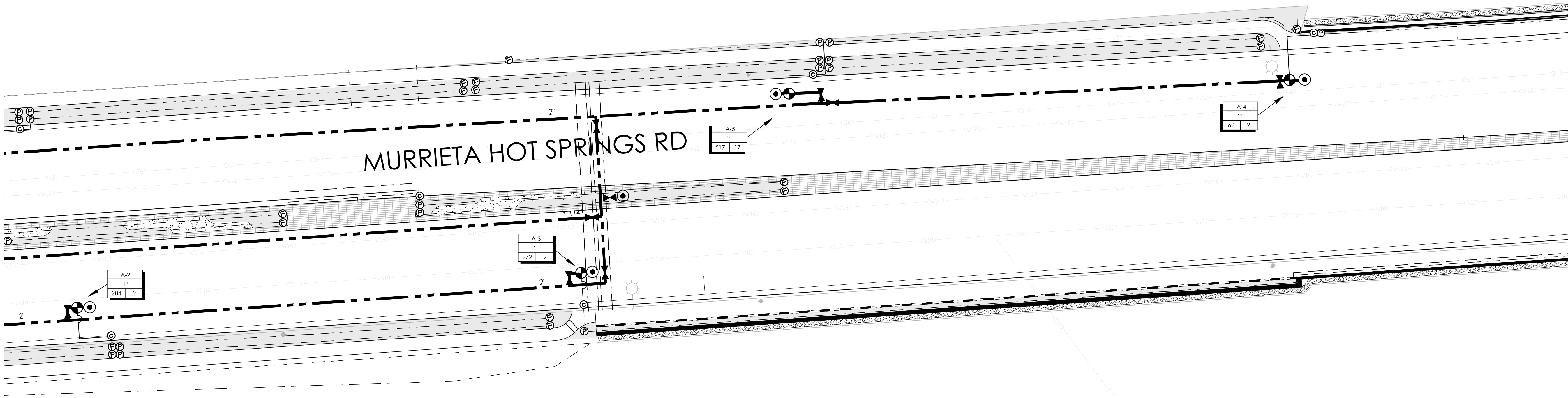
DWN BY:
CHKD BY:
FIELD BK:

CIP PROJECT NO.
07-310

DRAWING NO.

4/6/20

MATCHLINE - SEE SHEET 2.1



MATCHLINE - SEE SHEET 2.3

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(2) POINT OF CONNECTION 'B' SHALL BE A 1 ½" DOMESTIC WATER METER. CONTACT LANDSCAPE ARCHITECT IF WATER PRESSURE IS LOWER THAN 74 PSI.

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(4) ALL LATERAL LINES FOR DRIP SYSTEM SHALL BE PVC AS SHOWN IN THE LEGEND. POLYFLEX RISERS SHALL BE CONNECTED TO THE PVC LATERAL LINES IN LOCATIONS ALONG THE LATERAL LINE ROUTE IN QUANTITIES AND LOCATIONS REQUIRED BY THE PLANT GROUPS.

(5) INSERT DRIP EMITTERS INTO RISER AS CLOSE AS POSSIBLE TO PLANT MATERIALS.

(6) CONTRACTOR TO PROVIDE THE QUANTITY OF EMITTERS AND RISERS BASED ON THE ACTUAL PLANT COUNT. ANY REFERENCE TO EMITTER QUANTITIES ON THESE PLANS IS FOR DESIGN USE ONLY. VERIFY THE ACTUAL PLANT QUANTITIES AND SIZES FROM THE LANDSCAPE PLANS PRIOR TO BIDDING OR STARTING WORK.

(7) DUE TO THE SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS, SLEEVES, ETC. WHICH MAY BE REQUIRED. THE CONTRACTOR SHALL CAREFULLY INVESTIGATE THE STRUCTURAL AND FINISHED CONDITIONS AFFECTING ALL OF HIS WORK AND PLAN HIS WORK ACCORDINGLY, FURNISHING SUCH FITTINGS, ETC. AS MAY BE REQUIRED TO MEET SUCH CONDITIONS. DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATIVE OF THE WORK TO BE INSTALLED. THE WORK SHALL BE INSTALLED IN SUCH A MANNER AS TO AVOID CONFLICTS BETWEEN IRRIGATION SYSTEMS, PLANTING, AND ARCHITECTURAL FEATURES.

(8) ALL WORK CALLED FOR ON THE DRAWINGS BY NOTES OR DETAILS SHALL BE FURNISHED AND INSTALLED WHETHER OR NOT SPECIFICALLY MENTIONED IN THE SPECIFICATIONS. WHEN AN ITEM IS SHOWN ON THE PLANS BUT NOT SHOWN ON THE SPECIFICATIONS OR VICE VERSA, IT SHALL BE DEEMED TO BE AS SHOWN ON BOTH. THE LANDSCAPE ARCHITECT SHALL HAVE FINAL AUTHORITY FOR CLARIFICATION.

(9) THE CONTRACTOR SHALL NOT WILLFULLY INSTALL THE IRRIGATION SYSTEM AS SHOWN ON THE DRAWINGS WHEN IT IS OBVIOUS IN THE FIELD THAT OBSTRUCTIONS, GRADE DIFFERENCES OR DISCREPANCIES IN AREA DIMENSIONS EXIST THAT MIGHT NOT HAVE BEEN CONSIDERED IN ENGINEERING. SUCH OBSTRUCTIONS OR DIFFERENCES SHOULD BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT AS SOON AS DETECTED. IN THE EVENT THIS NOTIFICATION IS NOT PERFORMED, THE IRRIGATION CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY REVISION NECESSARY.

IRRIGATION MATERIAL LEGEND

SYMBOL	MANUFACTURER/MODEL #	SIZE	DETAIL
DRIP SYSTEM NOT SHOWN	BOWSMITH SB-20 DRIP EMITTER WITH SPAGHETTI FEEDER TUBE AND BUG CAP, USE ONE EMITTER PER SHRUB OR GROUND COVER PLANT, SEE DETAIL SID-008 FOR NUMBER OF EMITTERS REQUIRED FOR TREES. PSI 20 GPM 2 GPH		SID006, 7-9, 14
Ⓒ	KBI KSC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS UP HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
Ⓒ	KBI KC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS DOWN HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
Ⓟ	SENNINGER PR-25LF INLINE PLASTIC PRESSURE REGULATOR, LOW FLOW UNIT SIZED FOR UNDER 8 GPM AND 25 PSI, UNIT IS 3/4" SIZE AND WITH THREADED CONNECTIONS, BUSH MALE ADAPTERS DOWN WITH SLIP BUSHINGS FOR CONNECTION TO 1/2" LATERAL LINES BE INSTALLED ON.	N/A	SID006,9
Ⓕ	DURA #548-007 3/4" PVC HOSE ADAPTER THREADED CAP WITH O-RING AND A #533-005 PVC 3/4" MHT X 1/2" SPIGOT UVR PVC MALE ADAPTER COMBINATION USED AS FLUSH VALVE FOR DRIP SYSTEMS	N/A	SID006,10
M	1 1/2" POTABLE WATER METER - DOMESTIC WATER METER WITH A 1 1/2" SERVICE LINE FROM STREET. VERIFY ACTUAL LOCATION WITH UTILITY PLANS.	2"	SID015, C
B	FEBCO 825YA SERIES, BACKFLOW PREVENTION ASSEMBLY. INSTALL WILKINS 100YSBR WYE STTRAINER AS PART OF ASSEMBLEY. ALL PIPING BETWEEN METER AND BACKFLOW DEVICE SHALL BE RED BRASS. SET IN V.I.T. STRONGBOX SBBC-30SS & CR WITH A 'POLAR BEARIER'INSULATED COVER ON POURED IN PLACE CONCRETE PAD.	2 1/2"	SID016
V	HUNTER ICV-201G-AS (2 1/2") PLASTIC MASTER CONTROL VALVE WITH "ACCU-SET" PRESSURE REGULATOR	2 1/2"	SID022
F	CALSENSE FM-2B BRASS (2") FLOW SENSOR, INSTALL ON BASKET STRAINER ASSEMBLY INSIDE OF BACKFLOW ENCLOSURE PER DETAIL	2 1/2"	SID022
C	CALSENSE C3 IRRIGATION CONTROLLER WITH LOCAL RADIO ANTENNA, WITH TRANSIENT AND LINE PROTECTION DEVICES. INSTALL CONTROLLER INSIDE OF A STAINLESS STEEL ENCLOSURE. INSTALL CALSENSE COMMUNICATIONHUB PRIOR TO TURNOVER OF ANY POC WITHIN PROJECT LIMITS. NO FINAL TURNOVER OF ANY INDIVIDUAL POC WILL BE ALLOWED WITHOUT APPROVAL OF EQUIPMENT BEING CONNECTED TO HUB BY MCSD REPRESENTATIVE. FINAL CONNECTIONS SHALL BE DETERMINED AND CONFIRMED BY CALSENSE RADIO TECHNICIAN AND MCSD APPROVAL.	N/A	SID043, 50, 51
E	ELECTRICAL METER PEDESTAL, VERIFY LOCATION IN FIELD	N/A	N/A
⋈	NIBCO T-585 BRASS & STAINLESS BALL TYPE, FULL PORT ISOLATION VALVE, LINE SIZE PER MAINLINE SIZE OR WHERE USED IN A REMOTE CONTROL VALVE MANIFOLD ASSEMBLY, SIZE PER THE LARGEST RCV IN THE MANIFOLD. INSTALL WITH A STAINLESS STEEL HANDLE.	LINE SIZE	SID023
⦿	RAINBIRD 44LRC POTABLE WATER QUICK COUPLER VALVE, 1" SIZE	LINE SIZE	SID026
●	HUNTER ICV-101G-AS (1") SERIES PRESSURE REGULATED DRIP REMOTE CONTROL VALVE ASSEMBLY, SIZE AS SHOWN. INSTALL A NIBCO T-560 ISOLATION VALVE AND A AMIAD #1-1201 WYE FILTER WITH 120 MESH DISC ELEMENT WITH A KING BROTHERS KSC-125OT SWING CHECK VALVE AS PART OF THE DRIP SYSTEM CONTROL VALVE ASSEMBLY. INSTALL ALL DRIP SYSTEM CONTROL VALVES WITHIN A VALVE MANIFOLD AS DESCRIBED FOR THE RCV ABOVE. ICV-101G-AS-R (1") SERIES PRESSURE REGULATED PLASTIC REMOTE CONTROL VALVE, SIZE AS SHOWN INSTALL WITHIN VALVE MANIFOLD (SIZE MANIFOLD TO MATCH LARGEST LATERAL LINE IN MANIFOLD) WITH NIBCO BALL VALVE (SIZE BALL VALVE TO MATCH LARGEST RCV IN MANIFOLD)	PLAN SIZE	SID030,31,33, 34,43,53
—— - - ——	PACIFIC PLAST. IRR. MAINLINE - DEPTH AS PER DETAIL, 2"" SHALL BE SOLVENT WELD SCH. 40 W/ SCH.80 SOLVENT WELD FITTINGS - 2 1/2" SHALL BE BRASS W/ BRASS FITTINGS	PLAN SIZE 2" MIN.	SID035-37, 43
Ⓕ	MAINLINE FLUSH VALVE - INSTALL A NIBCO T-585 BALL VALVE INSIDE VALVE BOX AT THE END OF EVERY MAINLINE RUN. FLUSH LINES ONLY WITH MCSD REP. PRESENT	3/4"	SID035-37, 43
————	PACIFIC PLAST. PVC PIPE 1/2"-1 1/4" SCH. 40 AS LATERAL LINES 4" BELOW GRADE (UVR PIPE FOR ON GRADE APPLICATION)	PLAN SIZE	SID035-37, 43
— — —	HYDRORAIN 3/4" BLU-LOCK FLEXIBLE RECYCLED PIPE BLP-075-CR-3X AT 2" BELOW GRADE AND SECURED WITH METAL STAPLES AT EACH EMITTER PER DETAILS BLU-LOCK (PURPLE FOR RECYCLED PIPING) (1") AND FITTINGS (BLACK FOR RECYCLED) TO BE USED IN DRIP LAYOUT PER CITY DETAIL SID020	3/4"	SID019, SID020, SID021, SID022, SID023
═ ═ ═	SLEEVE LOCATIONS (THESE SLEEVES ARE SHOWN DIAGRAMMATICALLY, REFER TO AS BUILT PLANS PROVIDED BY CITY ENGINEER FOR ACTUAL LOCATION)	PLAN SIZE	SID035-37, 43
NOT SHOWN	PAIGE CABLE - UF RATED CONTROL WIRE, 12 GA COMMON, 14 GA PILOT; USE DBY-6 WIRE CONNECTORS FOR USE ON ALL WIRE CONNECTIONS	12/14 GA	SID035-37, 43
DURA	DURA - PVC PIPE FITTINGS 'DEEP SOCKET' SCH. 80 FOR MAINLINE AND SCH. 40 FOR NON PRESSURIZED LATERAL LINES.	12/14 GA	SID035-37, 43

A-1 — VALVE NUMBER
1" — VALVE SIZE
12 | 100 — QTY. OF EMITTERS

0 20' 40' 80'

Scale: 1"= 20'

NORTH

NOTE:
THE SPECIAL PROVISIONS SPECIFICATIONS BOOK COMPLETES THE CONTRACT DOCUMENTS AND SHALL TAKE PRECEDENCE OVER THE APPROVED LANDSCAPE PLANS. SHOULD A DISCREPANCY OCCUR BETWEEN ANY NOTES, SPECIFICATIONS, DETAILS, SITE CONDITIONS, OR OTHER SITUATION REGARDING THE CONSTRUCTION OF THESE PLANS, THE MURRIETA COMMUNITY SERVICE DISTRICT LANDSCAPE SPECIFICATIONS AND STANDARDS MANUAL SHALL TAKE PRECEDENCE AND ALL DECISIONS MADE BY THE MCSD SHALL BE FINAL. MCSD PHONE 1-951-461-6124.

HOLD HARMLESS AND INDEMNIFICATION CLAUSE
CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMETED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, AND THE LANDSCAPE ARCHITECT HARMLESS FROM ANY AND ALL LIABILITY REAL OR ELLEGED, IN CONNECTION WITH THE PERFROMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLEGENCE OF THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, OR THE LANDSCAPE ARCHITECT.

LATERAL PIPE SIZE

DIAMETER	SCHEDULE 40
3/4"	0-5 GPM
1"	6-9 GPM
1 1/4"	10-13 GPM
1 1/2"	14-23 GPM
2"	24-39 GPM
2 1/2"	40-59 GPM

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.-JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD ______ Date ______

CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

GEORGE MORING MCSD ______ DATE ______
PARKS MAINTENANCE SUPERINTENDENT

SEAL:
LICENSED LANDSCAPE ARCHITECT
David S. Neault No. 2884
Signature
06-30-2020
Renewal Date
04-06-2020
Date
STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

David NEAULT ASSOCIATES Inc.
landscape architecture
planning
golf course architecture
41877 enterprise
circle north suite 140
temecula, ca. 92590
951 296 3430
www.dnassociates.com

PREPARED BY:
R.L.A. NO. 2884
DATE:
DAVID S. NEAULT

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 2.2

CITY OF MURRIETA
PLANNING DEPARTMENT

SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
IRRIGATION PLAN

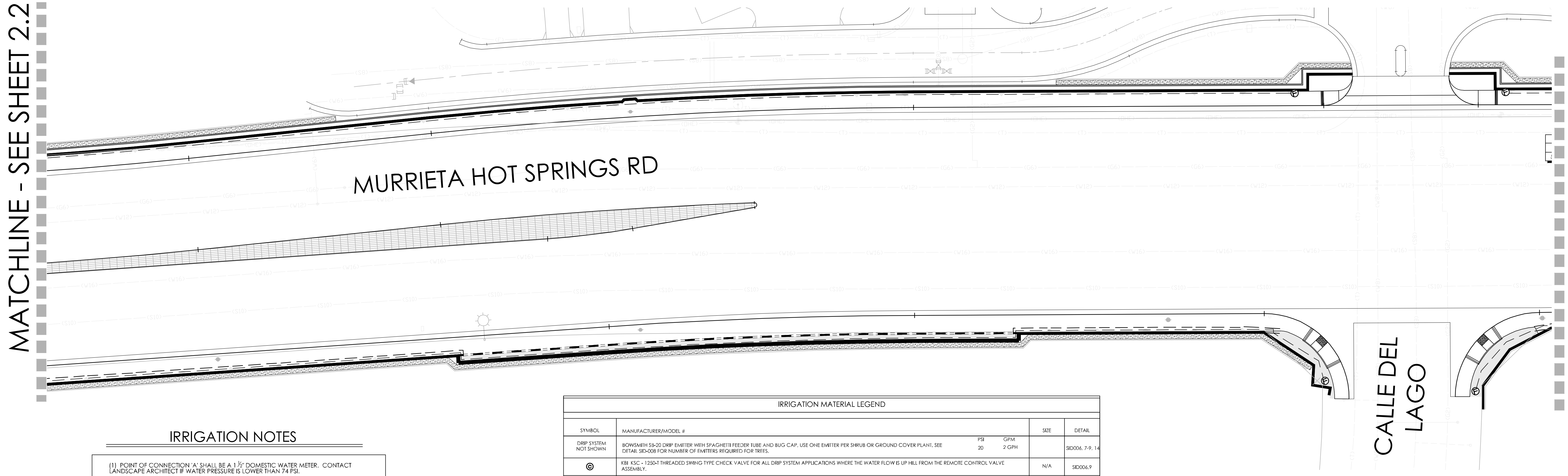
APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: ______
CHKD BY: ______
FIELD BK: ______

CIP PROJECT NO.
07-310

DRAWING NO.

4/6/20



IRRIGATION NOTES

(1) POINT OF CONNECTION 'A' SHALL BE A 1 ½" DOMESTIC WATER METER. CONTACT LANDSCAPE ARCHITECT IF WATER PRESSURE IS LOWER THAN 74 PSI.

(2) POINT OF CONNECTION 'B' SHALL BE A 1 ½" DOMESTIC WATER METER. CONTACT LANDSCAPE ARCHITECT IF WATER PRESSURE IS LOWER THAN 74 PSI.

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IRRIGATION MATERIAL LEGEND

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C	KBI KSC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS UP HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
C	KBI KC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS DOWN HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
P	SENNINGER PR-25LF INLINE PLASTIC PRESSURE REGULATOR, LOW FLOW UNIT SIZED FOR UNDER 8 GPM AND 25 PSI, UNIT IS 3/4" SIZE AND WITH THREADED CONNECTIONS, BUSH MALE ADAPTERS DOWN WITH SLIP BUSHINGS FOR CONNECTION TO 1/2" LATERAL LINES BE INSTALLED ON.	N/A	SID006,9
F	DURA #548-007 3/4" PVC HOSE ADAPTER THREADED CAP WITH O-RING AND A #533-005 PVC 3/4" MHT X 1/2" SPIGOT UVR PVC MALE ADAPTER COMBINATION USED AS FLUSH VALVE FOR DRIP SYSTEMS	N/A	SID006,10
M	1 1/2" POTABLE WATER METER - DOMESTIC WATER METER WITH A 1 1/2" SERVICE LINE FROM STREET. VERIFY ACTUAL LOCATION WITH UTILITY PLANS.	2"	SID015, C
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V	HUNTER ICV-201G-AS (2 1/2") PLASTIC MASTER CONTROL VALVE WITH "ACCU-SET" PRESSURE REGULATOR	2 1/2"	SID022
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E	ELECTRICAL METER PEDESTAL, VERIFY LOCATION IN FIELD	N/A	N/A
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⦿	RAINBIRD 44LRC POTABLE WATER QUICK COUPLER VALVE, 1" SIZE	LINE SIZE	SID026
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— - - —	PACIFIC PLAST. IRR. MAINLINE - DEPTH AS PER DETAIL, 2"' SHALL BE SOLVENT WELD SCH. 40 W/ SCH.80 SOLVENT WELD FITTINGS - 2 1/2" SHALL BE BRASS W/ BRASS FITTINGS	PLAN SIZE 2" MIN.	SID035-37, 43
FI	MAINLINE FLUSH VALVE - INSTALL A NIBCO T-585 BALL VALVE INSIDE VALVE BOX AT THE END OF EVERY MAINLINE RUN. FLUSH LINES ONLY WITH MCSD REP. PRESENT	3/4"	SID035-37, 43
———	PACIFIC PLAST. PVC PIPE 1/2"-1 1/4" SCH. 40 AS LATERAL LINES 4" BELOW GRADE (UVR PIPE FOR ON GRADE APPLICATION)	PLAN SIZE	SID035-37, 43
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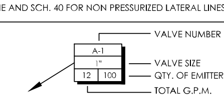
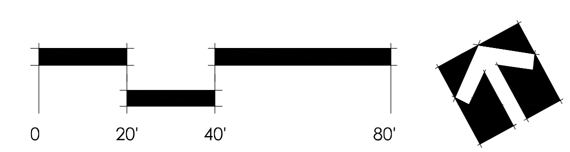
= = =	SLEEVE LOCATIONS (THESE SLEEVES ARE SHOWN DIAGRAMMATICALLY, REFER TO AS BUILT PLANS PROVIDED BY CITY ENGINEER FOR ACTUAL LOCATION)	PLAN SIZE	SID035-37, 43
NOT SHOWN	PAIGE CABLE - UF RATED CONTROL WIRE, 12 GA COMMON, 14 GA PILOT; USE DBY-6 WIRE CONNECTORS FOR USE ON ALL WIRE CONNECTIONS	12/14 GA	SID035-37, 43
DURA	DURA - PVC PIPE FITTINGS 'DEEP SOCKET' SCH. 80 FOR MAINLINE AND SCH. 40 FOR NON PRESSURIZED LATERAL LINES.	12/14 GA	SID035-37, 43





Scale: 1"= 20'

NORTH

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LATERAL PIPE SIZE

DIAMETER	SCHEDULE 40
3/4"	0-5 GPM
1"	6-9 GPM
1 1/4"	10-13 GPM
1 1/2"	14-23 GPM
2"	24-39 GPM
2 1/2"	40-59 GPM

"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD ____________ Date ____________

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.-JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

GEORGE MORING MCSD ____________ DATE
PARKS MAINTENANCE SUPERINTENDENT

SEAL:
LICENSED LANDSCAPE ARCHITECT
David S. Neault No. 2884
Signature
06-30-2020
Renewal Date
04-06-2020
Date
STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

landscape architecture
planning
golf course architecture
David NEAULT ASSOCIATES Inc.
41877 enterprise
circle north suite 140
temecula, ca. 92590
951 296 3430
www.dnassociates.com

PREPARED BY:
DAVID S. NEAULT
R.L.A. NO. 2884
DATE:

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 2.3

CITY OF MURRIETA
PLANNING DEPARTMENT

SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
IRRIGATION PLAN

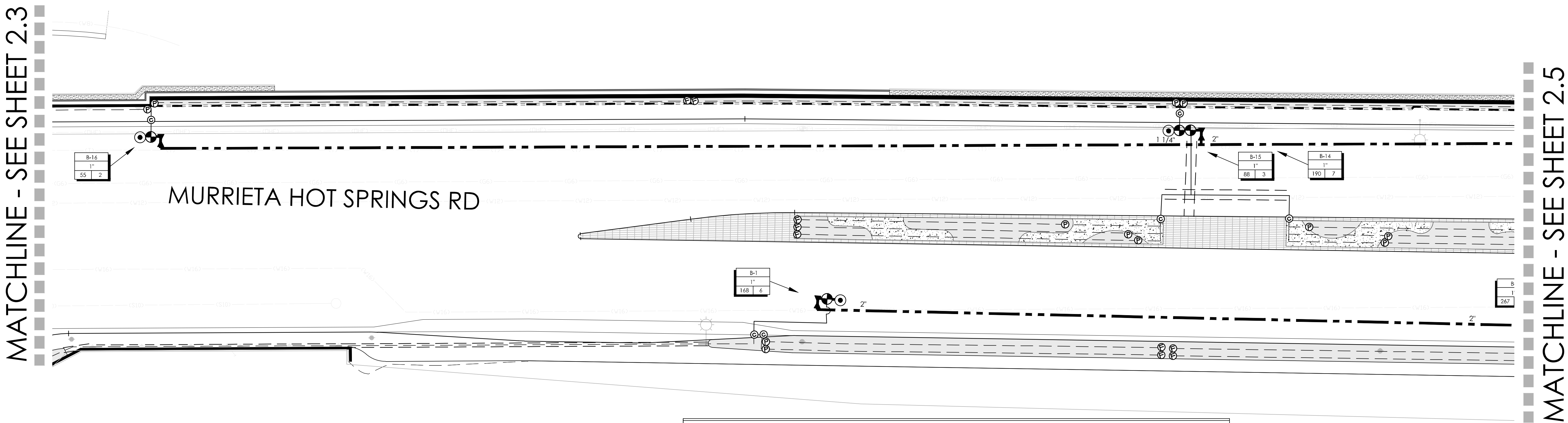
APPROVED
ROBERT K. MOEHLING ____________ DATE ____________
CITY ENGINEER RCE 63056

DWN BY: ____________
CHKD BY: ____________
FIELD BK: ____________

CIP PROJECT NO. 07-310

DRAWING NO.

4/6/20



IRRIGATION NOTES

(1) POINT OF CONNECTION 'A' SHALL BE A 1 ½" DOMESTIC WATER METER. CONTACT LANDSCAPE ARCHITECT IF WATER PRESSURE IS LOWER THAN 74 PSI.

(2) POINT OF CONNECTION 'B' SHALL BE A 1 ½" DOMESTIC WATER METER. CONTACT LANDSCAPE ARCHITECT IF WATER PRESSURE IS LOWER THAN 74 PSI.

(3) ALL PIPES AND WIRES UNDER HARDSCAPING ARE TO BE SLEEVED IN SCH 40 PVC. PIPE SLEEVES ARE TO BE 2x THE PIPE SIZE. WIRE SLEEVES ARE TO BE 1 1/2" SIZE.

(4) ALL LATERAL LINES FOR DRIP SYSTEM SHALL BE PVC AS SHOWN IN THE LEGEND. POLYFLEX RISERS SHALL BE CONNECTED TO THE PVC LATERAL LINES IN LOCATIONS ALONG THE LATERAL LINE ROUTE IN QUANTITIES AND LOCATIONS REQUIRED BY THE PLANT GROUPS.

(5) INSERT DRIP EMITTERS INTO RISER AS CLOSE AS POSSIBLE TO PLANT MATERIALS.

(6) CONTRACTOR TO PROVIDE THE QUANTITY OF EMITTERS AND RISERS BASED ON THE ACTUAL PLANT COUNT. ANY REFERENCE TO EMITTER QUANTITIES ON THESE PLANS IS FOR DESIGN USE ONLY. VERIFY THE ACTUAL PLANT QUANTITIES AND SIZES FROM THE LANDSCAPE PLANS PRIOR TO BIDDING OR STARTING WORK.

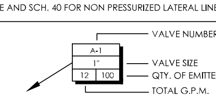
(7) DUE TO THE SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS, SLEEVES, ETC. WHICH MAY BE REQUIRED. THE CONTRACTOR SHALL CAREFULLY INVESTIGATE THE STRUCTURAL AND FINISHED CONDITIONS AFFECTING ALL OF HIS WORK AND PLAN HIS WORK ACCORDINGLY, FURNISHING SUCH FITTINGS, ETC. AS MAY BE REQUIRED TO MEET SUCH CONDITIONS. DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATIVE OF THE WORK TO BE INSTALLED. THE WORK SHALL BE INSTALLED IN SUCH A MANNER AS TO AVOID CONFLICTS BETWEEN IRRIGATION SYSTEMS, PLANTING, AND ARCHITECTURAL FEATURES.

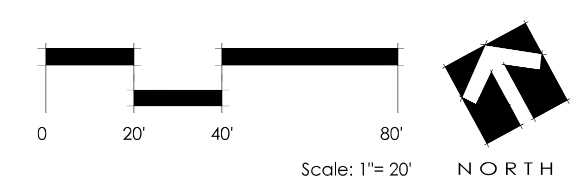
(8) ALL WORK CALLED FOR ON THE DRAWINGS BY NOTES OR DETAILS SHALL BE FURNISHED AND INSTALLED WHETHER OR NOT SPECIFICALLY MENTIONED IN THE SPECIFICATIONS. WHEN AN ITEM IS SHOWN ON THE PLANS BUT NOT SHOWN ON THE SPECIFICATIONS OR VICE VERSA, IT SHALL BE DEEMED TO BE AS SHOWN ON BOTH. THE LANDSCAPE ARCHITECT SHALL HAVE FINAL AUTHORITY FOR CLARIFICATION.

(9) THE CONTRACTOR SHALL NOT WILLFULLY INSTALL THE IRRIGATION SYSTEM AS SHOWN ON THE DRAWINGS WHEN IT IS OBVIOUS IN THE FIELD THAT OBSTRUCTIONS, GRADE DIFFERENCES OR DISCREPANCIES IN AREA DIMENSIONS EXIST THAT MIGHT NOT HAVE BEEN CONSIDERED IN ENGINEERING. SUCH OBSTRUCTIONS OR DIFFERENCES SHOULD BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT AS SOON AS DETECTED. IN THE EVENT THIS NOTIFICATION IS NOT PERFORMED, THE IRRIGATION CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY REVISION NECESSARY.

IRRIGATION MATERIAL LEGEND

SYMBOL	MANUFACTURER/MODEL #	SIZE	DETAIL
DRIP SYSTEM NOT SHOWN	BOWSMITH SB-20 DRIP EMITTER WITH SPAGHETTI FEEDER TUBE AND BUG CAP, USE ONE EMITTER PER SHRUB OR GROUND COVER PLANT, SEE DETAIL SID-008 FOR NUMBER OF EMITTERS REQUIRED FOR TREES. PSI 20 GPM 2 GPH		SID006, 7-9, 14
©	KBI KSC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS UP HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
©	KBI KC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS DOWN HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
Ⓟ	SENNINGER PR-25LF INLINE PLASTIC PRESSURE REGULATOR, LOW FLOW UNIT SIZED FOR UNDER 8 GPM AND 25 PSI, UNIT IS 3/4" SIZE AND WITH THREADED CONNECTIONS, BUSH MALE ADAPTERS DOWN WITH SLIP BUSHINGS FOR CONNECTION TO 1/2" LATERAL LINES BE INSTALLED ON.	N/A	SID006,9
Ⓕ	DURA #548-007 3/4" PVC HOSE ADAPTER THREADED CAP WITH O-RING AND A #533-005 PVC 3/4" MHT X 1/2" SPIGOT UVR PVC MALE ADAPTER COMBINATION USED AS FLUSH VALVE FOR DRIP SYSTEMS	N/A	SID006,10
M	1 1/2" POTABLE WATER METER - DOMESTIC WATER METER WITH A 1 1/2" SERVICE LINE FROM STREET. VERIFY ACTUAL LOCATION WITH UTILITY PLANS.	2"	SID015, C
B	FEBCO 825YA SERIES, BACKFLOW PREVENTION ASSEMBLY. INSTALL WILKINS 100YSBR WYE STTRAINER AS PART OF ASSEMBLEY. ALL PIPING BETWEEN METER AND BACKFLOW DEVICE SHALL BE RED BRASS. SET IN V.I.T. STRONGBOX SBBC-30SS & CR WITH A 'POLAR BEARIER'INSULATED COVER ON POURED IN PLACE CONCRETE PAD.	2 1/2"	SID016
V	HUNTER ICV-201G-AS (2 1/2") PLASTIC MASTER CONTROL VALVE WITH "ACCU-SET" PRESSURE REGULATOR	2 1/2"	SID022
F	CALSENSE FM-2B BRASS (2") FLOW SENSOR, INSTALL ON BASKET STRAINER ASSEMBLY INSIDE OF BACKFLOW ENCLOSURE PER DETAIL	2 1/2"	SID022
C	CALSENSE C3 IRRIGATION CONTROLLER WITH LOCAL RADIO ANTENNA, WITH TRANSIENT AND LINE PROTECTION DEVICES. INSTALL CONTROLLER INSIDE OF A STAINLESS STEEL ENCLOSURE. INSTALL CALSENSE COMMUNICATIONHUB PRIOR TO TURNOVER OF ANY POC WITHIN PROJECT LIMITS. NO FINAL TURNOVER OF ANY INDIVIDUAL POC WILL BE ALLOWED WITHOUT APPROVAL OF EQUIPMENT BEING CONNECTED TO HUB BY MCSD REPRESENTATIVE. FINAL CONNECTIONS SHALL BE DETERMINED AND CONFIRMED BY CALSENSE RADIO TECHNICIAN AND MCSD APPROVAL.	N/A	SID043, 50, 51
E	ELECTRICAL METER PEDESTAL, VERIFY LOCATION IN FIELD	N/A	N/A
⧓	NIBCO T-585 BRASS & STAINLESS BALL TYPE, FULL PORT ISOLATION VALVE, LINE SIZE PER MAINLINE SIZE OR WHERE USED IN A REMOTE CONTROL VALVE MANIFOLD ASSEMBLY, SIZE PER THE LARGEST RCV IN THE MANIFOLD. INSTALL WITH A STAINLESS STEEL HANDLE.	LINE SIZE	SID023
⦿	RAINBIRD 44LRC POTABLE WATER QUICK COUPLER VALVE, 1" SIZE	LINE SIZE	SID026
◕ / ●	HUNTER ICV-101G-AS (1") SERIES PRESSURE REGULATED DRIP REMOTE CONTROL VALVE ASSEMBLY, SIZE AS SHOWN. INSTALL A NIBCO T-560 ISOLATION VALVE AND A AMIAD #1-1201 WYE FILTER WITH 120 MESH DISC ELEMENT WITH A KING BROTHERS KSC-125OT SWING CHECK VALVE AS PART OF THE DRIP SYSTEM CONTROL VALVE ASSEMBLY. INSTALL ALL DRIP SYSTEM CONTROL VALVES WITHIN A VALVE MANIFOLD AS DESCRIBED FOR THE RCV ABOVE. ICV-101G-AS-R (1") SERIES PRESSURE REGULATED PLASTIC REMOTE CONTROL VALVE, SIZE AS SHOWN INSTALL WITHIN VALVE MANIFOLD (SIZE MANIFOLD TO MATCH LARGEST LATERAL LINE IN MANIFOLD) WITH NIBCO BALL VALVE (SIZE BALL VALVE TO MATCH LARGEST RCV IN MANIFOLD)	PLAN SIZE	SID030,31,33, 34,43,53
—— - - ——	PACIFIC PLAST. IRR. MAINLINE - DEPTH AS PER DETAIL, 2"" SHALL BE SOLVENT WELD SCH. 40 W/ SCH.80 SOLVENT WELD FITTINGS - 2 1/2" SHALL BE BRASS W/ BRASS FITTINGS	PLAN SIZE 2" MIN.	SID035-37, 43
Ⓕ	MAINLINE FLUSH VALVE - INSTALL A NIBCO T-585 BALL VALVE INSIDE VALVE BOX AT THE END OF EVERY MAINLINE RUN. FLUSH LINES ONLY WITH MCSD REP. PRESENT	3/4"	SID035-37, 43
————	PACIFIC PLAST. PVC PIPE 1/2"-1 1/4" SCH. 40 AS LATERAL LINES 4" BELOW GRADE (UVR PIPE FOR ON GRADE APPLICATION)	PLAN SIZE	SID035-37, 43
— — —	HYDRORAIN 3/4" BLU-LOCK FLEXIBLE RECYCLED PIPE BLP-075-CR-3X AT 2" BELOW GRADE AND SECURED WITH METAL STAPLES AT EACH EMITTER PER DETAILS BLU-LOCK (PURPLE FOR RECYCLED PIPING) (1") AND FITTINGS (BLACK FOR RECYCLED) TO BE USED IN DRIP LAYOUT PER CITY DETAIL SID020	3/4"	SID019, SID020, SID021, SID022, SID023
═ ═ ═	SLEEVE LOCATIONS (THESE SLEEVES ARE SHOWN DIAGRAMMATICALLY, REFER TO AS BUILT PLANS PROVIDED BY CITY ENGINEER FOR ACTUAL LOCATION)	PLAN SIZE	SID035-37, 43
NOT SHOWN	PAIGE CABLE - UF RATED CONTROL WIRE, 12 GA COMMON, 14 GA PILOT; USE DBY-6 WIRE CONNECTORS FOR USE ON ALL WIRE CONNECTIONS	12/14 GA	SID035-37, 43
DURA	DURA - PVC PIPE FITTINGS 'DEEP SOCKET' SCH. 80 FOR MAINLINE AND SCH. 40 FOR NON PRESSURIZED LATERAL LINES.	12/14 GA	SID035-37, 43





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HOLD HARMLESS AND INDEMNIFICATION CLAUSE
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LATERAL PIPE SIZE

DIAMETER	SCHEDULE 40
3/4"	0-5 GPM
1"	6-9 GPM
1 1/4"	10-13 GPM
1 1/2"	14-23 GPM
2"	24-39 GPM
2 1/2"	40-59 GPM

"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD   Date

Underground Service Alert
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.-JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

GEORGE MORING MCSD   DATE
PARKS MAINTENANCE SUPERINTENDENT

SEAL:
LICENSED LANDSCAPE ARCHITECT
David S. Neault No. 2884
Signature
06-30-2020
Renewal Date
04-06-2020
Date
STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

landscape architecture
planning
golf course architecture
David NEAULT ASSOCIATES Inc.
41877 enterprise circle north suite 140
temecula, ca. 92590
951 296 3430
www.dnassociates.com

PREPARED BY:
R.L.A. NO. 2884
DATE:
DAVID S. NEAULT

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 2.4
CITY OF MURRIETA
PLANNING DEPARTMENT
SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
IRRIGATION PLAN

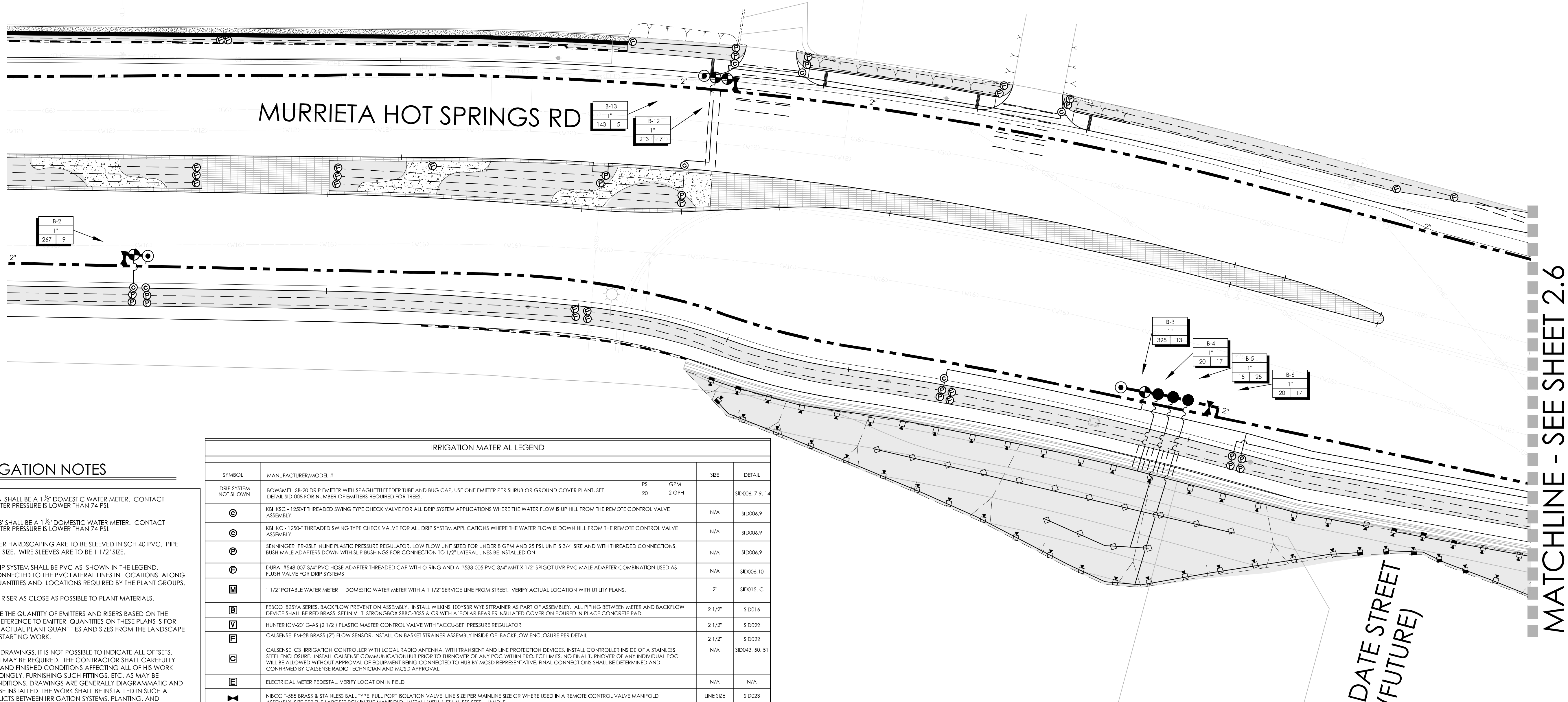
APPROVED
ROBERT K. MOEHLING   DATE
CITY ENGINEER   RCE 63056

DWN BY:
CHKD BY:
FIELD BK:

CIP PROJECT NO.
07-310

DRAWING NO.

4/6/20



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IRRIGATION MATERIAL LEGEND

SYMBOL	MANUFACTURER/MODEL #	SIZE	DETAIL
DRIP SYSTEM NOT SHOWN	BOWSMITH SB-20 DRIP EMITTER WITH SPAGHETTI FEEDER TUBE AND BUG CAP, USE ONE EMITTER PER SHRUB OR GROUND COVER PLANT, SEE DETAIL SID-008 FOR NUMBER OF EMITTERS REQUIRED FOR TREES. PSI 20 GPM 2 GPH		SID006, 7-9, 14
Ⓒ	KBI KSC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS UP HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
Ⓒ	KBI KC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS DOWN HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
Ⓟ	SENNINGER PR-25LF INLINE PLASTIC PRESSURE REGULATOR, LOW FLOW UNIT SIZED FOR UNDER 8 GPM AND 25 PSI, UNIT IS 3/4" SIZE AND WITH THREADED CONNECTIONS, BUSH MALE ADAPTERS DOWN WITH SLIP BUSHINGS FOR CONNECTION TO 1/2" LATERAL LINES BE INSTALLED ON.	N/A	SID006,9
Ⓕ	DURA #548-007 3/4" PVC HOSE ADAPTER THREADED CAP WITH O-RING AND A #533-005 PVC 3/4" MHT X 1/2" SPIGOT UVR PVC MALE ADAPTER COMBINATION USED AS FLUSH VALVE FOR DRIP SYSTEMS	N/A	SID006,10
M	1 1/2" POTABLE WATER METER - DOMESTIC WATER METER WITH A 1 1/2" SERVICE LINE FROM STREET. VERIFY ACTUAL LOCATION WITH UTILITY PLANS.	2"	SID015, C
B	FEBCO 825YA SERIES, BACKFLOW PREVENTION ASSEMBLY. INSTALL WILKINS 100YSBR WYE STTRAINER AS PART OF ASSEMBLEY. ALL PIPING BETWEEN METER AND BACKFLOW DEVICE SHALL BE RED BRASS. SET IN V.I.T. STRONGBOX SBBC-30SS & CR WITH A 'POLAR BEARIER'INSULATED COVER ON POURED IN PLACE CONCRETE PAD.	2 1/2"	SID016
V	HUNTER ICV-201G-AS (2 1/2") PLASTIC MASTER CONTROL VALVE WITH "ACCU-SET" PRESSURE REGULATOR	2 1/2"	SID022
F	CALSENSE FM-2B BRASS (2") FLOW SENSOR, INSTALL ON BASKET STRAINER ASSEMBLY INSIDE OF BACKFLOW ENCLOSURE PER DETAIL	2 1/2"	SID022
C	CALSENSE C3 IRRIGATION CONTROLLER WITH LOCAL RADIO ANTENNA, WITH TRANSIENT AND LINE PROTECTION DEVICES. INSTALL CONTROLLER INSIDE OF A STAINLESS STEEL ENCLOSURE. INSTALL CALSENSE COMMUNICATIONHUB PRIOR TO TURNOVER OF ANY POC WITHIN PROJECT LIMITS. NO FINAL TURNOVER OF ANY INDIVIDUAL POC WILL BE ALLOWED WITHOUT APPROVAL OF EQUIPMENT BEING CONNECTED TO HUB BY MCSD REPRESENTATIVE. FINAL CONNECTIONS SHALL BE DETERMINED AND CONFIRMED BY CALSENSE RADIO TECHNICIAN AND MCSD APPROVAL.	N/A	SID043, 50, 51
E	ELECTRICAL METER PEDESTAL, VERIFY LOCATION IN FIELD	N/A	N/A
⋈	NIBCO T-585 BRASS & STAINLESS BALL TYPE, FULL PORT ISOLATION VALVE, LINE SIZE PER MAINLINE SIZE OR WHERE USED IN A REMOTE CONTROL VALVE MANIFOLD ASSEMBLY, SIZE PER THE LARGEST RCV IN THE MANIFOLD. INSTALL WITH A STAINLESS STEEL HANDLE.	LINE SIZE	SID023
⦿	RAINBIRD 44LRC POTABLE WATER QUICK COUPLER VALVE, 1" SIZE	LINE SIZE	SID026
◕ ●	HUNTER ICV-101G-AS (1") SERIES PRESSURE REGULATED DRIP REMOTE CONTROL VALVE ASSEMBLY, SIZE AS SHOWN. INSTALL A NIBCO T-560 ISOLATION VALVE AND A AMIAD #1-1201 WYE FILTER WITH 120 MESH DISC ELEMENT WITH A KING BROTHERS KSC-125OT SWING CHECK VALVE AS PART OF THE DRIP SYSTEM CONTROL VALVE ASSEMBLY. INSTALL ALL DRIP SYSTEM CONTROL VALVES WITHIN A VALVE MANIFOLD AS DESCRIBED FOR THE RCV ABOVE. ICV-101G-AS-R (1") SERIES PRESSURE REGULATED PLASTIC REMOTE CONTROL VALVE, SIZE AS SHOWN INSTALL WITHIN VALVE MANIFOLD (SIZE MANIFOLD TO MATCH LARGEST LATERAL LINE IN MANIFOLD) WITH NIBCO BALL VALVE (SIZE BALL VALVE TO MATCH LARGEST RCV IN MANIFOLD)	PLAN SIZE	SID030,31,33, 34,43,53
▬ ▬ ▬ ▬	PACIFIC PLAST. IRR. MAINLINE - DEPTH AS PER DETAIL, 2"' SHALL BE SOLVENT WELD SCH. 40 W/ SCH.80 SOLVENT WELD FITTINGS - 2 1/2" SHALL BE BRASS W/ BRASS FITTINGS	PLAN SIZE 2" MIN.	SID035-37, 43
Ⓕ	MAINLINE FLUSH VALVE - INSTALL A NIBCO T-585 BALL VALVE INSIDE VALVE BOX AT THE END OF EVERY MAINLINE RUN. FLUSH LINES ONLY WITH MCSD REP. PRESENT	3/4"	SID035-37, 43
———	PACIFIC PLAST. PVC PIPE 1/2"-1 1/4" SCH. 40 AS LATERAL LINES 4" BELOW GRADE (UVR PIPE FOR ON GRADE APPLICATION)	PLAN SIZE	SID035-37, 43
— — —	HYDRORAIN 3/4" BLU-LOCK FLEXIBLE RECYCLED PIPE BLP-075-CR-3X AT 2" BELOW GRADE AND SECURED WITH METAL STAPLES AT EACH EMITTER PER DETAILS BLU-LOCK (PURPLE FOR RECYCLED PIPING) (1") AND FITTINGS (BLACK FOR RECYCLED) TO BE USED IN DRIP LAYOUT PER CITY DETAIL SID020	3/4"	SID019, SID020, SID021, SID022, SID023
═ ═ ═	SLEEVE LOCATIONS (THESE SLEEVES ARE SHOWN DIAGRAMMATICALLY, REFER TO AS BUILT PLANS PROVIDED BY CITY ENGINEER FOR ACTUAL LOCATION)	PLAN SIZE	SID035-37, 43
NOT SHOWN	PAIGE CABLE - UF RATED CONTROL WIRE, 12 GA COMMON, 14 GA PILOT; USE DBY-6 WIRE CONNECTORS FOR USE ON ALL WIRE CONNECTIONS	12/14 GA	SID035-37, 43
DURA	DURA - PVC PIPE FITTINGS 'DEEP SOCKET' SCH. 80 FOR MAINLINE AND SCH. 40 FOR NON PRESSURIZED LATERAL LINES.	12/14 GA	SID035-37, 43

SPRINKLER LEGEND

SYMBOL	MANUFACTURER/MODEL #	NOZZLE	RAD.	PSI	PRECIP.	GPM	DETAIL
TURF HI-POP SPRAY							
	RAIN BIRD 1812-SAM-PRS WITHR-VAN18/360 MOUNTED ON GRADE	(360, 180, 90)	13'-18'	30	0.64	1.65, 0.85, 0.42	SID018

A-1 — VALVE NUMBER
1" — VALVE SIZE
12 — QTY. OF EMITTERS
100 — TOTAL G.P.M.

LATERAL PIPE SIZE

DIAMETER	SCHEDULE 40
3/4"	0-5 GPM
1"	6-9 GPM
1 1/4"	10-13 GPM
1 1/2"	14-23 GPM
2"	24-39 GPM
2 1/2"	40-59 GPM

0 20' 40' 80'
Scale: 1"= 20'
NORTH

"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.
MCSD ____ Date ____

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TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
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3-1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.-JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL
GEORGE MORING MCSD ____ DATE
PARKS MAINTENANCE SUPERINTENDENT

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

SEAL:
LICENSED LANDSCAPE ARCHITECT
David S. Neault No. 2884
Signature
06-30-2020
Renewal Date
04-06-2020
Date
STATE OF CALIFORNIA

landscape architecture
planning
golf course architecture
David NEAULT ASSOCIATES Inc.
41877 enterprise
circle north suite 140
temecula, ca. 92590
951 296 3430
www.dnassociates.com

PREPARED BY:
DAVID S. NEAULT
R.L.A. NO. 2884
DATE:

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

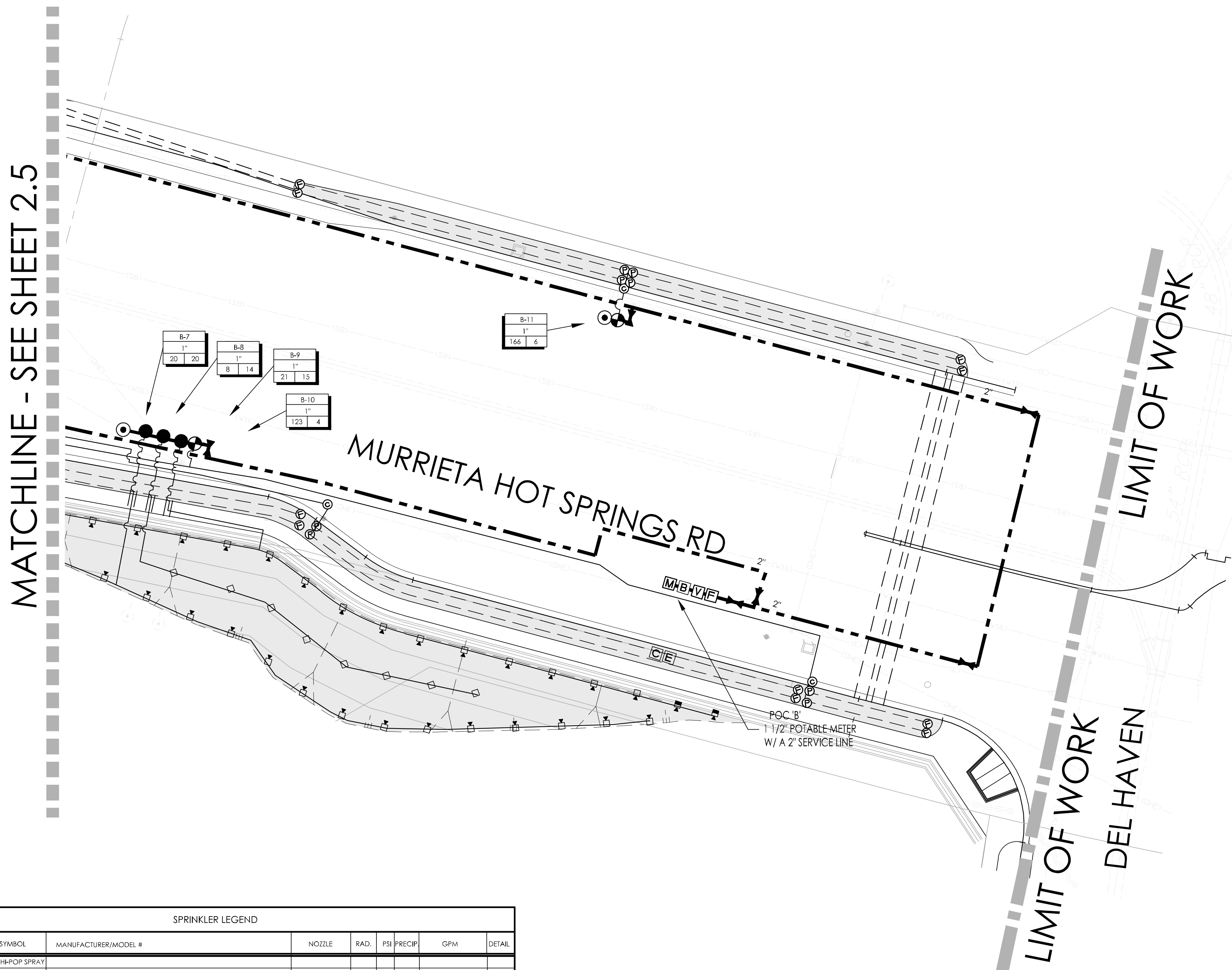
SHEET 2.5
CITY OF MURRIETA
PLANNING DEPARTMENT
SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
IRRIGATION PLAN

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER RCE 63056

DWN BY: ____
CHKD BY: ____
FIELD BK: ____
CIP PROJECT NO. 07-310
DRAWING NO.

4/6/20



IRRIGATION NOTES

(1) POINT OF CONNECTION 'A' SHALL BE A 1 ½" DOMESTIC WATER METER. CONTACT LANDSCAPE ARCHITECT IF WATER PRESSURE IS LOWER THAN 74 PSI.

(2) POINT OF CONNECTION 'B' SHALL BE A 1 ½" DOMESTIC WATER METER. CONTACT LANDSCAPE ARCHITECT IF WATER PRESSURE IS LOWER THAN 74 PSI.

(3) ALL PIPES AND WIRES UNDER HARDSCAPING ARE TO BE SLEEVED IN SCH 40 PVC. PIPE SLEEVES ARE TO BE 2x THE PIPE SIZE. WIRE SLEEVES ARE TO BE 1 1/2" SIZE.

(4) ALL LATERAL LINES FOR DRIP SYSTEM SHALL BE PVC AS SHOWN IN THE LEGEND. POLYFLEX RISERS SHALL BE CONNECTED TO THE PVC LATERAL LINES IN LOCATIONS ALONG THE LATERAL LINE ROUTE IN QUANTITIES AND LOCATIONS REQUIRED BY THE PLANT GROUPS.

(5) INSERT DRIP EMITTERS INTO RISER AS CLOSE AS POSSIBLE TO PLANT MATERIALS.

(6) CONTRACTOR TO PROVIDE THE QUANTITY OF EMITTERS AND RISERS BASED ON THE ACTUAL PLANT COUNT. ANY REFERENCE TO EMITTER QUANTITIES ON THESE PLANS IS FOR DESIGN USE ONLY. VERIFY THE ACTUAL PLANT QUANTITIES AND SIZES FROM THE LANDSCAPE PLANS PRIOR TO BIDDING OR STARTING WORK.

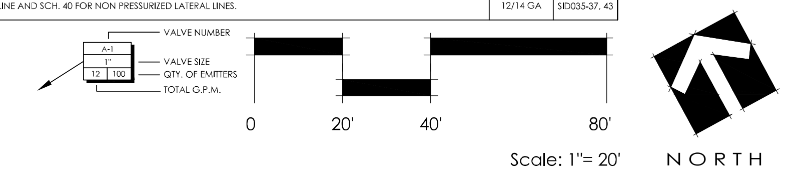
(7) DUE TO THE SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS, SLEEVES, ETC. WHICH MAY BE REQUIRED. THE CONTRACTOR SHALL CAREFULLY INVESTIGATE THE STRUCTURAL AND FINISHED CONDITIONS AFFECTING ALL OF HIS WORK AND PLAN HIS WORK ACCORDINGLY, FURNISHING SUCH FITTINGS, ETC. AS MAY BE REQUIRED TO MEET SUCH CONDITIONS. DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATIVE OF THE WORK TO BE INSTALLED. THE WORK SHALL BE INSTALLED IN SUCH A MANNER AS TO AVOID CONFLICTS BETWEEN IRRIGATION SYSTEMS, PLANTING, AND ARCHITECTURAL FEATURES.

(8) ALL WORK CALLED FOR ON THE DRAWINGS BY NOTES OR DETAILS SHALL BE FURNISHED AND INSTALLED WHETHER OR NOT SPECIFICALLY MENTIONED IN THE SPECIFICATIONS. WHEN AN ITEM IS SHOWN ON THE PLANS BUT NOT SHOWN ON THE SPECIFICATIONS OR VICE VERSA, IT SHALL BE DEEMED TO BE AS SHOWN ON BOTH. THE LANDSCAPE ARCHITECT SHALL HAVE FINAL AUTHORITY FOR CLARIFICATION.

(9) THE CONTRACTOR SHALL NOT WILLFULLY INSTALL THE IRRIGATION SYSTEM AS SHOWN ON THE DRAWINGS WHEN IT IS OBVIOUS IN THE FIELD THAT OBSTRUCTIONS, GRADE DIFFERENCES OR DISCREPANCIES IN AREA DIMENSIONS EXIST THAT MIGHT NOT HAVE BEEN CONSIDERED IN ENGINEERING. SUCH OBSTRUCTIONS OR DIFFERENCES SHOULD BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT AS SOON AS DETECTED. IN THE EVENT THIS NOTIFICATION IS NOT PERFORMED, THE IRRIGATION CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY REVISION NECESSARY.

IRRIGATION MATERIAL LEGEND

SYMBOL	MANUFACTURER/MODEL #	SIZE	DETAIL
DRIP SYSTEM NOT SHOWN	BOWSMITH SB-20 DRIP EMITTER WITH SPAGHETTI FEEDER TUBE AND BUG CAP, USE ONE EMITTER PER SHRUB OR GROUND COVER PLANT, SEE DETAIL SID-008 FOR NUMBER OF EMITTERS REQUIRED FOR TREES. PSI 20 GPM 2 GPH		SID006, 7-9, 14
©	KBI KSC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS UP HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
©	KBI KC - 1250-T THREADED SWING TYPE CHECK VALVE FOR ALL DRIP SYSTEM APPLICATIONS WHERE THE WATER FLOW IS DOWN HILL FROM THE REMOTE CONTROL VALVE ASSEMBLY.	N/A	SID006,9
Ⓟ	SENNINGER PR-25LF INLINE PLASTIC PRESSURE REGULATOR, LOW FLOW UNIT SIZED FOR UNDER 8 GPM AND 25 PSI, UNIT IS 3/4" SIZE AND WITH THREADED CONNECTIONS, BUSH MALE ADAPTERS DOWN WITH SLIP BUSHINGS FOR CONNECTION TO 1/2" LATERAL LINES BE INSTALLED ON.	N/A	SID006,9
Ⓕ	DURA #548-007 3/4" PVC HOSE ADAPTER THREADED CAP WITH O-RING AND A #533-005 PVC 3/4" MHT X 1/2" SPIGOT UVR PVC MALE ADAPTER COMBINATION USED AS FLUSH VALVE FOR DRIP SYSTEMS	N/A	SID006,10
M	1 1/2" POTABLE WATER METER - DOMESTIC WATER METER WITH A 1 1/2" SERVICE LINE FROM STREET. VERIFY ACTUAL LOCATION WITH UTILITY PLANS.	2"	SID015, C
B	FEBCO 825YA SERIES, BACKFLOW PREVENTION ASSEMBLY. INSTALL WILKINS 100YSBR WYE STTRAINER AS PART OF ASSEMBLEY. ALL PIPING BETWEEN METER AND BACKFLOW DEVICE SHALL BE RED BRASS. SET IN V.I.T. STRONGBOX SBBC-30SS & CR WITH A 'POLAR BEARIER'INSULATED COVER ON POURED IN PLACE CONCRETE PAD.	2 1/2"	SID016
V	HUNTER ICV-201G-AS (2 1/2") PLASTIC MASTER CONTROL VALVE WITH "ACCU-SET" PRESSURE REGULATOR	2 1/2"	SID022
F	CALSENSE FM-2B BRASS (2") FLOW SENSOR, INSTALL ON BASKET STRAINER ASSEMBLY INSIDE OF BACKFLOW ENCLOSURE PER DETAIL	2 1/2"	SID022
C	CALSENSE C3 IRRIGATION CONTROLLER WITH LOCAL RADIO ANTENNA, WITH TRANSIENT AND LINE PROTECTION DEVICES. INSTALL CONTROLLER INSIDE OF A STAINLESS STEEL ENCLOSURE. INSTALL CALSENSE COMMUNICATIONHUB PRIOR TO TURNOVER OF ANY POC WITHIN PROJECT LIMITS. NO FINAL TURNOVER OF ANY INDIVIDUAL POC WILL BE ALLOWED WITHOUT APPROVAL OF EQUIPMENT BEING CONNECTED TO HUB BY MCSD REPRESENTATIVE. FINAL CONNECTIONS SHALL BE DETERMINED AND CONFIRMED BY CALSENSE RADIO TECHNICIAN AND MCSD APPROVAL.	N/A	SID043, 50, 51
E	ELECTRICAL METER PEDESTAL, VERIFY LOCATION IN FIELD	N/A	N/A
⋈	NIBCO T-585 BRASS & STAINLESS BALL TYPE, FULL PORT ISOLATION VALVE, LINE SIZE PER MAINLINE SIZE OR WHERE USED IN A REMOTE CONTROL VALVE MANIFOLD ASSEMBLY, SIZE PER THE LARGEST RCV IN THE MANIFOLD. INSTALL WITH A STAINLESS STEEL HANDLE.	LINE SIZE	SID023
⦿	RAINBIRD 44LRC POTABLE WATER QUICK COUPLER VALVE, 1" SIZE	LINE SIZE	SID026
	HUNTER ICV-101G-AS (1") SERIES PRESSURE REGULATED DRIP REMOTE CONTROL VALVE ASSEMBLY, SIZE AS SHOWN. INSTALL A NIBCO T-560 ISOLATION VALVE AND A AMIAD #1-1201 WYE FILTER WITH 120 MESH DISC ELEMENT WITH A KING BROTHERS KSC-125OT SWING CHECK VALVE AS PART OF THE DRIP SYSTEM CONTROL VALVE ASSEMBLY. INSTALL ALL DRIP SYSTEM CONTROL VALVES WITHIN A VALVE MANIFOLD AS DESCRIBED FOR THE RCV ABOVE. ICV-101G-AS-R (1") SERIES PRESSURE REGULATED PLASTIC REMOTE CONTROL VALVE, SIZE AS SHOWN INSTALL WITHIN VALVE MANIFOLD (SIZE MANIFOLD TO MATCH LARGEST LATERAL LINE IN MANIFOLD) WITH NIBCO BALL VALVE (SIZE BALL VALVE TO MATCH LARGEST RCV IN MANIFOLD)	PLAN SIZE	SID030,31,33, 34,43,53
	PACIFIC PLAST. IRR. MAINLINE - DEPTH AS PER DETAIL, 2"" SHALL BE SOLVENT WELD SCH. 40 W/ SCH.80 SOLVENT WELD FITTINGS - 2 1/2" SHALL BE BRASS W/ BRASS FITTINGS	PLAN SIZE 2" MIN.	SID035-37, 43
Ⓕ	MAINLINE FLUSH VALVE - INSTALL A NIBCO T-585 BALL VALVE INSIDE VALVE BOX AT THE END OF EVERY MAINLINE RUN. FLUSH LINES ONLY WITH MCSD REP. PRESENT	3/4"	SID035-37, 43
	PACIFIC PLAST. PVC PIPE 1/2"-1 1/4" SCH. 40 AS LATERAL LINES 4" BELOW GRADE (UVR PIPE FOR ON GRADE APPLICATION)	PLAN SIZE	SID035-37, 43
	HYDRORAIN 3/4" BLU-LOCK FLEXIBLE RECYCLED PIPE BLP-075-CR-3X AT 2" BELOW GRADE AND SECURED WITH METAL STAPLES AT EACH EMITTER PER DETAILS BLU-LOCK (PURPLE FOR RECYCLED PIPING) (1") AND FITTINGS (BLACK FOR RECYCLED) TO BE USED IN DRIP LAYOUT PER CITY DETAIL SID020	3/4"	SID019, SID020, SID021, SID022, SID023
	SLEEVE LOCATIONS (THESE SLEEVES ARE SHOWN DIAGRAMMATICALLY, REFER TO AS BUILT PLANS PROVIDED BY CITY ENGINEER FOR ACTUAL LOCATION)	PLAN SIZE	SID035-37, 43
NOT SHOWN	PAIGE CABLE - UF RATED CONTROL WIRE, 12 GA COMMON, 14 GA PILOT; USE DBY-6 WIRE CONNECTORS FOR USE ON ALL WIRE CONNECTIONS	12/14 GA	SID035-37, 43
DURA	DURA - PVC PIPE FITTINGS 'DEEP SOCKET' SCH. 80 FOR MAINLINE AND SCH. 40 FOR NON PRESSURIZED LATERAL LINES.	12/14 GA	SID035-37, 43



SPRINKLER LEGEND

SYMBOL	MANUFACTURER/MODEL #	NOZZLE	RAD.	PSI	PRECIP.	GPM	DETAIL
TURF HI-POP SPRAY							
	RAIN BIRD 1812-SAM-PRS WITHR-VAN18/360 MOUNTED ON GRADE	(360, 180, 90)	13'-18'	30	0.64	1.65, 0.85, 0.42	SID018

NOTE:
THE SPECIAL PROVISIONS SPECIFICATIONS BOOK COMPLETES THE CONTRACT DOCUMENTS AND SHALL TAKE PRECEDENCE OVER THE APPROVED LANDSCAPE PLANS. SHOULD A DISCREPANCY OCCUR BETWEEN ANY NOTES, SPECIFICATIONS, DETAILS, SITE CONDITIONS, OR OTHER SITUATION REGARDING THE CONSTRUCTION OF THESE PLANS, THE MURRIETA COMMUNITY SERVICE DISTRICT LANDSCAPE SPECIFICATIONS AND STANDARDS MANUAL SHALL TAKE PRECEDENCE AND ALL DECISIONS MADE BY THE MCSD SHALL BE FINAL. MCSD PHONE 1-951-461-6124.

HOLD HARMLESS AND INDEMNIFICATION CLAUSE
CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMETED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, AND THE LANDSCAPE ARCHITECT HARMLESS FROM ANY AND ALL LIABILITY REAL OR ELLEGED, IN CONNECTION WITH THE PERFROMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLEGENCE OF THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, OR THE LANDSCAPE ARCHITECT.

LATERAL PIPE SIZE

DIAMETER	SCHEDULE 40
3/4"	0-5 GPM
1"	6-9 GPM
1 1/4"	10-13 GPM
1 1/2"	14-23 GPM
2"	24-39 GPM
2 1/2"	40-59 GPM

"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD ____________ Date ____________

SEAL: LICENSED LANDSCAPE ARCHITECT David S. Neault No. 2884 Signature 06-30-2020 Renewal Date 04-06-2020 Date STATE OF CALIFORNIA

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.-JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

GEORGE MORING MCSD ____________ DATE
PARKS MAINTENANCE SUPERINTENDENT

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

landscape architecture
planning
golf course architecture
David NEAULT ASSOCIATES Inc.
41877 enterprise
circle north suite 140
temecula, ca. 92590
951 296 3430
www.dnassociates.com

PREPARED BY:
DAVID S. NEAULT
R.L.A. NO. 2884
DATE:

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 2.6
CITY OF MURRIETA
PLANNING DEPARTMENT
SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
IRRIGATION PLAN

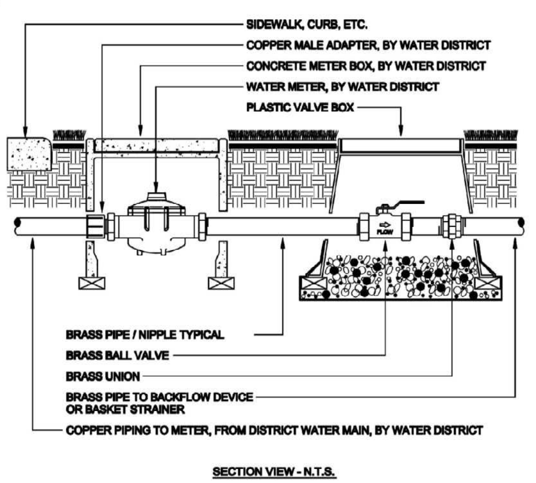
APPROVED
ROBERT K. MOEHLING ____________ DATE ____________
CITY ENGINEER RCE 63056

DWN BY:
CHKD BY:
FIELD BK:

CIP PROJECT NO. 07-310

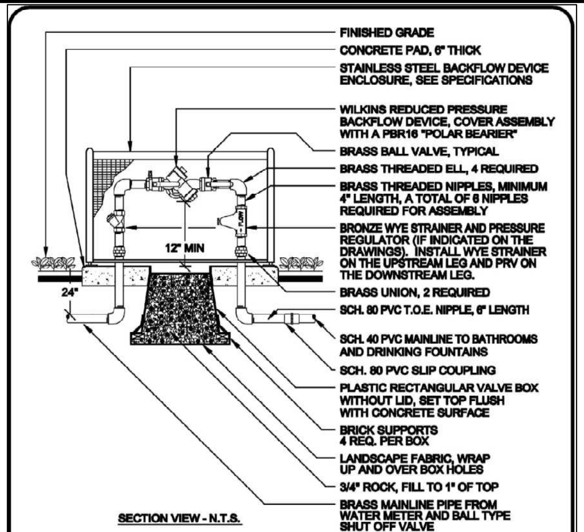
DRAWING NO.

4/6/20



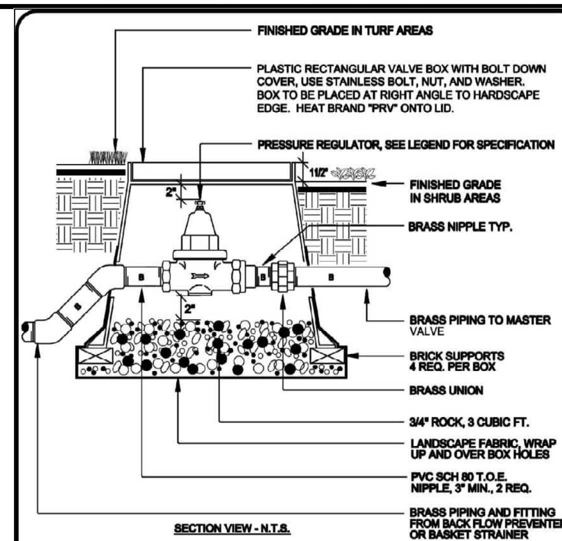
NOTE:
ALL EQUIPMENT UPSTREAM OF WATER METER, THE WATER METER AND METER BOX SHALL BE INSTALLED BY THE LOCAL WATER DISTRICT. ALL PIPING AND EQUIPMENT DOWNSTREAM OF METER SHALL BE INSTALLED BY THE CONTRACTOR. ALL PIPING BETWEEN THE WATER METER AND THE MASTER CONTROL VALVE, THROUGH ALL REQUIRED ASSEMBLIES, SHALL BE BRASS WITH BRASS FITTINGS AND UNIONS. WATER DISTRICT REQUIREMENTS SHALL SUPERCEDE THIS DETAIL.

CITY OF MURRIETA	NO SCALE
TYPICAL WATER METER HOOK-UP	SID001
	JANUARY 2014



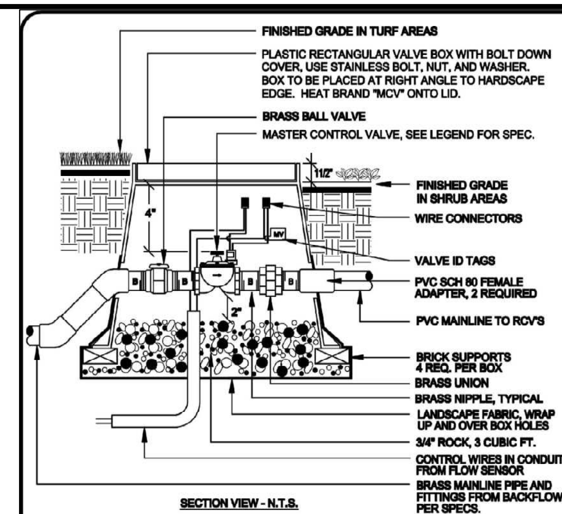
NOTE:
IF WYE STRAINER OR PRESSURE REGULATOR IS SPECIFIED, ONLY INSTALL ON EITHER THE HORIZONTAL PIPING OR ON THE DOWNSTREAM LEG AS SPACE PERMITS IF PERMITTED BY THE WATER AGENCY. INSTALL AN "POLAR BEARIER" INSULATING COVER OVER THE ENTIRE BACKFLOW ASSEMBLY.

CITY OF MURRIETA	NO SCALE
BACKFLOW PREVENTER WITH ENCLOSURE	SID003
	JANUARY 2014



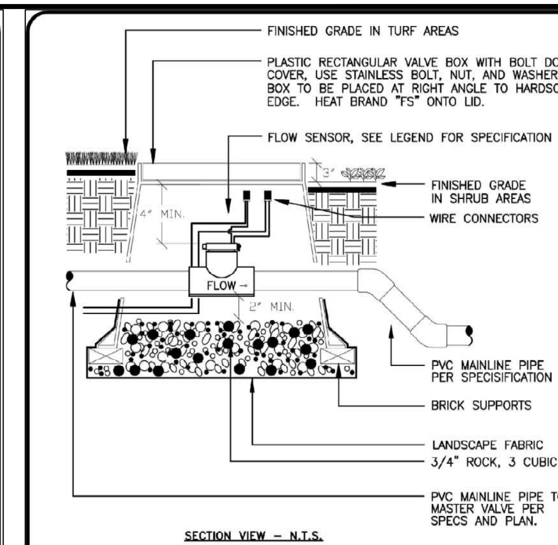
NOTE:
INSTALL CONTROL VALVES A MINIMUM OF 18" APART IN SHRUB AREAS UNLESS OTHERWISE NOTED.
USE 45 DEGREE ELLS TO ACHIEVE MAINLINE DEPTH FROM UP-STREAM SIDE OF THE PRESSURE REGULATOR ASSEMBLY.

CITY OF MURRIETA	NO SCALE
PRESSURE REGULATOR	SID006B
	JANUARY 2014



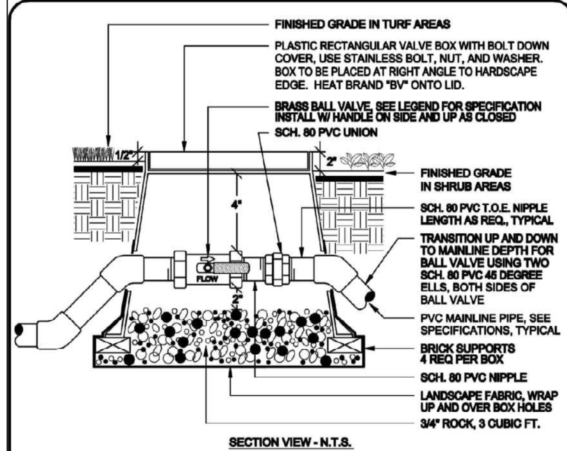
NOTE:
INSTALL CONTROL VALVES A MINIMUM OF 18" APART IN SHRUB AREAS UNLESS OTHERWISE NOTED.
USE 45 DEGREE ELLS TO ACHIEVE MAINLINE DEPTH FROM UP-STREAM SIDE OF THE MASTER VALVE ASSEMBLY.
EQUIPMENT SHALL BE INSTALLED SUCH THAT THERE IS NO LEVERAGE OR STRESS ON THE VALVE ASSEMBLY. PIPE SHALL NOT COME INTO CONTACT WITH VALVE BOX.
USE A NON-HARDENING TEFLON PIPE SEALANT ON ALL THREADED CONNECTIONS.

CITY OF MURRIETA	NO SCALE
MASTER CONTROL VALVE	SID007
	JANUARY 2014



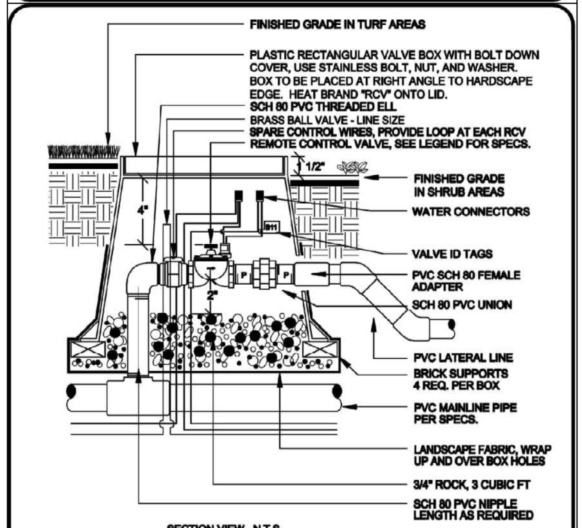
NOTE:
INSTALL FLOW SENSOR AS PER THE MANUFACTURER'S RECOMMENDATIONS, WIRE TO IRRIGATION CONTROLLER.
USE 45 DEGREE ELLS TO ACHIEVE MAINLINE DEPTH ON THE DOWN-STREAM SIDE OF THE FLOW SENSOR.

CITY OF MURRIETA	NO SCALE
FLOW SENSOR	SID008
	JANUARY 2014



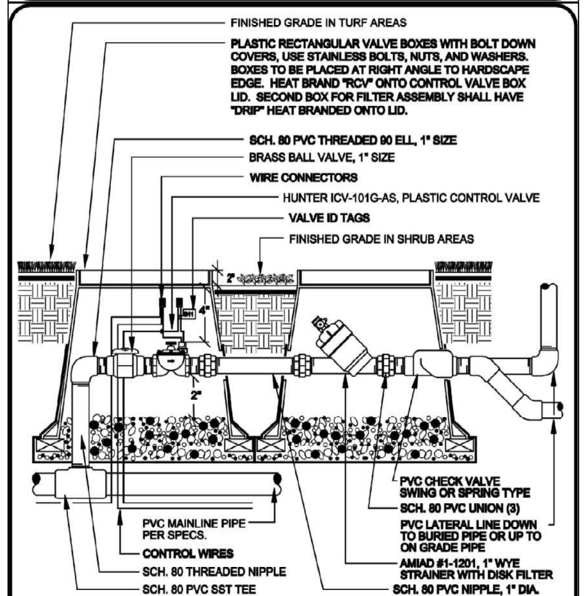
NOTE:
BOX TO BE INSTALLED AS TO ALLOW FOR PROPER OPERATION OF BALL VALVE, INSTALL VALVE AND BOX PARALLEL TO HARDSCAPE EDGE, INSTALL BOX OFF-CENTER OF VALVE. INSTALL VALVE BOX EXTENSIONS AS REQ. TO ACHIEVE PROPER VALVE AND PIPE DEPTH

CITY OF MURRIETA	NO SCALE
BALL VALVE 2" AND SMALLER	SID009
	JANUARY 2014



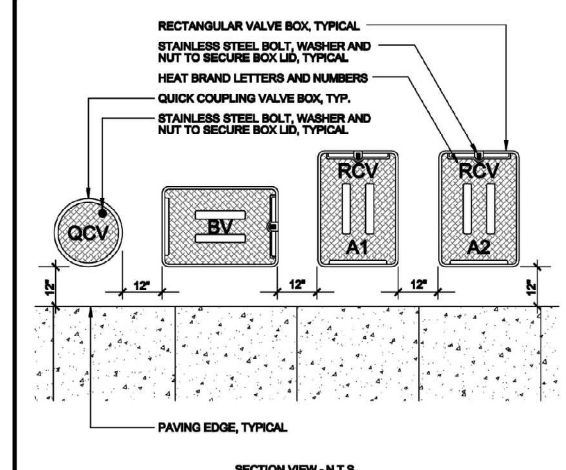
NOTE:
INSTALL CONTROL VALVES A MINIMUM OF 18" APART IN SHRUB AREAS UNLESS OTHERWISE NOTED.
EQUIPMENT SHALL BE INSTALLED SUCH THAT THERE IS NO LEVERAGE OR STRESS ON THE VALVE ASSEMBLY. PIPE SHALL NOT COME INTO CONTACT WITH VALVE BOX.
USE A NON-HARDENING TEFLON PIPE SEALANT ON ALL THREADED CONNECTIONS.

CITY OF MURRIETA	NO SCALE
REMOTE CONTROL VALVE	SID011
	JANUARY 2014



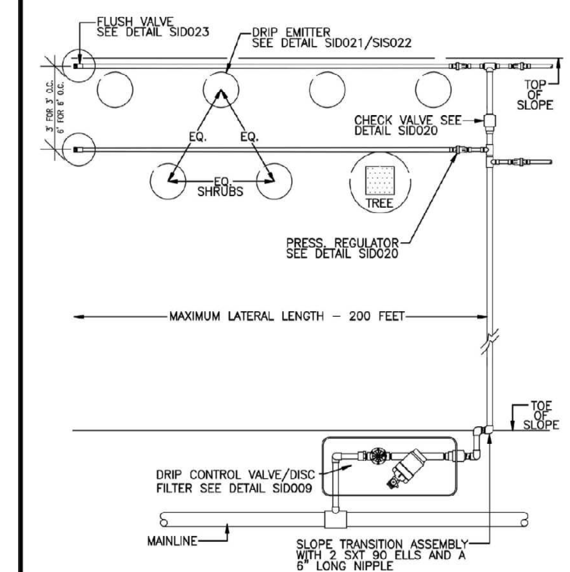
NOTE: SEE DETAIL SID018 FOR ADDITIONAL VALVE BOX INSTALLATION INFORMATION.

CITY OF MURRIETA	NO SCALE
DRIP R.C.V. ASSEMBLY	SID012
	JANUARY 2014



NOTE:
CENTER VALVE BOX OVER REMOTE CONTROL VALVE TO FACILITATE VALVE MAINTENANCE.
INSTALL VALVE BOXES IN SHRUB AND GROUND-COVER AREAS WHERE POSSIBLE.
INSTALL VALVE BOXES PARALLEL TO EACH OTHER & PERPENDICULAR TO PAVED EDGES.
AVOID HEAVILY COMPACTING SOIL AROUND VALVE BOXES TO PREVENT COLLAPSE AND DEFORMATION OF VALVE BOXES.
DRIP RCV & WYE STRAINER BOXES IN THE SAME ORIENTATION AS BALL VALVE BOXES.

CITY OF MURRIETA	NO SCALE
VALVE BOX PLACEMENT	SID013
	JANUARY 2014



CITY OF MURRIETA	NO SCALE
POINT TO POINT DRIP IRRIGATION LAYOUT	SID019
	JANUARY 2014

NOTE:
THE SPECIAL PROVISIONS SPECIFICATIONS BOOK COMPLETES THE CONTRACT DOCUMENTS AND SHALL TAKE PRECEDENCE OVER THE APPROVED LANDSCAPE PLANS. SHOULD A DISCREPANCY OCCUR BETWEEN ANY NOTES, SPECIFICATIONS, DETAILS, SITE CONDITIONS, OR OTHER SITUATION REGARDING THE CONSTRUCTION OF THESE PLANS, THE MURRIETA COMMUNITY SERVICE DISTRICT LANDSCAPE SPECIFICATIONS AND STANDARDS MANUAL SHALL TAKE PRECEDENCE AND ALL DECISIONS MADE BY THE MCSD SHALL BE FINAL. MCSD PHONE 1-951-461-6124.

HOLD HARMLESS AND INDEMNIFICATION CLAUSE
CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY: THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, AND THE LANDSCAPE ARCHITECT HARMLESS FROM ANY AND ALL LIABILITY REAL OR ELLEGED, IN CONNECTION WITH THE PERFROMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLEGENCE OF THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, OR THE LANDSCAPE ARCHITECT.

"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD

Date

SEAL:

Underground Service Alert
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.–JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

GEORGE MORING MCSD
PARKS MAINTENANCE SUPERINTENDENT
DATE

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

landscape architecture
planning
golf course architecture
David NEAULT ASSOCIATES Inc.
41877 enterprise
circle north suite 140
temecula, ca. 92590
951 296 3430
www.dnassociates.com

PREPARED BY:
R.L.A. NO. 2884
DATE:
DAVID S. NEAULT

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

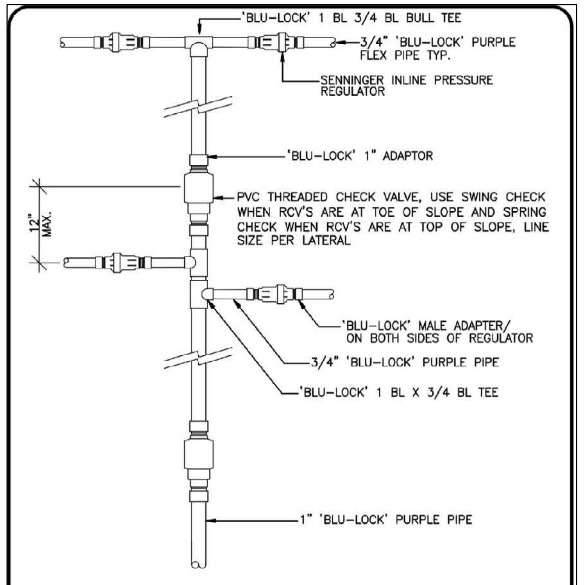
SHEET	CITY OF MURRIETA	SHEETS
2.7	PLANNING DEPARTMENT	18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
IRRIGATION DETAILS

APPROVED
ROBERT K. MOEHLING DATE
CITY ENGINEER RCE 63056

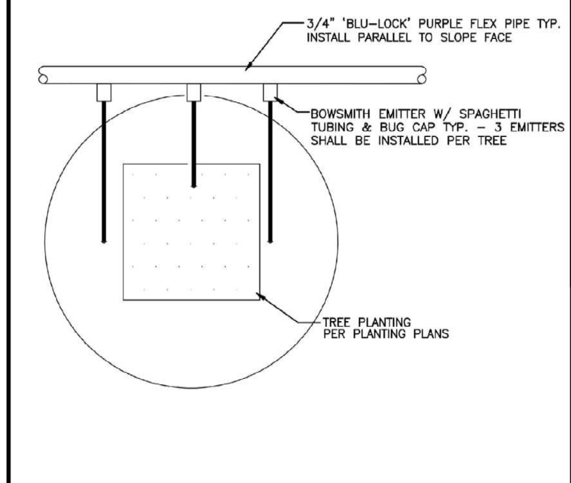
DWN BY:	CIP PROJECT NO.	DRAWING NO.
CHKD BY:	07-310	
FIELD BK:		

4/6/20



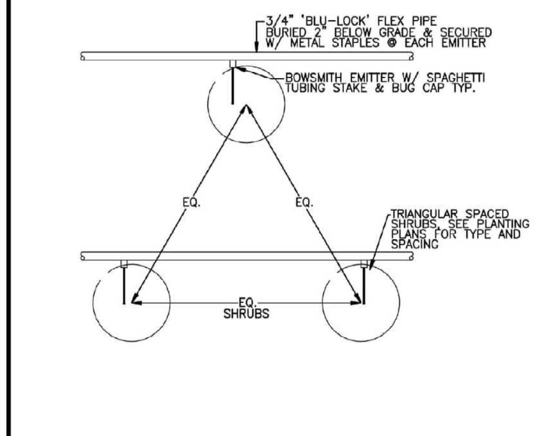
NOTE:
VERTICAL LATERAL LINE SHALL BE COMPLETELY FLUSHED CLEAN WITH WATER PRIOR TO THE INSTALLATION OF THE SENNINGER PRESSURE REGULATING VALVES.

CITY OF MURRIETA | NO SCALE
Murrieta
DRIP PRESSURE REGULATOR AND CHECK VALVE DETAIL
SID020
JANUARY 2014



NOTE:
DRIP EMITTERS SHALL BE PLACED TO DRIP DIRECTLY ADJACENT TO TREE ROOTBALL. ALL IRRIGATION SHALL BE COMPLETELY INSTALLED PRIOR TO PLANTING LAYOUT.

CITY OF MURRIETA | NO SCALE
Murrieta
TREE DRIP LAYOUT
SID021
JANUARY 2014

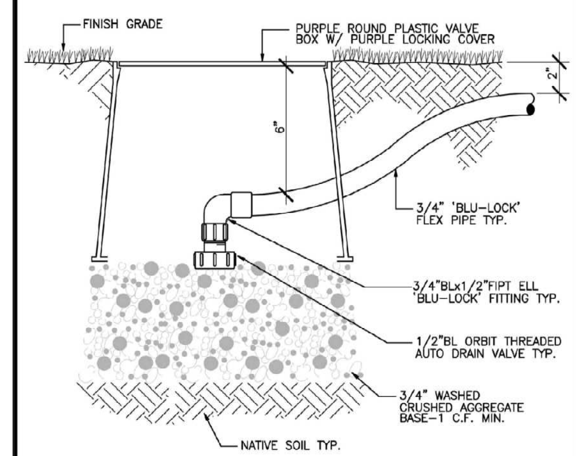


NOTE:
DRIP EMITTER SHALL BE PLACED TO DRIP DIRECTLY ADJACENT ASSEMBLY DETAIL

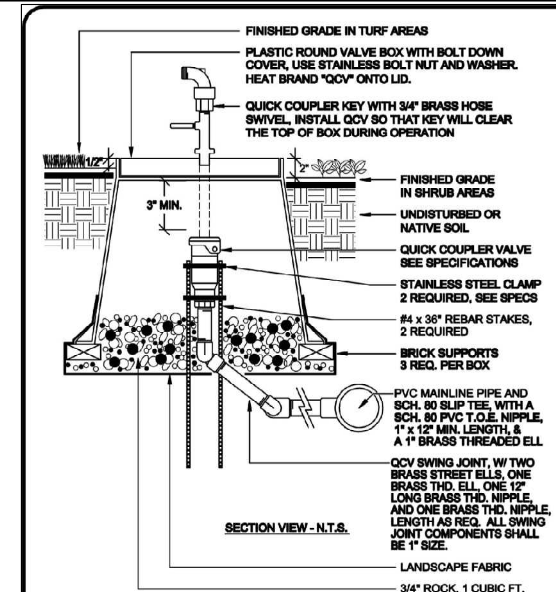
PVC LATERAL SUPPLY LINES SHALL RUN PARALLEL TO SLOPE WITH DRIP EMITTER LINES RUN PERPENDICULAR TO SLOPE AS SHOWN ABOVE.

ALL IRRIGATION SHALL BE COMPLETELY INSTALLED PRIOR TO PLANT LAYOUTS.

CITY OF MURRIETA | NO SCALE
Murrieta
DRIP EMITTER ASSEMBLY DETAIL
SID022
JANUARY 2014

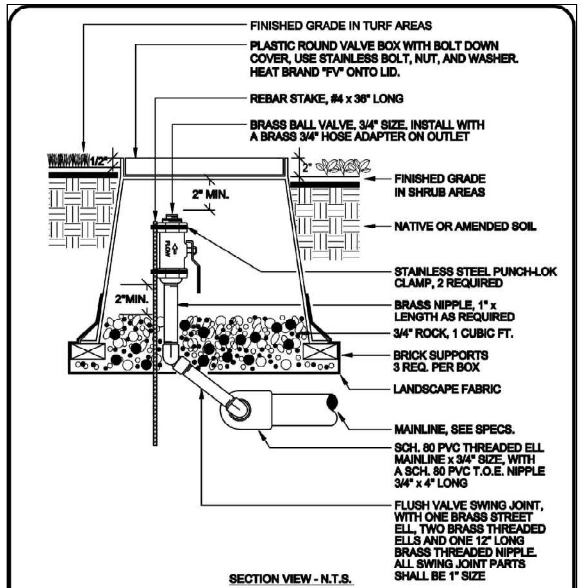


CITY OF MURRIETA | NO SCALE
Murrieta
END FLUSH CAP
SID023
JANUARY 2014



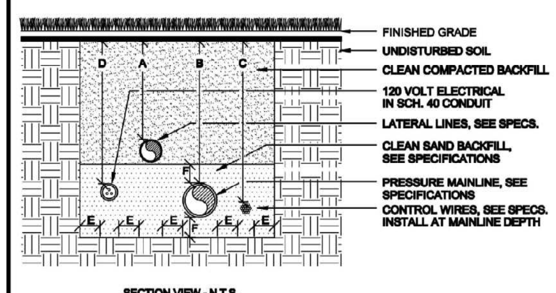
NOTE:
USE A NON-HARDENING TEFLON PIPE SEALANT ON ALL THREADED CONNECTIONS.

CITY OF MURRIETA | NO SCALE
Murrieta
QUICK COUPLER VALVE IN VALVE BOX
SID024
JANUARY 2014



NOTE:
INSTALL MAINLINE FLUSH VALVE AT END OF IRRIGATION MAINLINE AND PER DRAWINGS.

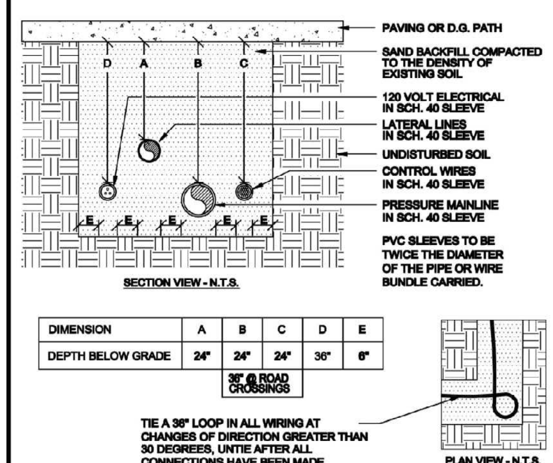
CITY OF MURRIETA | NO SCALE
Murrieta
MAINLINE FLUSH VALVE INSTALLED IN BOX
SID025
JANUARY 2014



DIMENSION	A	B	C	D	E	F
1/2" TO 1 1/2" SIZE	12"	18"	18"	30"	6"	6"
2" TO 2 1/2" IN SIZE	12"	24"	24"	30"	6"	6"
3" AND LARGER	18"	24"	24"		6"	6"

NOTE:
ALL PLASTIC PIPING SHALL BE SNAKED WITHIN TRENCH.
BUNDLE WIRING AND WRAP WITH TAPE AT TEN FOOT INTERVALS.
ALL MAINLINE PIPING TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTALLATION SPECIFICATIONS.

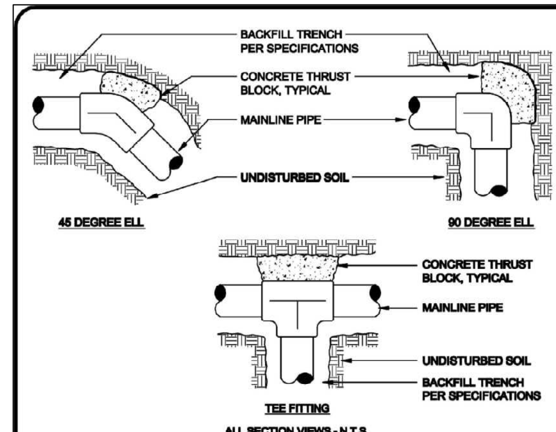
CITY OF MURRIETA | NO SCALE
Murrieta
PIPE AND WIRE TRENCHING
SID026
JANUARY 2014



DIMENSION	A	B	C	D	E
DEPTH BELOW GRADE	24"	24"	24"	36"	6"
			36" @ ROAD CROSSINGS		

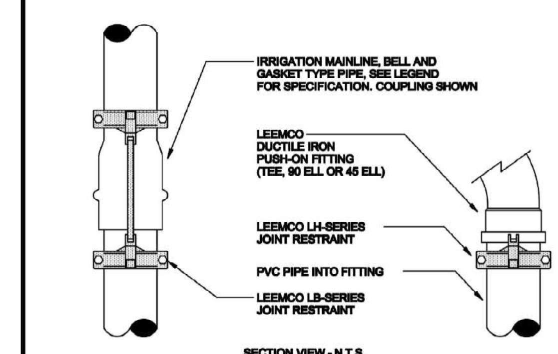
NOTE:
ALL PVC MAINLINE, PVC LATERAL LINES, AND CONTROL WIRES SHALL BE SLEEVED BELOW ALL HARDSCAPE ELEMENTS WITH SCH. 40 PVC, 2 TIMES THE DIAMETER OF THE PIPE OR WIRE BUNDLE WITHIN.
ALL CURBS SHALL BE MARKED WITH A "SCORE" MARK TO DESIGNATE SLEEVE LOCATION.
SLEEVE DETAIL SHALL ALSO BE USED FOR INSTALLATION OF PIPE IN ROCK SOIL.

CITY OF MURRIETA | NO SCALE
Murrieta
SLEEVE TRENCHING
SID027
JANUARY 2014



NOTES:
ALL CONCRETE USED IN THRUST BLOCKS SHALL BE 470-C-2000.
SOLVENT WELD MAINLINE PIPE & FITTINGS SHALL RECEIVE CONCRETE THRUST BLOCKS.
BELL AND GASKET MAINLINE PIPE AND FITTINGS SHALL USE PIPE RESTRAINT SYSTEMS.
CONCRETE THRUST BLOCKS SHALL BE A MINIMUM OF 1 CUBIC FOOT IN VOLUME. THRUST BLOCKS SHALL NOT ENCASE THE FITTINGS IN CONCRETE.
ALL MAINLINES SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTALLATION RECOMMENDATIONS AND PRESSURE TESTED PER THE SPECIFICATIONS.
ALL TRENCH DEPTH AND WIDTH SHALL BE PER THE SPECIFICATIONS.
WRAP PLASTIC FITTINGS IN CONTACT WITH CONCRETE USING 10 MIL. PIPE WRAP.

CITY OF MURRIETA | NO SCALE
Murrieta
THRUST BLOCKS
SID028
JANUARY 2014



NOTE:
USE JOINT RESTRAINTS ON ALL BELL & GASKET MAINLINE PIPE W/PUSH-ON FITTINGS.
USE THRUST BLOCKS ON ALL SOLVENT WELD MAINLINE PIPE AND FITTINGS.
USE LB SERIES RESTRAINTS FOR BELL AND GASKET "PIPE-TO-PIPE" JOINTS.
USE RESTRAINTS FOR PVC PIPE TO DUCTILE IRON PUSH-ON FITTINGS, INCLUDING 45 ELLS, 90 ELLS, MAINLINE TEES, AND RCV MANIFOLD & QCV STUB OUTS.
WHEN INSTALLING A RCV OR QCV MANIFOLD STUB OUT USE AN LH SERIES RESTRAINT THE MAINLINE (TEE OR ELL) AS WELL AS VALVE STUB OUT SIDE OF THE ASSEMBLY.
GATE VALVES AND OTHER FLANGED CONNECTIONS TO BELL AND GASKET PIPE SHALL BE MADE USING SR-FB SELF RESTRAINING FLANGE ADAPTERS.
SIZE OF RESTRAINT SHALL BE AS REQUIRED BY THE PIPE AND FITTING USED.
ALL DUCTILE IRON PUSH-ON FITTINGS AND RESTRAINTS SHALL BE LEEMCO.
FITTINGS WITH BUILT IN RESTRAINTS SHALL BE APPROVED BY THE INSPECTOR.

CITY OF MURRIETA | NO SCALE
Murrieta
PIPE RESTRAINT SYSTEM
SID029
JANUARY 2014

NOTE:
THE SPECIAL PROVISIONS SPECIFICATIONS BOOK COMPLETES THE CONTRACT DOCUMENTS AND SHALL TAKE PRECEDENCE OVER THE APPROVED LANDSCAPE PLANS. SHOULD A DISCREPANCY OCCUR BETWEEN ANY NOTES, SPECIFICATIONS, DETAILS, SITE CONDITIONS, OR OTHER SITUATION REGARDING THE CONSTRUCTION OF THESE PLANS, THE MURRIETA COMMUNITY SERVICE DISTRICT LANDSCAPE SPECIFICATIONS AND STANDARDS MANUAL SHALL TAKE PRECEDENCE AND ALL DECISIONS MADE BY THE MCSD SHALL BE FINAL. MCSD PHONE 1-951-461-6124.

HOLD HARMLESS AND INDEMNIFICATION CLAUSE
CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, AND THE LANDSCAPE ARCHITECT HARMLESS FROM ANY AND ALL LIABILITY REAL OR ALLEGED, IN CONNECTION WITH THE PERFROMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLEGENCE OF THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, OR THE LANDSCAPE ARCHITECT.

"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.
MCSD
Date

Underground Service Alert
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.-JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL
GEORGE MORING MCSD
PARKS MAINTENANCE SUPERINTENDENT
DATE

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

SEAL:
LICENSED LANDSCAPE ARCHITECT
David S. Neault
Signature
06-30-2020
Renewal Date
04-06-2020
Date
STATE OF CALIFORNIA

landscape architecture
planning
golf course architecture
David NEAULT ASSOCIATES Inc.
41877 enterprise circle north suite 140
temecula, ca. 92590
951 296 3430
www.dnassociates.com
PREPARED BY:
R.L.A. NO. 2884
DATE:
DAVID S. NEAULT

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

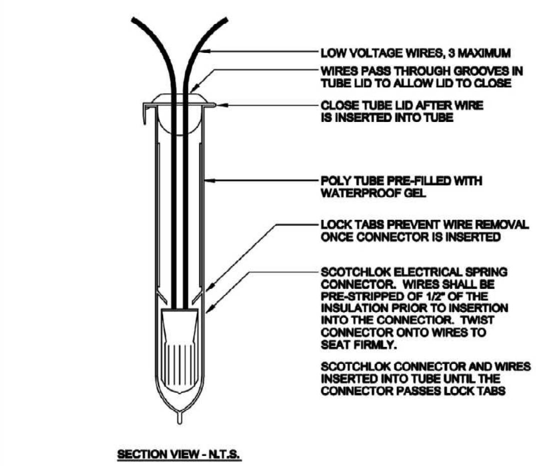
SHEET 2.8
CITY OF MURRIETA
PLANNING DEPARTMENT
SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
IRRIGATION DETAILS

APPROVED
ROBERT K. MOEHLING DATE
CITY ENGINEER RCE 63056

DWN BY:
CHKD BY:
FIELD BK:
CIP PROJECT NO.
07-310
DRAWING NO.

4/6/20



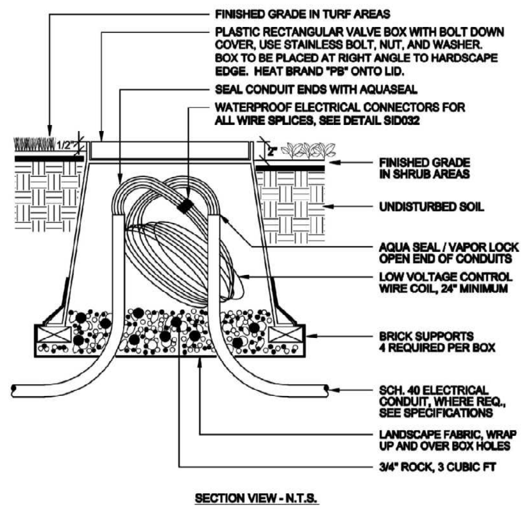
NOTE:

WIRE CONNECTOR SHALL BE A 3M DBY DIRECT BURY SPLICE KIT.

KIT SHALL INCLUDE A SCOTCHLOK SPRING CONNECTOR, A POLYPROPYLENE TUBE AND A WATERPROOF SEALING GEL. TUBE SHALL BE SUPPLIED PREFILLED WITH GEL.

DIRECT BURY SPLICE KIT SHALL BE USED TO ELECTRICALLY CONNECT 2 - 3 #14 OR 2 #12 PRE-STRIPPED COPPER WIRES. LARGER WIRES OR GREATER QUANTITIES OF WIRES SHALL REQUIRE A LARGER APPROVED WIRE CONNECTION.

Murrieta	CITY OF MURRIETA	NO SCALE
	WIRE CONNECTOR	SID032
		JANUARY 2014

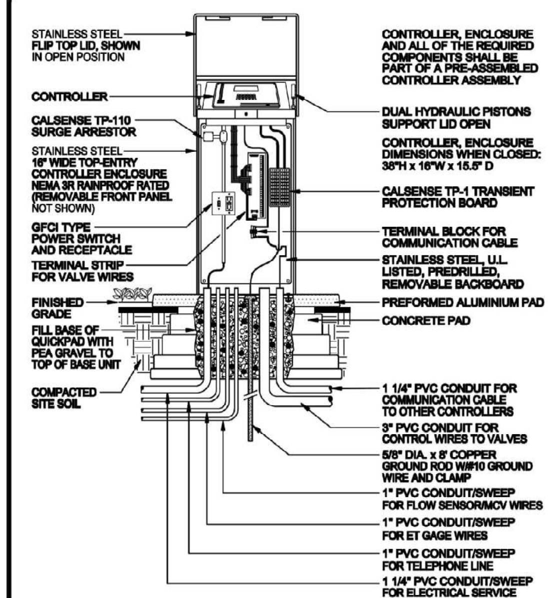


NOTE:

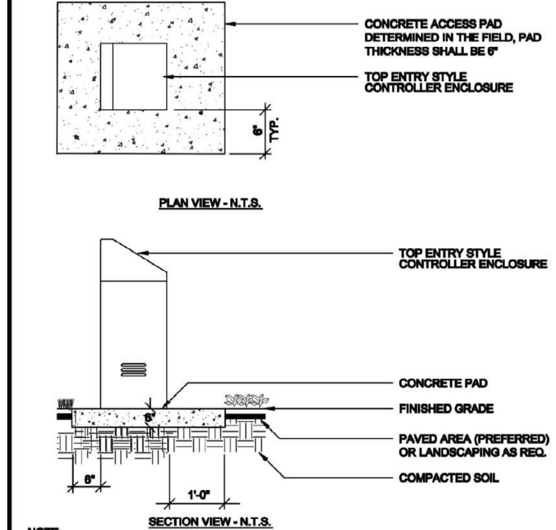
ALL CONTROL WIRE SPLICES SHALL BE INSTALLED INSIDE PULL BOXES.

ALL SPLICES SHALL BE MADE USING WATERPROOF ELECTRICAL CONNECTORS.

Murrieta	CITY OF MURRIETA	NO SCALE
	CONTROL WIRE PULL BOX	SID033
		JANUARY 2014



Murrieta	CITY OF MURRIETA	NO SCALE
	CALSENSE SATELLITE, EXTERIOR INSTALLATION	SID035
		JANUARY 2014



NOTE:
WHERE POSSIBLE ORIENT FRONT OF ACCESS PAD ADJACENT TO SIDEWALK OR PAVING.

Murrieta	CITY OF MURRIETA	NO SCALE
	CONTROLLER ENCLOSURE CONCRETE FOOTING	SID036
		JANUARY 2014

City of Murrieta Landscape Water Use Calculations

Project Type Commercial

Murrieta Hot Springs Road, Streetscape

0.45 ETo allowance

Applicant to use drop down menus in cells that indicate a selection to describe each hydrozone.
Where "INPUT" is shown, applicant to enter project specific information.
Please note that embedded formulas will reflect as 'false' or as an error until selections are completed.

1 Maximum Annual Water Allowance (MAWA)

INPUT the total square footage of landscape = 45,124 S.F.
INPUT the Hist. ETo for the area = 57.00

MAWA = 95,937 cu ft / yr

2 Estimated Annual Water Use (EAWU)

Hydrozone # 1 — Plant Factor = 0.2 — Plant Type: Shrubs / Groundcover — Water Use: Low
INPUT Square Foot Area of Hydrozone = 24,691
Hydrozone Irrigation Efficiency = 0.90 — Point Source Drip
EAWU = 25,923 cu ft / yr

Hydrozone # 2 — Plant Factor = 0.5 — Plant Type: Basin - Bottom — Water Use: Moderate
INPUT square footage of hydrozone = 6,762
Hydrozone Irrigation Efficiency = 0.90 — Point Source Drip
EAWU = 17,749 cu ft / yr

Hydrozone # 3 — Plant Factor = 0.1 — Plant Type: Hydroseed — Water Use: Very Low
INPUT square footage of hydrozone = 13,671
Hydrozone Irrigation Efficiency = 0.75 — Rotator / Precision Spray Nozzle
EAWU = 8,612 cu ft / yr

Hydrozone # 4 — Plant Factor = FALSE — Plant Type: SELECT — Water Use: SELECT
INPUT square footage of hydrozone = 0
Hydrozone Irrigation Efficiency = 1 — n/a
EAWU = 0 cu ft / yr

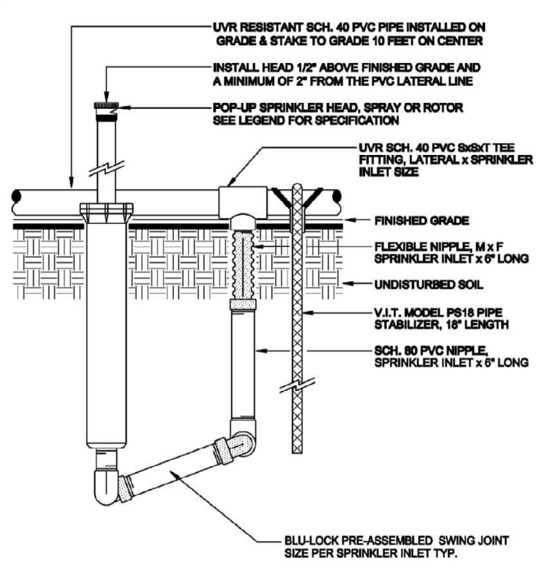
Hydrozone # 5 — Plant Factor = FALSE — Plant Type: SELECT — Water Use: SELECT
INPUT square footage of hydrozone = 0
Hydrozone Irrigation Efficiency = 1 — n/a
EAWU = 0 cu ft / yr

Hydrozone # 6 — Plant Factor = FALSE — Plant Type: SELECT — Water Use: SELECT
INPUT square footage of hydrozone = 0
Hydrozone Irrigation Efficiency = 1 — n/a
EAWU = 0 cu ft / yr

SubTotal EAWU = 52,284 cu ft / yr
Input Irrigation System Operation Factor 0.85
Total EAWU = 61,511
MAWA - EAWU = 34,426 cu ft / yr
(this number must be positive)

PERCENTAGE OF WATER SAVED RELATIVE TO MAX ALLOWED = 36%

* Trees are not required to be listed as a separate hydrozone if understory is planted with plants of an equal or higher plant factor, and foot area is already included in calculations.



NOTE:
PRE- ASSEMBLED SWING JOINT SHALL BE SIZED TO MATCH THE SPRINKLER INLET.

Murrieta	CITY OF MURRIETA	NO SCALE
	MITIGATION POP-UP SPRINKLER ON GRADE PIPE	SID018
		JANUARY 2014

MURRIETA COMMUNITY SERVICES DEPARTMENT - SEASONAL IRRIGATION SCHEDULE:							SUMMER (Jun., Jul. and Aug.)		
Project Name:		(INSERT NAME OF PROJECT AND TRACT NUMBER)					Water meter Number:		1
Designer Name:		(INSERT NAME OF IRRIGATION DESIGNER)					Reclaimed / Potable:		P
Date Prepared:		(INSERT THE DATE THIS SCHEDULE WAS PREPARED)							
Evapotranspiration Rates:			Plant Factors (% of ETo):				Irrigation Efficiency (%):		
Historical:	55.45	In. / Yr.			Turf:	0.8		Stream Rotors:	0.75
Seasonal:	22.08	In.			Low Water Use Shrubs:	0.3		Spray Heads:	0.65
Seasonal:	1.70	In. / Wk.			Medium Water Use Shrubs:	0.4		Bubbler Heads:	0.85
					High Water Use Shrubs:	0.5		Drip Systems:	0.90
Controller Letter:		A							
VALVE NUMBER	FLOW IN GPM	PLANT FACTOR	PRECIP. RATE	IRRIG. EFFIC.	MAX. MIN./CYCLE	IR/WK INCHES	IR/WK MINUTES	CYCLES PER WK	GALLONS PER WK
1	8	0.5	0.45	0.90	13	0.94	126	9	1,006
2	9	0.3	0.45	0.90	13	0.57	75	6	679
3	9	0.3	0.45	0.90	13	0.57	75	6	679
4	2	0.3	0.45	0.90	13	0.57	75	6	151
5	17	0.3	0.45	0.90	13	0.57	75	6	1,283
6	7	0.3	0.45	0.90	13	0.57	75	6	528
7	8	0.3	0.45	0.90	13	0.57	75	6	604
8	4	0.3	0.45	0.90	13	0.57	75	6	302
9	7	0.5	0.45	0.90	13	0.94	126	9	881
Run Time Totals:			Water Use Totals:					Water Cost Totals:	
780	Min. / Wk.		6,114	Gal. / Wk.	0.02	Acft / Wk.		$630.00	Cost / Acft.
13.00	Hrs. / Wk.		26,476	Gal. / Mo.	0.08	Acft / Mo.		$51.19	Cost / Mo.
6	Days / Wk.		79,488	Gal. / Ssn.	0.24	Acft / Ssn.		$153.69	Cost / Ssn.
2.17	Hrs. / Day		1,019	Gal. / Day	0.00	Acft / Day		$385.97	Cost / Yr.

MURRIETA COMMUNITY SERVICES DEPARTMENT - SEASONAL IRRIGATION SCHEDULE:							SUMMER (Jun., Jul. and Aug.)		
									B
Project Name:		Murrieta Hot Springs					Water meter Number:		2
Designer Name:		David Neault Associates					Reclaimed / Potable:		P
Date Prepared:		12.20.19							
Evapotranspiration Rates:			Plant Factors (% of ETo):				Irrigation Efficiency (%):		
Historical:	55.45	In. / Yr.			Turf:	0.8		Stream Rotors:	0.75
Seasonal:	22.08	In.			Low Water Use Shrubs:	0.3		Spray Heads:	0.65
Seasonal:	1.70	In. / Wk.			Medium Water Use Shrubs:	0.4		Bubbler Heads:	0.85
					High Water Use Shrubs:	0.5		Drip Systems:	0.90
Controller Letter:		B							
VALVE NUMBER	FLOW IN GPM	PLANT FACTOR	PRECIP. RATE	IRRIG. EFFIC.	MAX. MIN./CYCLE	IR/WK INCHES	IR/WK MINUTES	CYCLES PER WK	GALLONS PER WK
1	6	0.3	0.45	0.90	13	0.57	75	6	453
2	9	0.3	0.45	0.90	13	0.57	75	6	679
3	13	0.3	0.45	0.90	13	0.57	75	6	981
4	17	0.1	0.65	0.75	9	0.23	21	2	355
5	25	0.1	0.65	0.75	9	0.23	21	2	523
6	17	0.1	0.65	0.75	9	0.23	21	2	355
7	20	0.1	0.65	0.75	9	0.23	21	2	418
8	14	0.1	0.65	0.75	9	0.23	21	2	293
9	15	0.3	0.45	0.90	13	0.57	75	6	1,132
10	4	0.5	0.45	0.90	13	0.94	126	9	503
11	6	0.5	0.45	0.90	13	0.94	126	9	755
12	7	0.3	0.45	0.90	13	0.57	75	6	528
13	5	0.3	0.45	0.90	13	0.57	75	6	377
14	7	0.3	0.45	0.90	13	0.57	75	6	528
15	3	0.3	0.45	0.90	13	0.57	75	6	226
16	2	0.3	0.45	0.90	13	0.57	75	6	151
Run Time Totals:			Water Use Totals:					Water Cost Totals:	
1,036	Min. / Wk.		8,260	Gal. / Wk.	0.03	Acft / Wk.		$630.00	Cost / Acft.
17.26	Hrs. / Wk.		35,765	Gal. / Mo.	0.11	Acft / Mo.		$69.15	Cost / Mo.
6	Days / Wk.		107,378	Gal. / Ssn.	0.33	Acft / Ssn.		$207.62	Cost / Ssn.
2.88	Hrs. / Day		1,377	Gal. / Day	0.00	Acft / Day		$521.40	Cost / Yr.

IRRIGATION WATER PRESSURE CALCULATIONS

POC	A	RCV VALVE	A-5
SIZE	1"	SIZE	1"
STATIC PRESSURE	74.00	RCV TOTAL DEMAND	17.00
PRESSURE ZONE	1347.00	RCV ELEVATION	-
POC ELEV.	1105.00	POC ELEV.	-
ELEV. DIFFERENCE	242.00	ELEV. DIFFERENCE	-

ITEM NUMBER	SIZE	QTY/UNIT	DESCRIPTION	PSI LOSS
1	1 1/2"	50 FT	SERVICE LINE	1.50
2	1 1/2"	1	WATER METER	0.50
3	1 1/2"	1	BACKFLOW	11.00
4	1 1/2"	1	GATE/BALL VALVE	1.50
5	1 1/2"	1	MASTER VALVE	3.00
6	2"	500	MAINLINE CL. 315	1.25
7	1"	1	R.C.V.	3.00
8	-	-	LATERAL LINE LOSS	2.18
9	-	-	FITTING LOSS	2.39
10	-	-	ELEV. DIFF. (RCV-HEAD)	2.20
11	-	-	ELEV. DIFF. (POC-RCV)	1.00
12			TOTAL SYSTEM PRESSURE LOSS	29.52
13			PRESSURE REQUIRED AT HEAD	30.00
14			TOTAL PRESSURE REQUIRED	59.52
16			STATIC WATER PRESSURE	74.00
17			RESIDUAL PRESSURE	14.48
15			SET PRV OR MCV AT	69.52
18			PRESSURE ADDED FROM BOOSTER PUMP	N/A

IRRIGATION WATER PRESSURE CALCULATIONS

POC	B	RCV VALVE	B-6
SIZE	1"	SIZE	1"
STATIC PRESSURE	74.00	RCV TOTAL DEMAND	25.00
PRESSURE ZONE	1347.00	HEAD ELEVATION	1120.00
POC ELEV.	1105.00	POC ELEV.	1105.00
ELEV. DIFFERENCE	242.00	ELEV. DIFFERENCE	15.00

ITEM NUMBER	SIZE	QTY/UNIT	DESCRIPTION	PSI LOSS
1	1 1/2"	50 FT	SERVICE LINE	1.50
2	1 1/2"	1	WATER METER	1.20
3	1 1/2"	1	BACKFLOW	11.00
4	1 1/2"	1	GATE/BALL VALVE	1.50
5	1 1/2"	1	MASTER VALVE	3.00
6	2"	400 FT	MAINLINE CL. 315	2.40
7	1"	1	R.C.V.	1.50
8	-	-	LATERAL LINE LOSS	2.21
9	-	-	FITTING LOSS	2.43
10	-	-	ELEV. DIFF. (RCV-HEAD)	6.50
11	-	-	ELEV. DIFF. (POC-RCV)	0.00
12			TOTAL SYSTEM PRESSURE LOSS	33.24
13			PRESSURE REQUIRED AT HEAD	30.00
14			TOTAL PRESSURE REQUIRED	63.24
16			STATIC WATER PRESSURE	74.00
17			RESIDUAL PRESSURE	10.76
15			SET PRV OR MCV AT	73.24
18			PRESSURE ADDED FROM BOOSTER PUMP	N/A

NOTE:
FOR ALL IRRIGATION AND PLANTING SPECIFICATIONS, REFER TO CITY OF MURRIETA PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS SPECIAL PROVISIONS SPECIFICATION BOOK FOR LANDSCAPE IMPROVEMENTS OF MURRIETA HOT SPRINGS RD.

NOTE:
THE SPECIAL PROVISIONS SPECIFICATIONS BOOK COMPLETES THE CONTRACT DOCUMENTS AND SHALL TAKE PRECEDENCE OVER THE APPROVED LANDSCAPE PLANS. SHOULD A DISCREPANCY OCCUR BETWEEN ANY NOTES, SPECIFICATIONS, DETAILS, SITE CONDITIONS, OR OTHER SITUATION REGARDING THE CONSTRUCTION OF THESE PLANS, THE MURRIETA COMMUNITY SERVICE DISTRICT LANDSCAPE SPECIFICATIONS AND STANDARDS MANUAL SHALL TAKE PRECEDENCE AND ALL DECISIONS MADE BY THE MCSD SHALL BE FINAL. MCSD PHONE 1-951-461-6124.

HOLD HARMLESS AND INDEMNIFICATION CLAUSE
CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, AND THE LANDSCAPE ARCHITECT HARMLESS FROM ANY AND ALL LIABILITY REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, OR THE LANDSCAPE ARCHITECT.

"AS BUILT"
Receipt of As–Builts, Controller Charts and Turn–over Items required by specifications.

MCSD ____________ Date ____________

SEAL: LICENSED LANDSCAPE ARCHITECT — David S. Neault No. 2884 — Signature — 06-30-2020 Renewal Date — 04-06-2020 Date — STATE OF CALIFORNIA

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
RIV. CO. BM T 46–81 RESET 1997, ELEV. 1097.163
3–1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.–JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

GEORGE MORING MCSD ____________ DATE
PARKS MAINTENANCE SUPERINTENDENT

SCALE
HORIZONTAL: AS NOTED
VERTICAL: AS NOTED

landscape architecture
planning
golf course architecture
David NEAULT ASSOCIATES Inc.
41877 enterprise
circle north suite 140
temecula, ca. 92590
951 296 3430
www.dnassociates.com

PREPARED BY:
DAVID S. NEAULT
R.L.A. NO. 2884
DATE:

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 2.9 — CITY OF MURRIETA PLANNING DEPARTMENT — SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
IRRIGATION DETAILS

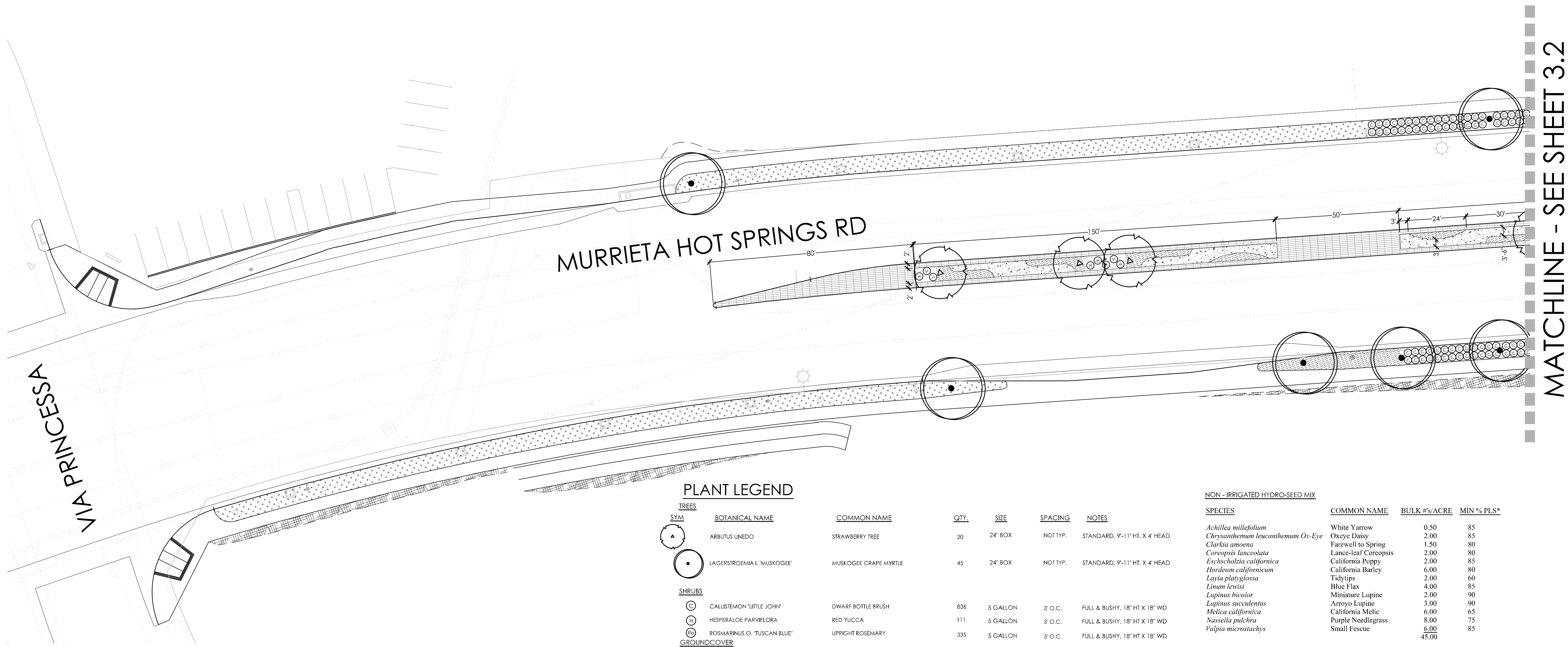
APPROVED
ROBERT K. MOEHLING ____________ DATE ____________
CITY ENGINEER RCE 63056

DWN BY:
CHKD BY:
FIELD BK:

CIP PROJECT NO. 07–310

DRAWING NO.

4/6/20



PLANT LEGEND

TREES

SYM	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	SPACING	NOTES
	ARBUTUS UNEDO	STRAWBERRY TREE	20	24" BOX	NOT TYP.	STANDARD, 9'-11' HT. X 4' HEAD
	LAGERSTROEMIA I. 'MUSKOGEE'	MUSKOGEE CRAPE MYRTLE	45	24" BOX	NOT TYP.	STANDARD, 9'-11' HT. X 4' HEAD

SHRUBS

SYM	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	SPACING	NOTES
C	CALLISTEMON 'LITTLE JOHN'	DWARF BOTTLE BRUSH	836	5 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD
H	HESPERALOE PARVIFLORA	RED YUCCA	111	5 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD
Ro	ROSMARINUS O. "TUSCAN BLUE"	UPRIGHT ROSEMARY	335	5 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD

GROUNDCOVER

SYM	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	SPACING	NOTES
	ROSEMARINUS OFFICIALIS	GROUNDCOVER ROSEMARY	930	1 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD
	CAREX TUMULICOLA	BERKLEY SEDGE	730	1 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD
	NON-IRRIGATED HYDRO-SEED MIX (SEE MIX ON SEPARATE LEGEND)		AS REQ'D	HYDROSEED		
	4X8 CONCRETE PAVERS, COLOR TO BE BROWNSTONE, INSTALLED IN RUNNING BOND PATTERN, TO MATCH CITY STANDARD.		PROVIDE SAMPLE TO CITY PRIOR TO ORDERING			
	STABILIZED DECOMPOSED GRANITE, COLOR TO BE "BRIMSTONE".		PROVIDE SAMPLE TO CITY PRIOR TO ORDERING			

VINES

SYM	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	SPACING	NOTES
	PATHENOCISSUS TRICUSPIDATA	BOSTON IVY	120	1 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD

NON - IRRIGATED HYDRO-SEED MIX

SPECIES	COMMON NAME	BULK #'s/ACRE	MIN % PLS*
Achillea millefolium	White Yarrow	0.50	85
Chrysanthemum leucanthemum Ox-Eye	Oxeye Daisy	2.00	85
Clarkia amoena	Farewell to Spring	1.50	80
Coreopsis lanceolata	Lance-leaf Coreopsis	2.00	80
Eschscholzia californica	California Poppy	2.00	85
Hordeum californicum	California Barley	6.00	80
Layia platyglossa	Tidytips	2.00	60
Linum lewisi	Blue Flax	4.00	85
Lupinus bicolor	Miniature Lupine	2.00	90
Lupinus succulentus	Arroyo Lupine	3.00	90
Melica californica	California Melic	6.00	65
Nassella pulchra	Purple Needlegrass	8.00	75
Vulpia microstachys	Small Fescue	6.00	85
		45.00	

* MIN % PLS (Pure Live Seed) = Seed Purity x Germination Rate

Seed: 45 lbs. per acre
Height: 24-36 inches
Emergence: 10-15 days
Establishment:75 days to 80% cover after emergence

0 20' 40' 80'

Scale: 1"= 20'

NORTH

NOTES:

1. CONTRACTOR SHALL CONTACT MCSD, IF PLANT HEIGHT AND WIDTH SPECIFICATIONS INDICATED ARE NOT AVAILABLE.

2. ALL SHRUB PLANTING AREAS REQUIRE 4" DEPTH SHREDDED BARK MULCH 3" MINUS. A BARK SAMPLE SHALL BE APPROVED BY CITY MCSD PRIOR TO PURCHASE

3. ALL TREES WITHIN 10' OF HARDSCAPE OR BUILDINGS SHALL BE INSTALLED WITH 20' LINEAR, (DEEP ROOT) ROOTBARRIER CENTERED ON TREE, TYP. DEPTH OF ROOTBARIER SHALL BE 36". IF UTILITIES DO NOT ALLOW FOR 36", ROOTBARRIER SHALL BE A MINIMUM 18" DEEP. AS DIRECTED BY MCSD.

4. ALL TREE SPECIFICATIONS & LOCATIONS SHALL BE APPROVED BY THE MCSD PRIOR TO INSTALLATION FOR APPROVAL. CONTRACTOR SHALL FORWARD DIGITAL PHOTO'S OF ALL TREES WITH A PERSON IN THE PHOTO FOR SCALE AND WITH THE TREE SEPARATED FROM OTHER TREES FOR APPROVAL BY THE MCSD PRIOR TO PURCHASE AND DELIVERY.

5. TREES SHALL BE CENTERED IN PLANTER AREAS OR LOCATED A MINIMUM OF 2.5' FROM PAVING, OR AS DIRECTED BY THE MCSD.

NOTE:
THE SPECIAL PROVISIONS SPECIFICATIONS BOOK COMPLETES THE CONTRACT DOCUMENTS AND SHALL TAKE PRECEDENCE OVER THE APPROVED LANDSCAPE PLANS. SHOULD A DISCREPANCY OCCUR BETWEEN ANY NOTES, SPECIFICATIONS, DETAILS, SITE CONDITIONS, OR OTHER SITUATION REGARDING THE CONSTRUCTION OF THESE PLANS, THE MURRIETA COMMUNITY SERVICE DISTRICT LANDSCAPE SPECIFICATIONS AND STANDARDS MANUAL SHALL TAKE PRECEDENCE AND ALL DECISIONS MADE BY THE MCSD SHALL BE FINAL. MCSD PHONE 1-951-461-6124.

HOLD HARMLESS AND INDEMNIFICATION CLAUSE
CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMETED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, AND THE LANDSCAPE ARCHITECT HARMLESS FROM ANY AND ALL LIABILITY REAL OR ELLEGED, IN CONNECTION WITH THE PERFROMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLEGENCE OF THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, OR THE LANDSCAPE ARCHITECT.

"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD ______ Date ______

SEAL: LICENSED LANDSCAPE ARCHITECT — David S. Neault No. 2884 — Signature — 06-30-2020 Renewal Date — 04-06-2020 Date — STATE OF CALIFORNIA

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CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

GEORGE MORING MCSD ______ DATE
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SHEET 3.1
CITY OF MURRIETA
PLANNING DEPARTMENT
SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
PLANTING PLAN

APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

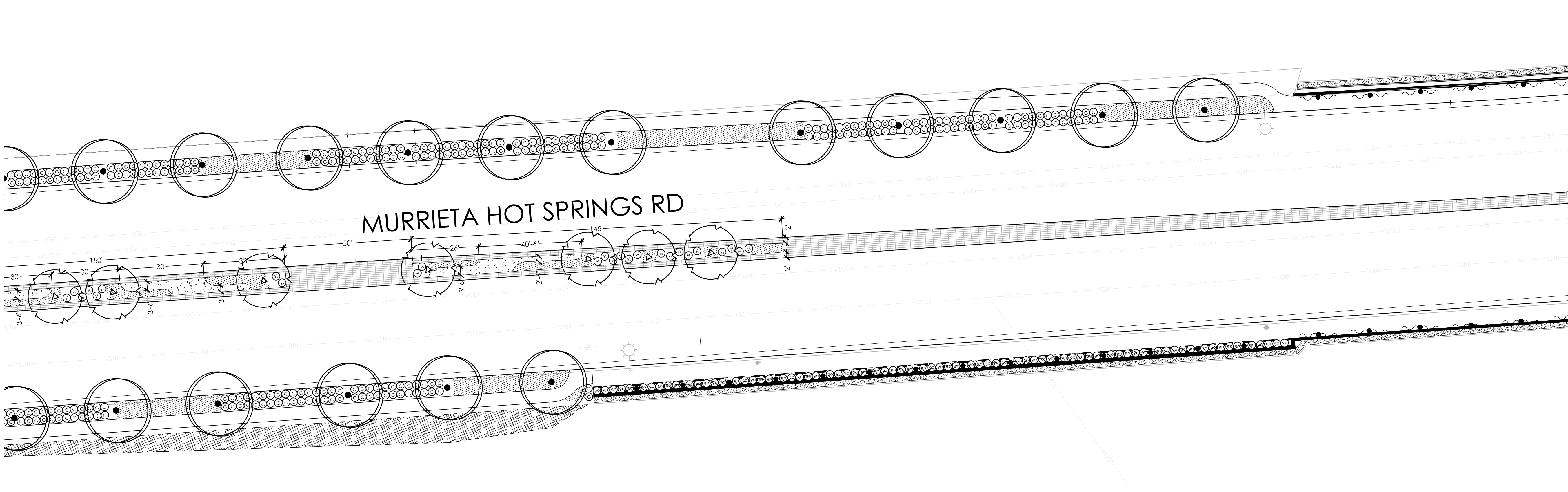
DWN BY: ______
CHKD BY: ______
FIELD BK: ______

CIP PROJECT NO.
07–310

DRAWING NO.

4/6/20

MATCHLINE - SEE SHEET 3.1



MATCHLINE - SEE SHEET 3.3

PLANT LEGEND

TREES

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	NON-IRRIGATED HYDRO-SEED MIX (SEE MIX ON SEPARATE LEGEND)		AS REQ'D	HYDROSEED		
	4X8 CONCRETE PAVERS, COLOR TO BE BROWNSTONE, INSTALLED IN RUNNING BOND PATTERN, TO MATCH CITY STANDARD.		PROVIDE SAMPLE TO CITY PRIOR TO ORDERING			
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Hordeum californicum	California Barley	6.00	80
Layia platyglossa	Tidytips	2.00	60
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		45.00	

* MIN % PLS (Pure Live Seed) = Seed Purity x Germination Rate

Seed: 45 lbs. per acre
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"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD Date

SEAL:
LICENSED LANDSCAPE ARCHITECT
David S. Neault No. 2884
Signature
06-30-2020
Renewal Date
04-06-2020
Date
STATE OF CALIFORNIA

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CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

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DATE:
DAVID S. NEAULT

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 3.2

CITY OF MURRIETA
PLANNING DEPARTMENT

SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
PLANTING PLAN

APPROVED
ROBERT K. MOEHLING DATE
CITY ENGINEER RCE 63056

DWN BY:
CHKD BY:
FIELD BK:

CIP PROJECT NO.
07-310

DRAWING NO.

4/6/20

PLANT LEGEND

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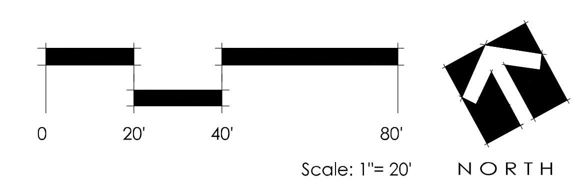

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SHEET	CITY OF MURRIETA	SHEETS
3.3	PLANNING DEPARTMENT	18

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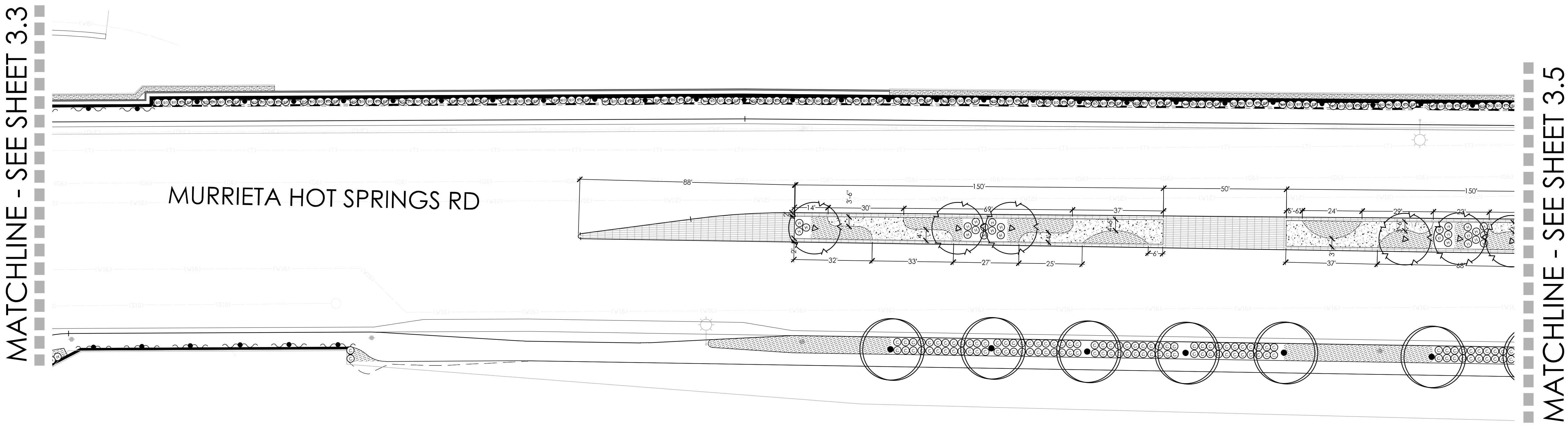

PLANT LEGEND

TREES

SYM	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	SPACING	NOTES
	ARBUTUS UNEDO	STRAWBERRY TREE	20	24" BOX	NOT TYP.	STANDARD, 9'-11' HT. X 4' HEAD
	LAGERSTROEMIA I. 'MUSKOGEE'	MUSKOGEE CRAPE MYRTLE	45	24" BOX	NOT TYP.	STANDARD, 9'-11' HT. X 4' HEAD
SHRUBS						
C	CALLISTEMON 'LITTLE JOHN'	DWARF BOTTLE BRUSH	836	5 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD
H	HESPERALOE PARVIFLORA	RED YUCCA	111	5 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD
Ro	ROSMARINUS O. "TUSCAN BLUE"	UPRIGHT ROSEMARY	335	5 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD
GROUNDCOVER						
	ROSEMARINUS OFFICIALIS	GROUNDCOVER ROSEMARY	930	1 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD
	CAREX TUMULICOLA	BERKLEY SEDGE	730	1 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD
	NON-IRRIGATED HYDRO-SEED MIX (SEE MIX ON SEPARATE LEGEND)		AS REQ'D	HYDROSEED		
	4X8 CONCRETE PAVERS, COLOR TO BE BROWNSTONE, INSTALLED IN RUNNING BOND PATTERN, TO MATCH CITY STANDARD.		PROVIDE SAMPLE TO CITY PRIOR TO ORDERING			
	STABILIZED DECOMPOSED GRANITE, COLOR TO BE "BRIMSTONE".		PROVIDE SAMPLE TO CITY PRIOR TO ORDERING			
VINES						
	PATHENOCISSUS TRICUSPIDATA	BOSTON IVY	120	1 GALLON	3' O.C.	FULL & BUSHY, 18" HT X 18" WD

NON - IRRIGATED HYDRO-SEED MIX

SPECIES	COMMON NAME	BULK #'s/ACRE	MIN % PLS*
Achillea millefolium	White Yarrow	0.50	85
Chrysanthemum leucanthemum Ox-Eye	Oxeye Daisy	2.00	85
Clarkia amoena	Farewell to Spring	1.50	80
Coreopsis lanceolata	Lance-leaf Coreopsis	2.00	80
Eschscholzia californica	California Poppy	2.00	85
Hordeum californicum	California Barley	6.00	80
Layia platyglossa	Tidytips	2.00	60
Linum lewisi	Blue Flax	4.00	85
Lupinus bicolor	Miniature Lupine	2.00	90
Lupinus succulentus	Arroyo Lupine	3.00	90
Melica californica	California Melic	6.00	65
Nassella pulchra	Purple Needlegrass	8.00	75
Vulpia microstachys	Small Fescue	6.00	85
		45.00	

* MIN % PLS (Pure Live Seed) = Seed Purity x Germination Rate

Seed: 45 lbs. per acre
Height: 24-36 inches
Emergence: 10-15 days
Establishment:75 days to 80% cover after emergence

NOTES:

1. CONTRACTOR SHALL CONTACT MCSD, IF PLANT HEIGHT AND WIDTH SPECIFICATIONS INDICATED ARE NOT AVAILABLE.

2. ALL SHRUB PLANTING AREAS REQUIRE 4" DEPTH SHREDDED BARK MULCH 3" MINUS. A BARK SAMPLE SHALL BE APPROVED BY CITY MCSD PRIOR TO PURCHASE

3. ALL TREES WITHIN 10' OF HARDSCAPE OR BUILDINGS SHALL BE INSTALLED WITH 20' LINEAR, (DEEP ROOT) ROOTBARRIER CENTERED ON TREE, TYP. DEPTH OF ROOTBARIER SHALL BE 36". IF UTILITIES DO NOT ALLOW FOR 36", ROOTBARRIER SHALL BE A MINIMUM 18" DEEP. AS DIRECTED BY MCSD.

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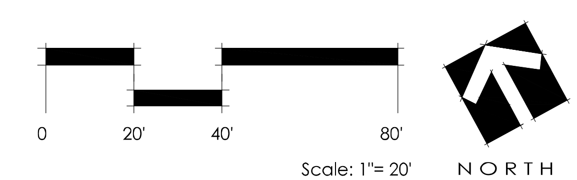

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"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD ______ Date ______

SEAL: LICENSED LANDSCAPE ARCHITECT David S. Neault No. 2884 Signature 06-30-2020 Renewal Date 04-06-2020 Date STATE OF CALIFORNIA

landscape architecture
planning
golf course architecture
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BENCH MARK
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.-JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

CITY OF MURRIETA COMMUNITY SERVICES
DISTRICT APPROVAL

GEORGE MORING MCSD ______ DATE
PARKS MAINTENANCE SUPERINTENDENT

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

PREPARED BY:
R.L.A. NO. 2884
DATE:
DAVID S. NEAULT

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 3.4
CITY OF MURRIETA
PLANNING DEPARTMENT
SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
PLANTING PLAN

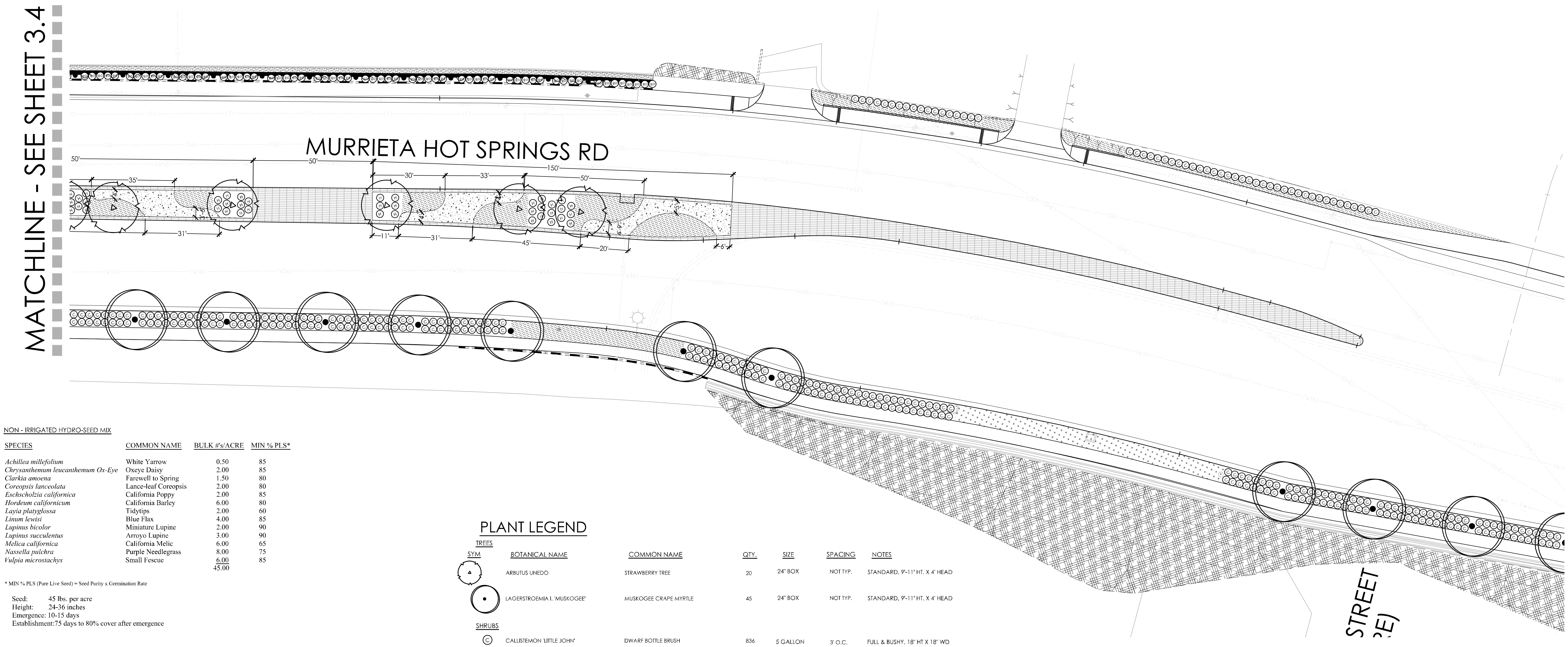
APPROVED
ROBERT K. MOEHLING ______ DATE ______
CITY ENGINEER RCE 63056

DWN BY: ______
CHKD BY: ______
FIELD BK: ______

CIP PROJECT NO.
07-310

DRAWING NO.

4/6/20



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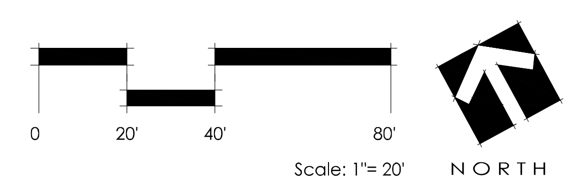

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PREPARED BY:
R.L.A. NO. 2884
DATE:
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CITY OF MURRIETA
PLANNING DEPARTMENT
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PLANTING PLAN

APPROVED
ROBERT K. MOEHLING DATE
CITY ENGINEER RCE 63056

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CHKD BY:
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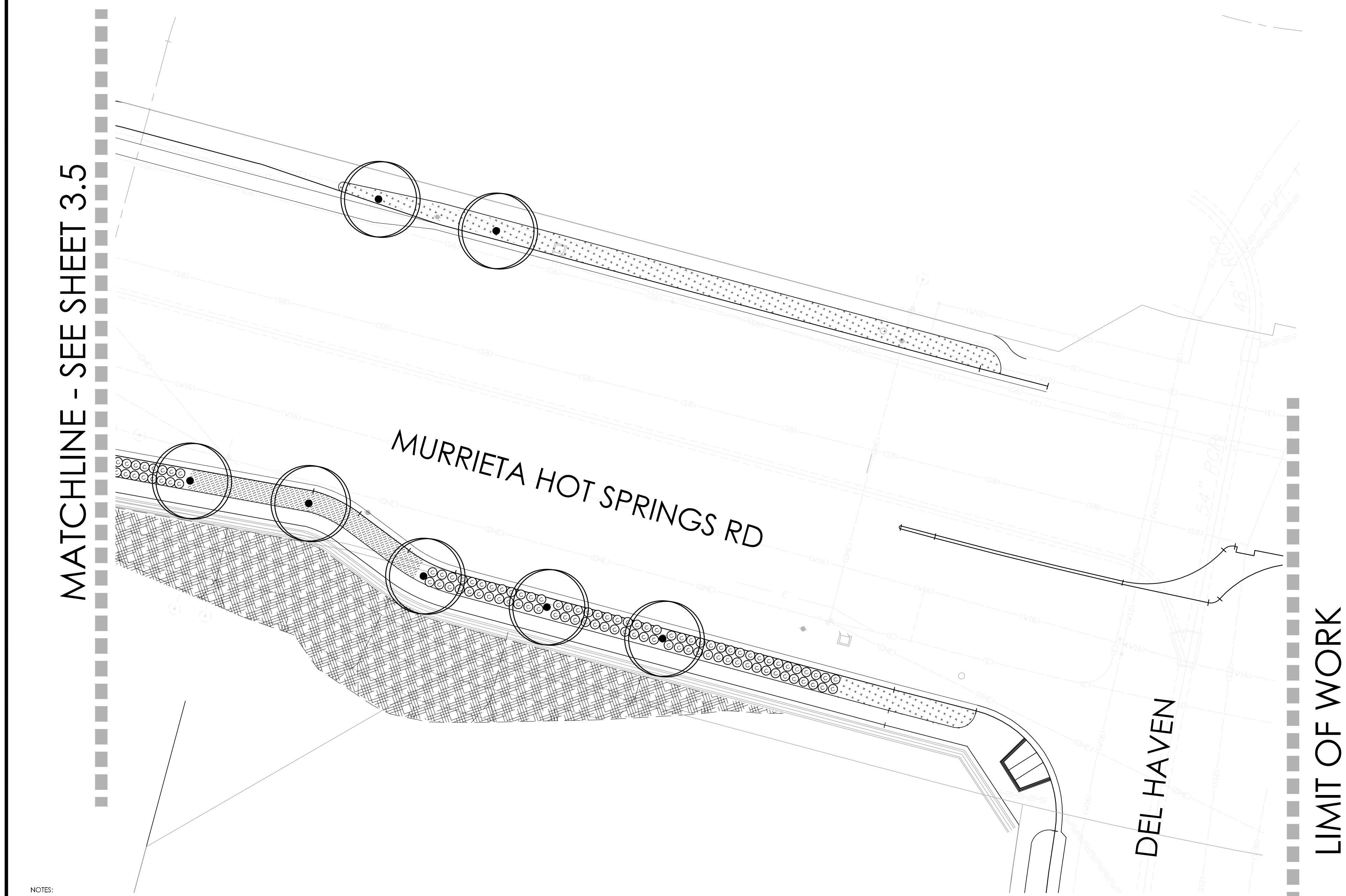

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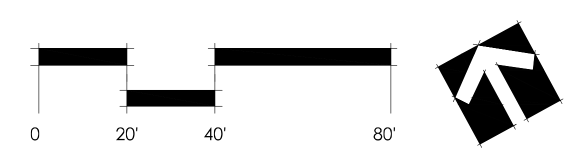

Scale: 1"= 20'

NORTH

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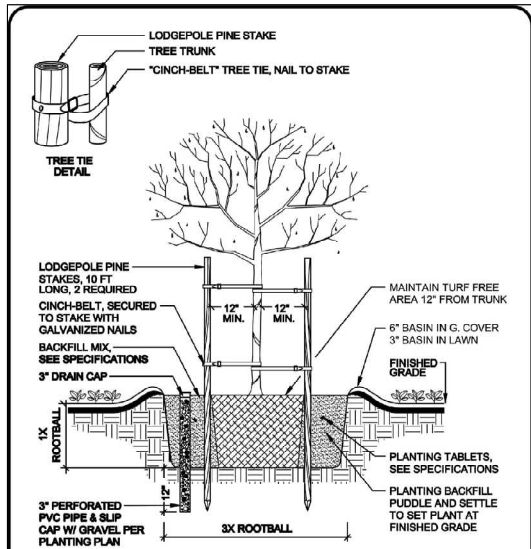
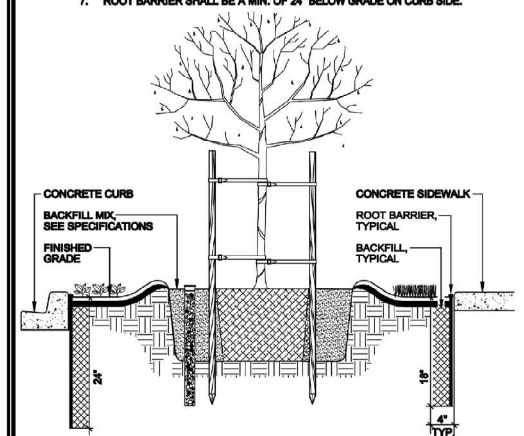


NOTE:
ALL PLANT BASINS SHALL RECEIVE A 4" DEEP LAYER OF APPROVED MULCH.

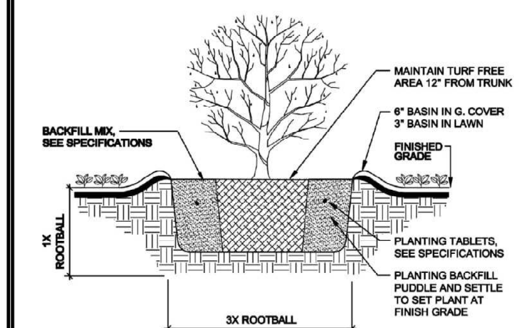
CITY OF MURRIETA	NO SCALE
Murrieta — DOUBLE STAKE TREE 5 GAL., 15 GAL., 24" BOX	SLD001
	JANUARY 2014

NOTE:
1. TOP OF ROOT CONTROL BARRIER MUST BE AT GRADE.
2. POSITION ROOT CONTROL BARRIER ADJACENT TO STRUCTURE.
3. BIO-BARRIER ROOT INHIBITORS MUST BE FACING PLANTED AREA.
4. BARRIER SHALL EXTEND A MIN. OF 8" BELOW BOTTOM OF HARDSCAPE.
5. PROVIDE A MIN. OF 20 FEET OF ROOT BARRIER PER TREE.
6. ROOT BARRIER SHALL BE A MIN. OF 18" BELOW GRADE ON WALK SIDE.
7. ROOT BARRIER SHALL BE A MIN. OF 24" BELOW GRADE ON CURB SIDE.



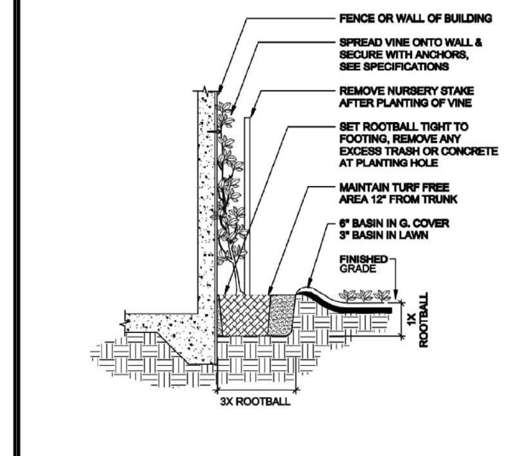
NOTE:
DETAIL IS FOR THE INSTALLATION OF BIO-BARRIER ROOT BARRIERS ONLY, REFER TO THE TREE DETAILS FOR INSTALLATION INSTRUCTIONS FOR TREES.

CITY OF MURRIETA	NO SCALE
Murrieta — TREE ROOT BARRIER	SLD005
	JANUARY 2014



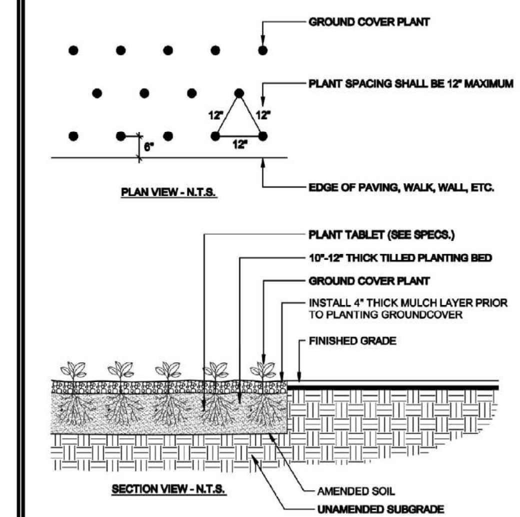
NOTE:
ALL PLANT BASINS SHALL RECEIVE A 4" DEEP LAYER OF APPROVED MULCH.

CITY OF MURRIETA	NO SCALE
Murrieta — SHRUB PLANTING	SLD006
	JANUARY 2014

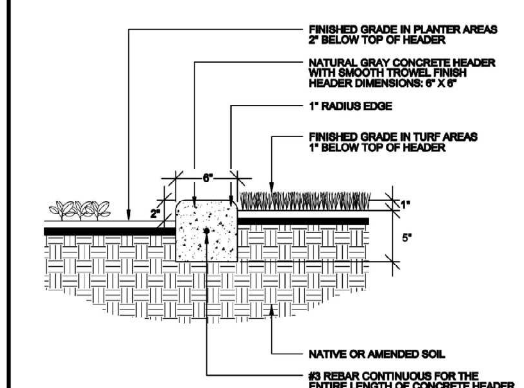


NOTE:
ALL PLANT BASINS SHALL RECEIVE A 4" DEEP LAYER OF APPROVED MULCH.

CITY OF MURRIETA	NO SCALE
Murrieta — VINE PLANTING	SLD008
	JANUARY 2014

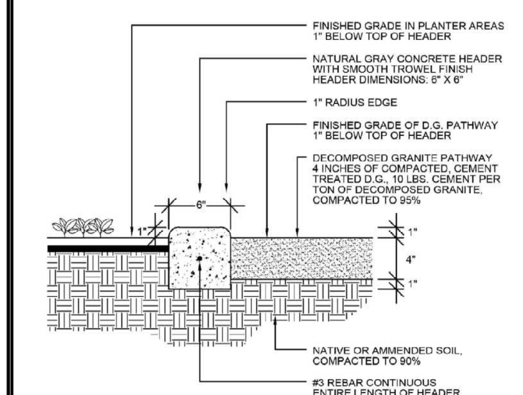


CITY OF MURRIETA	NO SCALE
Murrieta — GROUND COVER PLANTING	SLD009
	JANUARY 2014



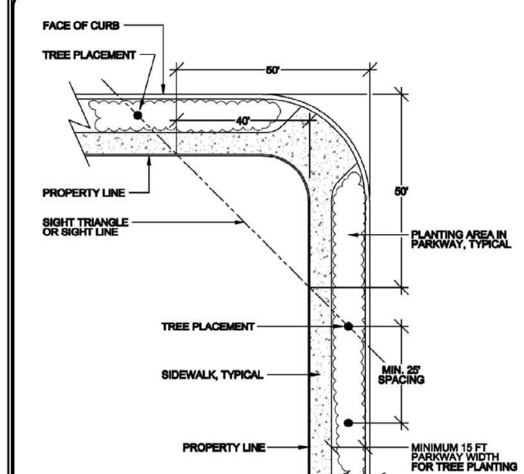
NOTE:
PROVIDE A CONCRETE MOW STRIP IN FRONT OF ALL MONUMENT SIGNS.
CONCRETE MOW STRIP OR EQUAL SHALL BE USED TO DESIGNATE THE SEPARATION OF MCSD'S PROPERTY AND ADJACENT PROPERTIES

CITY OF MURRIETA	NO SCALE
Murrieta — CONCRETE HEADER	SLD010
	JANUARY 2014



NOTE:
ALL IRRIGATION PIPING AND WIRES ROUTED UNDER D.G. PATHWAYS AND CONCRETE HEADERS SHALL BE INSTALLED INSIDE SCH. 40 SLEEVES AS IF UNDER PAVING
THE MINIMUM WIDTH FOR ALL DECOMPOSED GRANITE PATHS SHALL BE 10'.

CITY OF MURRIETA	NO SCALE
Murrieta — DECOMPOSED GRANITE PATH	SLD013
	JANUARY 2014



NOTE:
ALL SHRUB PLANTING BETWEEN CURB AND SIDEWALK CANNOT EXCEED MAXIMUM HEIGHT OF 3'-0" AT FULL MATURITY.
AREAS LESS THAN 2'-6" WIDE ARE TO BE HARDSCAPED.
NO TURF IS ALLOWED IN PLANTING AREA BETWEEN CURB AND EDGE OF SIDEWALK.

CITY OF MURRIETA	NO SCALE
Murrieta — PLANTING ADJACENT TO ROADWAY	SLD014
	JANUARY 2014

NOTE:
FOR ALL IRRIGATION AND PLANTING SPECIFICATIONS, REFER TO CITY OF MURRIETA PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS SPECIAL PROVISIONS SPECIFICATION BOOK FOR LANDSCAPE IMPROVEMENTS OF MURRIETA HOT SPRINGS RD.

NOTE:
THE SPECIAL PROVISIONS SPECIFICATIONS BOOK COMPLETES THE CONTRACT DOCUMENTS AND SHALL TAKE PRECEDENCE OVER THE APPROVED LANDSCAPE PLANS. SHOULD A DISCREPANCY OCCUR BETWEEN ANY NOTES, SPECIFICATIONS, DETAILS, SITE CONDITIONS, OR OTHER SITUATION REGARDING THE CONSTRUCTION OF THESE PLANS, THE MURRIETA COMMUNITY SERVICE DISTRICT LANDSCAPE SPECIFICATIONS AND STANDARDS MANUAL SHALL TAKE PRECEDENCE AND ALL DECISIONS MADE BY THE MCSD SHALL BE FINAL. MCSD PHONE 1-951-461-6124.

HOLD HARMLESS AND INDEMNIFICATION CLAUSE
CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, AND THE LANDSCAPE ARCHITECT HARMLESS FROM ANY AND ALL LIABILITY REAL OR ELLEGED, IN CONNECTION WITH THE PERFROMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLEGENCE OF THE OWNER, THE MCSD, COUNTY OF LOCAL JURISDICTION, OR THE LANDSCAPE ARCHITECT.

"AS BUILT"
Receipt of As-Builts, Controller Charts and Turn-over Items required by specifications.

MCSD ____ Date ____

SEAL: LICENSED LANDSCAPE ARCHITECT — David S. Neault — No. 2884 — Signature — 06-30-2020 — 04-06-2020 — STATE OF CALIFORNIA

Underground Service Alert
Call: TOLL FREE 1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB FROM THE INT. OF RANCHO CA. RD. AND FRONT ST. 1.7 MILES NW ON FRONT ST.-JEFFERSON AVE TO THE INT. OF JEFFERSON AND WINCHESTER, 2.0 MILES NE ON WINCHESTER RD. TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK

CITY OF MURRIETA COMMUNITY SERVICES DISTRICT APPROVAL

GEORGE MORING MCSD PARKS MAINTENANCE SUPERINTENDENT — DATE

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

landscape architecture
planning
golf course architecture

David NEAULT ASSOCIATES Inc.
41877 enterprise circle north suite 140
temecula, ca. 92590
951 296 3430
www.dnassociates.com

PREPARED BY: DAVID S. NEAULT
R.L.A. NO. 2884
DATE:

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 3.7
CITY OF MURRIETA
PLANNING DEPARTMENT
SHEETS 18

PLANS FOR THE LANDSCAPE IMPROVEMENT OF:
MURRIETA HOT SPRINGS RD WIDENING
PLANTING DETAILS

APPROVED
ROBERT K. MOEHLING ____ DATE ____
CITY ENGINEER — RCE 63056

DWN BY:
CHKD BY:
FIELD BK:

CIP PROJECT NO. 07-310

DRAWING NO.

4/6/20

Appendix 3: Soils Information

Geotechnical Study, Other Infiltration Testing Data, and/or Other Documentation

Examples of material to provide in Appendix 3 may include but are not limited to the following:

- Geotechnical Study/Report prepared for the project,
- Additional soils testing data (if not included in the Geotechnical Study),
- Exhibits/Maps/Other Documentation of the Hydrologic Soils Groups (HSG)s at the project site.

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections A and D of this Template.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Western Riverside Area, California

Murrieta Hot Springs Road Widening

October 25, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

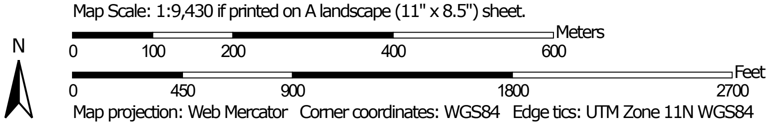
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:9,430 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 12, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 24, 2015—Feb 26, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GtA	Grangeville fine sandy loam, drained, 0 to 2 percent sl opes	0.2	0.1%
GyA	Greenfield sandy loam, 0 to 2 percent slopes	10.3	2.5%
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	60.1	14.3%
HcC	Hanford coarse sandy loam, 2 to 8 percent slopes	32.2	7.7%
HuC2	Honcut loam, 2 to 8 percent slopes, eroded	0.7	0.2%
LkF3	Las Posas rocky loam, 15 to 50 percent slopes, severely eroded	4.1	1.0%
MmC2	Monserate sandy loam, 5 to 8 percent slopes, eroded	4.3	1.0%
MmE3	Monserate sandy loam, 15 to 25 percent slopes, severely eroded	72.8	17.3%
MnE3	Monserate sandy loam, shallow, 15 to 25 percent slopes, severely eroded	8.0	1.9%
RaB2	Ramona sandy loam, 2 to 5 percent slopes, eroded	26.9	6.4%
RmE3	Ramona and Buren sandy loams, 15 to 25 percent slopes, severely eroded	146.5	34.8%
RuF	Rough broken land	34.3	8.2%
TeG	Terrace escarpments	12.8	3.0%
Wg	Willows silty clay, saline-alkali	7.3	1.7%
Totals for Area of Interest		**420.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

GtA—Grangeville fine sandy loam, drained, 0 to 2 percent sl opes

Map Unit Setting

National map unit symbol: hcvn
Elevation: 10 to 1,800 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 270 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Grangeville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grangeville

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 36 inches: fine sandy loam
H2 - 36 to 64 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: A/D
Ecological site: SANDY BASIN (R019XD070CA)
Hydric soil rating: No

Minor Components

Dello

Percent of map unit: 10 percent

Hydric soil rating: No

Traver

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Hydric soil rating: No

GyA—Greenfield sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hcvv
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Greenfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenfield

Setting

Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 26 inches: sandy loam
H2 - 26 to 43 inches: fine sandy loam
H3 - 43 to 60 inches: loam
H4 - 60 to 72 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: A
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 10 percent
Hydric soil rating: No

Arlington

Percent of map unit: 2 percent
Hydric soil rating: No

Pachappa

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Hydric soil rating: No

GyC2—Greenfield sandy loam, 2 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcvw
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Greenfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenfield

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 26 inches: sandy loam
H2 - 26 to 43 inches: fine sandy loam
H3 - 43 to 60 inches: loam
H4 - 60 to 72 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 3 percent
Hydric soil rating: No

Pachappa

Percent of map unit: 3 percent
Hydric soil rating: No

Arlington

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Ramona

Percent of map unit: 3 percent
Hydric soil rating: No

HcC—Hanford coarse sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hcw2
Elevation: 150 to 900 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 to 64 degrees F
Frost-free period: 250 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hanford and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hanford

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 8 inches: coarse sandy loam
H2 - 8 to 40 inches: fine sandy loam
H3 - 40 to 60 inches: stratified loamy sand to coarse sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: SANDY (R020XD012CA)
Hydric soil rating: No

Minor Components

Greenfield

Percent of map unit: 5 percent
Hydric soil rating: No

Ramona

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 2 percent
Hydric soil rating: No

Tujunga

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Hydric soil rating: No

HuC2—Honcut loam, 2 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcwg
Elevation: 2,000 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Honcut and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Honcut

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 22 inches: loam
H2 - 22 to 60 inches: loam

Properties and qualities

Slope: 2 to 8 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

LkF3—Las Posas rocky loam, 15 to 50 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: hcwp
Elevation: 200 to 3,000 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 240 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Las posas and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Las Posas

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from gabbro

Typical profile

H1 - 0 to 6 inches: stony loam
H2 - 6 to 20 inches: clay loam
H3 - 20 to 24 inches: weathered bedrock

Properties and qualities

Slope: 15 to 50 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: SHALLOW LOAMY (1975) (R019XD060CA)
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Cajalco

Percent of map unit: 5 percent
Hydric soil rating: No

Murrieta

Percent of map unit: 5 percent
Hydric soil rating: No

Tumescal

Percent of map unit: 5 percent
Hydric soil rating: No

MmC2—Monserate sandy loam, 5 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcx5
Elevation: 700 to 2,500 feet
Mean annual precipitation: 10 to 18 inches
Mean annual air temperature: 63 to 64 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monserate and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monserate

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 28 inches: sandy clay loam
H3 - 28 to 45 inches: indurated
H4 - 45 to 57 inches: cemented
H5 - 57 to 70 inches: loamy coarse sand, coarse sandy loam
H5 - 57 to 70 inches:

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 20 to 39 inches to duripan
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Minor Components

Greenfield

Percent of map unit: 3 percent
Hydric soil rating: No

Tujunga

Percent of map unit: 3 percent
Hydric soil rating: No

Ramona

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Hanford

Percent of map unit: 3 percent
Hydric soil rating: No

MmE3—Monserate sandy loam, 15 to 25 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: hcx7
Elevation: 700 to 2,500 feet
Mean annual precipitation: 10 to 18 inches
Mean annual air temperature: 63 to 64 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Monserate and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monserate

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 5 inches: sandy loam
H2 - 5 to 28 inches: sandy clay loam
H3 - 28 to 45 inches: indurated

H4 - 45 to 57 inches: cemented
H5 - 57 to 62 inches: loamy coarse sand, coarse sandy loam
H5 - 57 to 62 inches:

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Minor Components

Tujunga

Percent of map unit: 5 percent
Hydric soil rating: No

Greenfield

Percent of map unit: 5 percent
Hydric soil rating: No

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

MnE3—Monserate sandy loam, shallow, 15 to 25 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: hcx9
Elevation: 700 to 2,500 feet
Mean annual precipitation: 10 to 18 inches
Mean annual air temperature: 63 to 64 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Monserate and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monserate

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 18 inches: sandy clay loam
H3 - 18 to 45 inches: indurated
H4 - 45 to 57 inches: cemented
H5 - 57 to 70 inches: loamy coarse sand

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to duripan
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: SHALLOW LOAMY (1975) (R019XD060CA)
Hydric soil rating: No

Minor Components

Greenfield

Percent of map unit: 5 percent
Hydric soil rating: No

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

Tujunga

Percent of map unit: 5 percent
Hydric soil rating: No

RaB2—Ramona sandy loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcy5
Elevation: 250 to 3,500 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ramona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramona

Setting

Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 23 inches: fine sandy loam
H3 - 23 to 68 inches: sandy clay loam
H4 - 68 to 74 inches: gravelly sandy loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Minor Components

Arlington

Percent of map unit: 4 percent
Hydric soil rating: No

Greenfield

Percent of map unit: 4 percent
Hydric soil rating: No

Hanford

Percent of map unit: 4 percent
Hydric soil rating: No

Tujunga

Percent of map unit: 3 percent
Hydric soil rating: No

RmE3—Ramona and Buren sandy loams, 15 to 25 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: hcyj
Elevation: 250 to 3,500 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Ramona and similar soils: 45 percent
Buren and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramona

Setting

Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 8 inches: sandy loam
H2 - 8 to 17 inches: fine sandy loam
H3 - 17 to 68 inches: sandy clay loam
H4 - 68 to 74 inches: gravelly sandy loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Description of Buren

Setting

Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Alluvium

Typical profile

H1 - 0 to 12 inches: sandy loam
H2 - 12 to 28 inches: loam
H3 - 28 to 37 inches: loam
H4 - 37 to 52 inches: cemented

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 37 to 40 inches to duripan
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: LOAMY (1975) (R019XD029CA)
Hydric soil rating: No

Minor Components

Ramona

Percent of map unit: 5 percent
Hydric soil rating: No

Buren

Percent of map unit: 5 percent
Hydric soil rating: No

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

RuF—Rough broken land

Map Unit Composition

Rough broken land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rough Broken Land

Setting

Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum derived from mixed sources

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 0 to 3 inches to paralithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

TeG—Terrace escarpments

Map Unit Composition

Terrace escarpments: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Terrace Escarpments

Setting

Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from mixed sources

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Ecological site: SHALLOW LOAMY (1975) (R019XD060CA)
Hydric soil rating: No

Wg—Willows silty clay, saline-alkali

Map Unit Setting

National map unit symbol: hd08
Elevation: 0 to 1,700 feet
Mean annual precipitation: 19 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 210 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Willows and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Willows

Setting

Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed sources

Typical profile

H1 - 0 to 10 inches: silty clay
H2 - 10 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent

Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: SILTY BASIN (R019XD068CA)
Hydric soil rating: No

Minor Components

Domino

Percent of map unit: 5 percent
Hydric soil rating: No

Madera

Percent of map unit: 5 percent
Hydric soil rating: No

Chino

Percent of map unit: 5 percent
Hydric soil rating: No

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TRANSMITTAL

To: SB&O, Inc.
41689 Enterprise Circle North, Suite 126
Temecula, California 92590

Date: May 12, 2010

Project No: 602804-001

Attention: Daniel J. O'Rourke, P.E.

Transmitted:		*The Following:*		*For:*	
X	Mail/Overnight	___	Draft Report	X	Your Use
___	Courier	X	Final Report	___	As Requested
___	Pick Up	___	Extra Report		
		___	Proposal		
		___	Other		

Subject: Geotechnical Exploration, Date Street Improvements - CIP 8040, & Murrieta Hot Springs Road Widening - CIP 8079, Murrieta, California

LEIGHTON CONSULTING, INC.

By: Simon I. Saiid, GE

Copies to: (4) Addressee (plus CD)

GEOTECHNICAL EXPLORATION
DATE STREET IMPROVEMENTS - CIP 8040
& MURRIETA HOT SPRINGS ROAD WIDENING - CIP 8079
MURRIETA, CALIFORNIA

Prepared for

SB&O, INC.

41689 Enterprise Circle North, Suite 126
Temecula, California 92590

Project No. 602804-001

May 12, 2010

Leighton Consulting, Inc.

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Leighton Consulting, Inc.
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May 12, 2010
Project No. 602804-001

SB&O, Inc.
41689 Enterprise Circle North, Suite 126
Temecula, California 92590

Attention: Daniel J. O'Rourke, P.E.

Subject: Geotechnical Exploration, Date Street Improvements - CIP 8040, & Murrieta Hot Springs Road Widening - CIP 8079, Murrieta, California

In accordance with your authorization, we performed a geotechnical exploration for the subject project. This report presents our findings and provides geotechnical recommendations for the design and construction of the proposed improvements.

Based on the results of our geotechnical exploration, the proposed improvements appear feasible from a geotechnical viewpoint. The site materials generally consisted of dense silty to clayey sand and may be considered CalOSHA Type C soils. Based on our analyses, the proposed 2:1 slope for the extension of Date Street should be grossly stable under both static and dynamic conditions for the considered loads. Site soils are considered highly erosive and mitigation or erosion protection will be needed for the proposed major cut slopes.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to call our office.

Respectfully submitted,
LEIGHTON CONSULTING, INC.

Simon I. Saiid
GE 2641 (Exp. 09/30/11)
Principal Engineer

Robert F. Riha
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Senior Principal Geologist

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1.0 INTRODUCTION

1.1 Project and Site Description

The project site is located in the City of Murrieta, California, (see *Figure 1 – Site Location Map)*. The proposed Date Street Improvements (CIP 8040) generally consists of extending Date Street from Winchester Creek Avenue to Murrieta Hot Springs Road (MHSR). Approximately, the first 600 LF of this proposed extension has been previously improved and will only require minimal grading and pavement construction for the west bound lanes. The remaining portion of this extension will require major grading and deep excavations that will result in cut slopes up to approximately 60 feet in height in order to match existing grades at MHSR.

We also understand that the proposed improvements associated with MHSR (CIP 8079) include widening of MHSR from Via Princesa to Date Street. Retaining walls up to a maximum height of 15 feet are anticipated along both sides of MHSR approximately 800’ east and west of Calle Del Lago due to existing slopes and close proximity to private properties and existing improvements.

1.2 Purpose and Scope of Evaluation

As described in our proposal, the purpose and scope of our geotechnical evaluation included the following:

- ***Desktop Research:*** Review of existing geotechnical/geologic maps, reports or other related documents for the roadway alignment and widening areas.
- ***Pre-Field Preparation:*** Prior to scheduling fieldwork, Leighton Consulting, Inc. (Leighton) performed the following tasks:
  - Review available data and plans for proposed street improvements;
  - Obtained a “no fee” encroachment permit from the City of Murrieta.
  - Coordinated with Underground Surface Alert prior to field exploration.
- ***Field Exploration:*** Excavated, log and sample 9 exploratory test pits along the proposed road extension / widening and visual evaluation of existing pavement for MHSR.
- ***Laboratory Testing:*** Performed laboratory testing on representative onsite soil samples to determine maximum dry density, direct shear, grain size analysis and R-value.
- ***Geotechnical Report:*** Preparation of this geotechnical report which addresses the general geotechnical conditions of the site, and presents conclusions and recommendations with respect to the construction of the proposed street improvements.

1.3 Field Exploration

Our field exploration consisted of the excavation of 9 test pit excavations in accessible areas within the site. Prior to excavation, we located and marked test pit locations for coordination with Underground Service Alert (USA). Our field exploration was performed on April 20, 2010. Approximate locations of the test pits are shown on Figure 2.

The exploratory test pits for the extension of Date Street were excavated utilizing a rubber tired backhoe. The test pits were logged by a geologist from our firm. Logs of all test pits are included in Appendix A. During excavation, bulk and relatively undisturbed samples were obtained from the test pits for laboratory testing and evaluation. Our field evaluation for MHSR widening project (CIP 8079) included visual evaluation of existing pavement and a test pit excavation/hand auger along the existing slope north of the intersection of Calle Del Lago and MHSR.

1.4 Laboratory Testing

Laboratory tests were performed on representative samples to provide a basis for development of geotechnical design parameters. Selected samples were tested to determine the following parameters: insitu moisture and density, direct shear, maximum dry density and optimum moisture content, soluble sulfate content and expansion index. The results of our laboratory testing and summaries of the testing procedures are presented in Appendix B.

2.0 SUMMARY OF GEOTECHNICAL FINDINGS

A summary of our geotechnical/geologic findings from research of pertinent literature, site-specific field exploration, geotechnical laboratory testing and engineering analysis, is discussed in this section.

2.1 Geologic Settings

Murrieta is located within the Peninsular Ranges geomorphic province characterized by steep elongated ranges and valleys that trend northwesterly. More specifically, the subject site is located in the southwest portion of Perris Block and is located less approximately two miles east of a fault controlled, down dropped graben, known as the Elsinore Trough (Kennedy, 1977). The Elsinore Trough is bounded on the northeast by the Wildomar Fault and on the southwest by the Willard Fault. The Murrieta Hot Springs Fault, a roughly east-west-trending transverse splay of the Elsinore Fault Zone, is within approximately 1,000 feet north of the site. These faults are all part of the Elsinore Fault Zone, which extends from the San Gabriel River Valley southeasterly to south of the United States-Mexican border.

The Santa Ana Mountains lie along the western side of the Elsinore Fault Zone and the Perris Block is located along the eastern side of the fault zone. The Perris Block is underlain by pre-Cretaceous metasedimentary and metavolcanic rocks and Cretaceous plutonic rocks of the Southern California batholith. Tertiary sediments, volcanics and Quaternary sediments flank the mountain ranges. The Tertiary and Quaternary rocks are generally comprised of non-marine sediments consisting of sandstones, mudstones, conglomerates, and locally volcanic units. Alluviual deposits fill in the lower valley and drainage areas.

2.2 Site Geologic Units

Our field explorations, observations, and a review of the pertinent literature (References) indicate that earth materials within the site consist of several surficial units including fill soils, alluvium, and bedrock units locally known as Pauba formation and/or Wildomar Sandstone. The site specific geology is depicted on the Figure 3A (Date Street). Detailed descriptions of the earth materials encountered in each excavation are provided in Appendix B. A general description of each unit is provided below:

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- **Artificial Fill (not mapped): A**rtificial fill materials should be expected within the existing streets and generally consist of existing pavement and associated subgrade soils, retaining wall backfill and fill slopes, especially along portions of MHSR.
- **Alluvium (Qal):** Alluvial soils should be expected in localized areas along portions of MHSR where widening may require fill to meet design grades (~Sta. 62+00 to 66+00 - Southside). Also, as depicted on Figure 3A, localized alluvium ranging in depth up to 5.5 feet was encountered along the extension of Date Street (TP-5 & TP-6). Sampled alluvium from this area consisted generally of moist silty fine to coarse sand (SM) and expected to generally possess very low expansion (EI<21) due to its granular nature. Loose alluvium should generally be removed and recompacted prior to placing additional fills and/or structural improvements.
- **Pauba Formation (Qps):** Where encountered, the Pauba Formation generally consists of yellow- to red-brown, damp to moist, dense, silty sand (SM) with localized relatively clean (cohesionless) friable sand (SP) and clayey sand (SC). These materials are expected to possess low expanion potential and generally suitable for support of additional fills and/or structural improvements.
- **Sandstone and Conglomerate of Wildomar area (map symbol QTws)):** Although not encountered in our exploratory test pits, this formation consists primarily of friable, pale yellowish-green, medium grained, caliche-rich sandstone and located primarily along the alinemenet of MHSR based on published geologic maps and our in-house data.

2.3 Rippability / Excavation Characteristics

Where encountered, the onsite material (Pauba formation) was excavated without great difficulty utilizing a conventional rubber-tired backhoe. As such, rippability of the material is expected to be readily accomplished with standard heavy earthmoving equipment in good condition. Some localized cemented sandstone may be encountered, but should be limited in extent and generally rippable.

2.4 Surface and Groundwater

No surface water or groundwater was observed at the time of our field exploration. Groundwater seepage may be encountered locally or fluctuate seasonally within the proposed alignment, but is not anticipated to be a major constraint during construction of the proposed improvements. Perched water may develop in areas of soils with low permeabilities, possibly resulting in saturated fills or seepage from adjacent sites or slopes.

2.5 Faulting and Seismicity

The subject site, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity on this site is movement along the northwest-trending regional fault systems such as the San Andreas and San Jacinto. Based on our review of published geologic map (Hart, 1999, CGS, 1995), the subject site is not included within an Earthquake Fault Zone as created by the Alquist-Priolo Earthquake Fault Zoning Act.

The seismic coefficients based on the 2007 California Building Code (CBC) are calculated utilizing a software program, published by the United States Geological Survey (USGS), which follows the procedures, included in American Society of Civil Engineers (ASCE) Publication ASCE 7-05 and Chapter 16 of 2007 CBC.

Table 1. 2007 CBC Site-Specific Seismic Coefficients

CBC Categorization/Coefficient		Acceleration Value (g)
~Intersection of Date Street and Murrieta Hot Springs Road	Site Latitude (33.5540 N) Site Longitude (-117. 1460 W)	
Site Class Definition (Table 1613.5.2) – D		
Mapped Spectral Response Acceleration at 0.2s Period, S_s (Fig. 1613.5(3))		**1.6**
Mapped Spectral Response Acceleration at 1s Period, S_1 (Fig. 1613.5(4))		**0.6**
Short Period Site Coefficient at 0.2s Period, F_a (Table 1613.5.3(1))		1.0
Long Period Site Coefficient at 1s Period, F_v (Table 1613.5.3(2))		1.5
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS} (Eq. 16-37)		**1.6**
Adjusted Spectral Response Acceleration at 1s Period, S_{M1} (Eq. 16-38)		**0.9**
Design Spectral Response Acceleration at 0.2s Period, S_{DS} (Eq. 16-39)		**1.0**
Design Spectral Response Acceleration at 1s Period, S_{D1} (Eq. 16-40)		**0.6**

* g- Gravity acceleration

2.6 Secondary Seismic Hazards

Due to the nature of the site geologic conditions (dense Pauba), the potential for secondary seismic hazards that are generally associated with severe ground shaking during an earthquake such as surface ground rupture, liquefaction, lateral spreading, rock fall, and flooding are considered very low for this site.

2.7 Existing Pavement Surface Conditions

In general, the overall pavement surface along this portion of MHSR appears to be in a relatively poor to fair condition with a distinct change at approximately Station 77+00 to Winchester Road intersection. The existing asphalt concrete (AC) in this section (Sta. 77+00 to 99+00) is in a relatively good condition except for localized distressed areas within the eastbound right lane which appears to have been a most recent widening of the old MHSR. Our field observations of the pavement surface conditions from Winchester Road to Via Princessa are summarized below. Photos of the existing pavement at various locations are included in Appendix B.

MHSR (Sta. ~57+00 to 77+00):
The existing pavement surface along this section (Photos 1 through 5) is generally in a "poor to fair condition" and can be further characterized by the following:

- High-severity alligator cracking in localized areas (1/8" to 2" wide cracks).
- Small size potholes and loss of aggregates.
- Localized subgrade failure and patching.

MHSR (Sta. ~77+00 to 99+00):
The existing pavement surface (Photos 5 through 7) appears to be in a relatively "good condition" and can be further characterized by the following:

- Localized alligator cracking in eastbound right lane (1/8" to 1" wide cracks).
- Minor raveling and loss of aggregates (eastbound right lane).
- Low-severity thermal cracking

Based on the observed conditions, an AC overlay combined with minimal cold milling may be applied for the entire street section if required for structural adequacy. However, proper treatment of existing cracks and localized areas of removal and replacement may be necessary to retard reflective cracking and ensure adequate structural integrity. Methods of pavement rehabilitation for this street were beyond the scope of this study and would required additional field and laboratory testing.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 General

The proposed improvements appear feasible from a geotechnical viewpoint provided that the following recommendations are incorporated into the design and construction phases of development. The following geotechnical recommendations for design and construction are based on the limited subsurface soil conditions encountered during this evaluation. A review of the final grading and improvement plans should be made by Leighton before they are put out to bid or submitted for final approval.

3.2 Earthwork Considerations

Earthwork associated with the proposed improvements should be performed in accordance with applicable City Standards, "Standard Specifications for Public Works Construction" (Green Book, latest edition) and the recommendations included in the text of this report. The General Earthwork and Grading Specifications in Appendix D are general grading specifications provided for typical grading projects and some of the recommendations may not be strictly applicable to this project. In case of conflict, the specific recommendations contained in the text of this report supersede those included in Appendix D. Earthwork for the proposed improvements are generally associated with the extension of Date Street.

3.2.1 General: Excavation should be performed in accordance with the project plans, specifications, and all applicable OSHA requirements. The contractor should be responsible for providing the "competent person" required by OSHA standards. Contractors should be advised that sandy soils (such as onsite alluvium and Pauba) could make excavations particularly unsafe, even if all safety precautions are taken.

3.2.2 Pavement Subgrade / Date Street: The subgrade materials for the proposed extension of Date Street are expected to consist of dense formational materials (Pauba) at the proposed design grades. However, we recommend that after excavation, the upper 12 inches of subgrade be scarified, moisture conditioned, and compacted to at least 90 percent relative compaction (per ASTM 1557). Depending on actual field conditions encountered during construction, localized over-excavation may be necessary to remove unsuitable materials, especially at connection grades with MHSR.

3.2.3 MHSR Subgrade: The subgrade materials for proposed improvements along MHSR (i.e. sidewalks, medians, etc.) should require at least scarification and recompaction of the upper 12 inches and further evaluation of the geotechnical consultant during construction. Any widening areas in MHSR should require at least removal and recompaction of the upper 2 feet of existing soils or minimum of 2 feet below subgrade elevation in cut areas. Further field evaluation of the geotechnical consultant during construction should be implemented. The lateral extent of removal should be equivalent to that vertically removed.

3.2.4 Backfill: The onsite soils are generally suitable as backfill materials provided they are free of rocks over 3 inches in diameter and free of organic matter. Trench backfill should be compacted in uniform lifts by mechanical means to at least 90 percent relative compaction or as required per District standard specifications.

3.2.5 Shrinkage: Due to the proposed deep cuts for Date Streets, this project is expected to generate excess materials at the completion of grading. Based on the results of laboratory testing and our experience with similar materials, the following values are provided as guidelines:

- Topsoil, Alluvium/Colluvium: 10 to 15 percent shrinkage
- Undocumented-reusable Fill: 5 to 10 percent shrinkage
- Pauba Formation: 5 percent bulking to 5 percent shrinkage

3.3 Slope Stability

3.3.1 Analysis: Our review of the project plan indicates that cut slopes at inclinations of 2:1 (horizontal to vertical) or flatter with an approximate maximum height of 60 feet are proposed for Date Street. This slope was analyzed using a computer program called GSTABL7 with STEDwin, Version 2.0 (Gregory, 2004). The program uses the Modified Bishop and the Simplified Janbu method of slices for calculating the factor of safety against failure. Our cross-sectional model was generally analyzed based on circular type failure for the maximum anticipated height of 60 feet. The results of our analyses indicate that the proposed cut slope is considered grossly stable under both static and seismic loading. However, if surficial soils are allowed to become saturated without proper erosion control, surficial sloughing, erosion and instability should be expected. The strength parameters assumed in our analyses are based on our laboratory test results and our experience with similar units. The results of our analyses are included in Appendix C.

3.3.2 Slope Maintenance and Erosion Control: Since the onsite soils have a high susceptibility to erosion (Photo #9), vegetation selection and slope surface preparation are imperative to properly performing slopes. It is recommended that the exposed natural soils at cut slope face be at least be scarified in two directions and compacted to a minimum of 90 percent relative compaction. Immediately after, these slopes should be properly protected against erosion/drying by applying approved erosion control measures. Alternatively, replacement fill may be implemented by over-cutting into the slopes so that at least the outer 15 feet of cut slopes consist of compacted fill as depicted in Appendix D. Fill slopes are normally overbuilt and trimmed back to expose the properly compacted slope face or periodically back-rolled with increasing height of the fill slope with a weighted sheeps-foot compactor and track-walked with a tracked dozer or other equivalent proven methods. All graded slopes should then be landscaped with drought-tolerant, slope stabilizing vegetation as soon as possible to minimize the potential for erosion and slumping. Moisture in the slope face should be maintained relatively constant (i.e., prolonged drying and wetting of the slope faces should be avoided). Burrowing activity by rodents and other vermin should be controlled at all times. In addition, drainage should be directed away from the tops of slopes.

3.4 Utility Trench

Utility trenches should be backfilled with compacted fill in accordance with Sections 306-1.2 and 306-1.3 of the *Standard Specifications for Public Works Construction*, ("Greenbook"), 2009 Edition. Fill material above the pipe zone should be placed in lifts not exceeding 8 inches in uncompacted thickness and should be compacted to at least 90 percent relative compaction (ASTM D 1557) by mechanical means only. Site soils may generally be suitable as trench backfill provided these soils are screened of rocks over 1½ inches in diameter and organic matter. If imported sand is used as backfill, the upper 3 feet in building and pavement areas should be compacted to 95 percent. The upper 6 inches of backfill in all pavement areas should be compacted to at least 95 percent relative compaction.

Where granular backfill is used in utility trenches adjacent moisture sensitive subgrades and foundation soils, we recommend that a cut-off "plug" of impermeable material be placed in these trenches at the perimeter of buildings, and at pavement edges adjacent to irrigated landscaped areas. A "plug" can consist of a 5-foot long section of clayey soils with more than 35-percent passing the No. 200 sieve, or a Controlled Low Strength Material (CLSM) consisting of one sack of Portland-cement plus one sack of bentonite per cubic-yard of sand. CLSM should generally conform to Section 201-6 of the *Standard Specifications for Public Works Construction*, ("Greenbook"), 2009 Edition. This is intended to reduce the likelihood of water permeating trenches from landscaped areas, then seeping along permeable trench backfill into the building and pavement subgrades, resulting in wetting of moisture sensitive subgrade earth materials under buildings and pavements.

Excavation of utility trenches should be performed in accordance with the project plans, specifications and the *California Construction Safety Orders* (2009 Edition or more current). The contractor should be responsible for providing a "competent person" as defined in Article 6 of the *California Construction Safety Orders*. Contractors should be advised that sandy soils (such as fills generated from the onsite alluvium) could make excavations particularly unsafe if all safety precautions are not properly implemented. In addition, excavations at or near the toe of slopes and/or parallel to slopes may be highly unstable due to the increased driving force and load on the trench wall. Spoil piles from the excavation(s) and construction equipment should be kept away from the sides of the trenches. Leighton does not consult in the area of safety engineering.

3.5 Bearing Capacity and Passive Resistance

A net allowable bearing capacity of 2,500 psf, or a modulus of subgrade reaction of 150 pci may be used for design of retaining wall footings or any appurtenant structures founded into compacted fill or dense Pauba. A minimum base width of 18 inches for continuous footings and a minimum bearing area of 3 square feet (1.75 ft by 1.75 ft) for pad foundations should be used. Additionally, an increase of one-third may be applied when considering short-term live loads (e.g. seismic and wind). An net allowable passive pressure based on an equivalent fluid pressure of 250 pounds-per-cubic-foot (pcf), not to exceed 2,500 pounds per square foot (psf) can be used. A coefficient of friction between soil and concrete of 0.35 may be used with dead load forces. When combining passive pressure and frictional resistance, the total pressure should be reduced by fifty percent. Alternatively, either the base or passive resistance should be used in the design. Based on known conditions, total settlement is expected to be less than ½ inch with ¼ inch differential settlement across a lateral distance of 30 feet.

3.6 Asphalt Paving

Pavement construction associated with the proposed street improvements should conform to latest version of *Caltrans Standard Specifications* or the *Standard Specifications for Public Works Construction* (Green Book), and applicable City Standards. Our laboratory test results on representative samples of the onsite soils materials indicate R-values ranging from 26 to 49 for the anticipated pavement subgrade (see Appendix B).

Based on the design procedures outlined in the current Caltrans Highway Design Manual, and a conservative R-value of 26, the recommended flexible pavement sections are provided in Table 2 below for assumed Traffic Indices (TIs) ranging from 7.5 to 9.0.

Table 2. Preliminary Pavement Sections

Traffic Index	Asphalt Concrete (AC) Thickness (in)	Class 2 Aggregate Base (AB) Thickness (in)
7.5 to 8.0	5.0	11.5
8.5 to 9.0	5.0	14.5

Representative samples of the actual subgrade materials for R-value testing during subgrade preparation or prior to pavement construction should be performed and appropriate Traffic Index (TI) data should be selected or verified by the project civil engineer or traffic engineering consultant prior to finalizing the pavement section design. Based on our field exploration, the existing pavement for a portion of Date Street consists of 5 to 6 inches of AC over approximately 6 to 7 inches of AB.

Prior to placing aggregate base or asphalt, the subgrade soils should be evaluated and approved by the geotechnical consultant. The Aggregate Base (AB) and at least the upper 8 inches of subgrade in pavement areas should be compacted to a minimum of 95 percent relative compaction.

3.7 Soil Sulfate Evaluation

Table below summarizes current standards for concrete exposed to sulfate-containing solutions.

Table 3. Sulfate Concentration and Sulfate Exposure

Sulfate In Water (parts-per-million)	Water-Soluble Sulfate (SO_4) in soil (percentage by weight)	Sulfate Exposure
0-150	0.00 - 0.10	Negligible
150-1,500	0.10 - 0.20	Moderate (Seawater)
1,500-10,000	0.20 - 2.00	Severe
>10,000	Over 2.00	Very Severe

The results indicate that the water soluble sulfate is less than 0.2 percent by weight, which is considered moderate as per Table above.

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3.8 Retaining Walls

As indicated in Section 1.1, retaining walls up to a maximum height of 15 feet are anticipated along both sides of MHSR for any proposed future widening. Retaining walls backfilled with low-expansive soils (EI<51) should be designed using the following equivalent fluid pressures:

Table 4. Retaining Wall Design Earth Pressures (Static, Drained)

Loading Conditions	Equivalent Fluid Density (pcf)	
	Level Backfill	2:1 Backfill
Active	35	50
At-Rest	50	85
Passive*	300	150 (2:1, sloping down)

* This assumes level condition in front of the wall will remain for the duration of the project, not to exceed 3,500 psf at depth. If sloping down (2:1) grades exist in front of walls, then they should be designed using passive values reduced to ½ of level backfill passive resistance values.

Retaining wall earth pressures are a function of the amount of wall yielding horizontally under load. If the wall can yield enough to mobilize full shear strength of backfill soils, then the wall can be designed for "active" pressure. If the wall cannot yield under the applied load, the shear strength of the soil cannot be mobilized and the earth pressure will be higher. Such walls should be designed for "at rest" conditions. If a structure moves toward the soils, the resulting resistance developed by the soil is the "passive" resistance.

Total depth of retained earth for design of cantilever walls should be measured as the vertical distance below the ground surface measured at the wall face for stem design, or measured at the heel of the footing for overturning and sliding calculations. Should a sloping backfill other than a 2:1 (horizontal:vertical) be constructed above the wall (or a backfill is loaded by an adjacent surcharge load), the equivalent fluid weight values provided above should be re-evaluated on an individual case basis by us. Non-standard wall designs should also be reviewed by us prior to construction to check that the proper soil parameters have been incorporated into the wall design.

For retaining walls less-than (<) 12 feet in height, incremental seismic loads need not be considered per the 2007 CBC. However, for wall more than 12 feet in height, an incremental seismic load should be used for design. Utilizing the Mononobe-Okabe method of analysis and incorporating an estimated PGA of 0.4g based on Sds/2.5 (2007 CBC), the seismic resultant of lateral pressure for a wall with level backfill should be $14H^2$ lbs, where H is the retained height in feet. These equivalent fluid pressures (triangular pressure distribution) should be applied as inverted triangles with the maximum lateral earth pressure at the top and zero pressure at the bottom. Therefore, the resultant of this pressure, as force per horizontal-foot of wall, may be assumed to be acting at 2/3 the wall height measured up from the bottom of the wall. These pressures are in addition to the static earth pressure presented above. Higher magnitude of the seismic resultant/lateral earth pressures should be incorporated if sloped backfill is constructed.

The subgrade materials for the proposed retaining walls should consist of compacted fill or dense formational materials. In cut areas (>2feet), we recommend at the least the upper 8 inches of subgrade be scarified and compacted to at least 90 percent relative compaction (per ASTM 1557). In fill areas (or cut < 2feet), we recommend at the least the 2 feet of subgrade be removed and compacted to at least 90 percent relative compaction. Depending on actual field conditions encountered during construction, localized over-excavation may be necessary to remove unsuitable materials, especially for retaining walls greater than 10 feet in height.

All retaining walls should be provided with appropriate drainage. The outlet pipe should be sloped to drain to a suitable outlet. Typical wall drainage design is illustrated in Appendix D, *Retaining Wall Backfill and Subdrain Detail*. Wall backfill should be low expansive soils (EI ≤ 51) compacted by mechanical methods to a minimum of 90 percent relative compaction (ASTM D 1557). Clayey/expansive site soils should not be used as wall backfill. Walls should not be backfilled until wall concrete attains the 28-day compressive strength and/or as determined by the Structural Engineer that the wall is structurally capable of supporting backfill. Lightweight compaction equipment should be used, unless other wise approved by the Structural Engineer.

3.9 Additional Geotechnical Services

This report was based in part on data obtained from a limited number of observations, site visits, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many roadway alignments is such that differing soil or geologic conditions can be present within relatively small distances between test pits and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions and recommendations presented in this report are only valid if Leighton has the opportunity to observe subsurface conditions during construction, to confirm that our preliminary data are representative for the alignment. Geotechnical observation and testing should be provided by Leighton during grading construction and when any unusual conditions are encountered.

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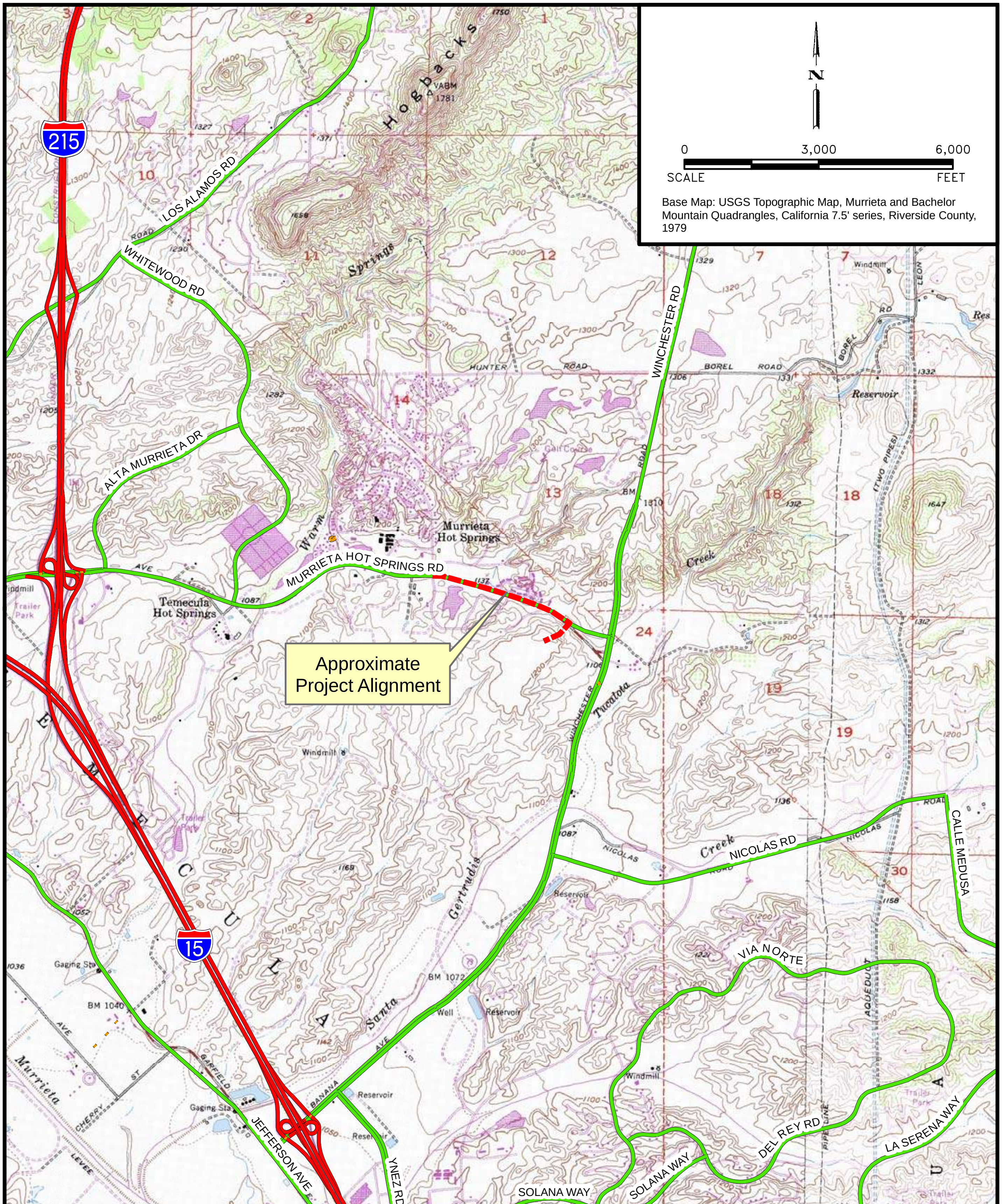

Date Street Improvement **Murrieta, California**	**SITE LOCATION MAP**	Project No. **602804-001** Date **May 2010** Figure 1

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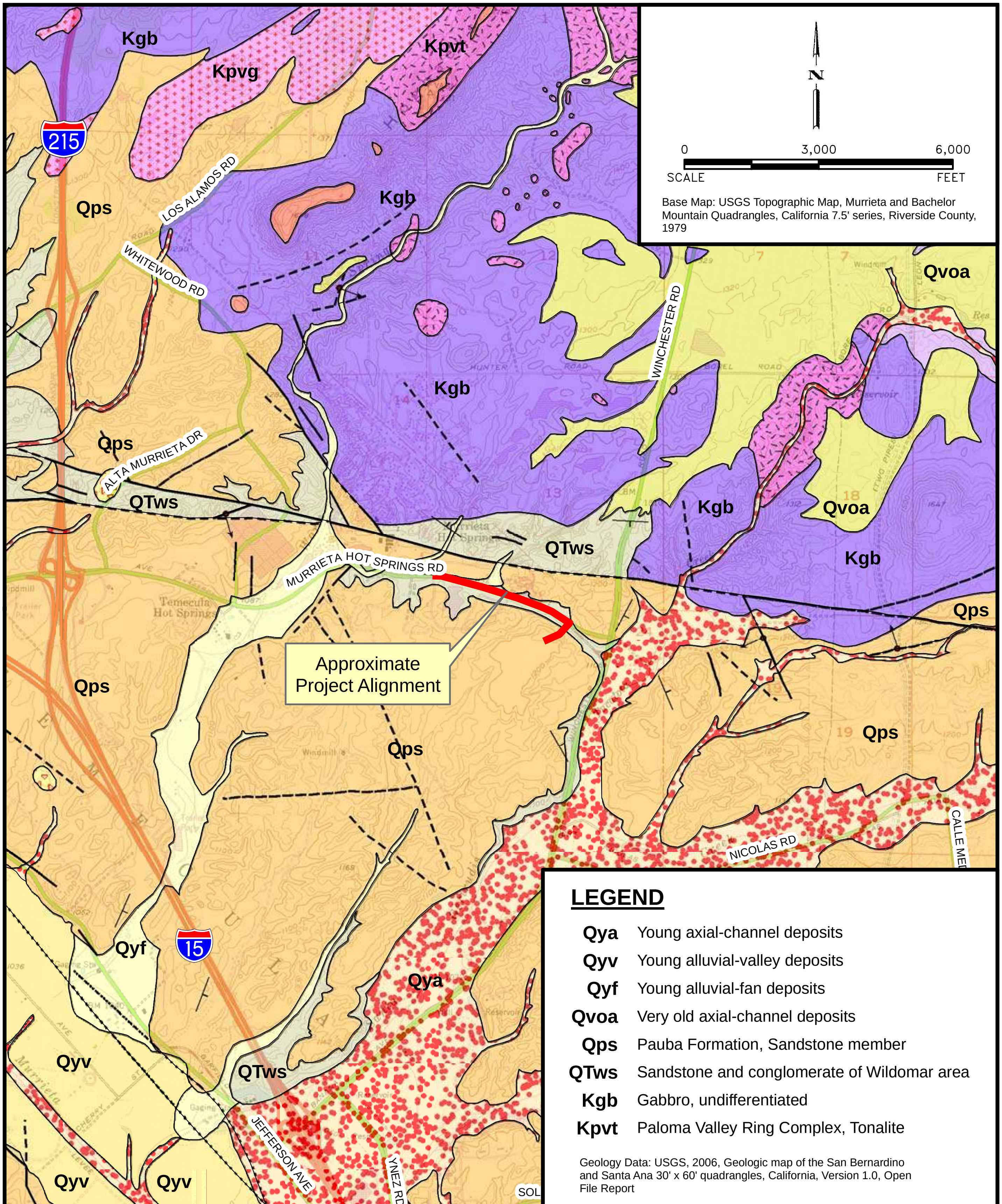
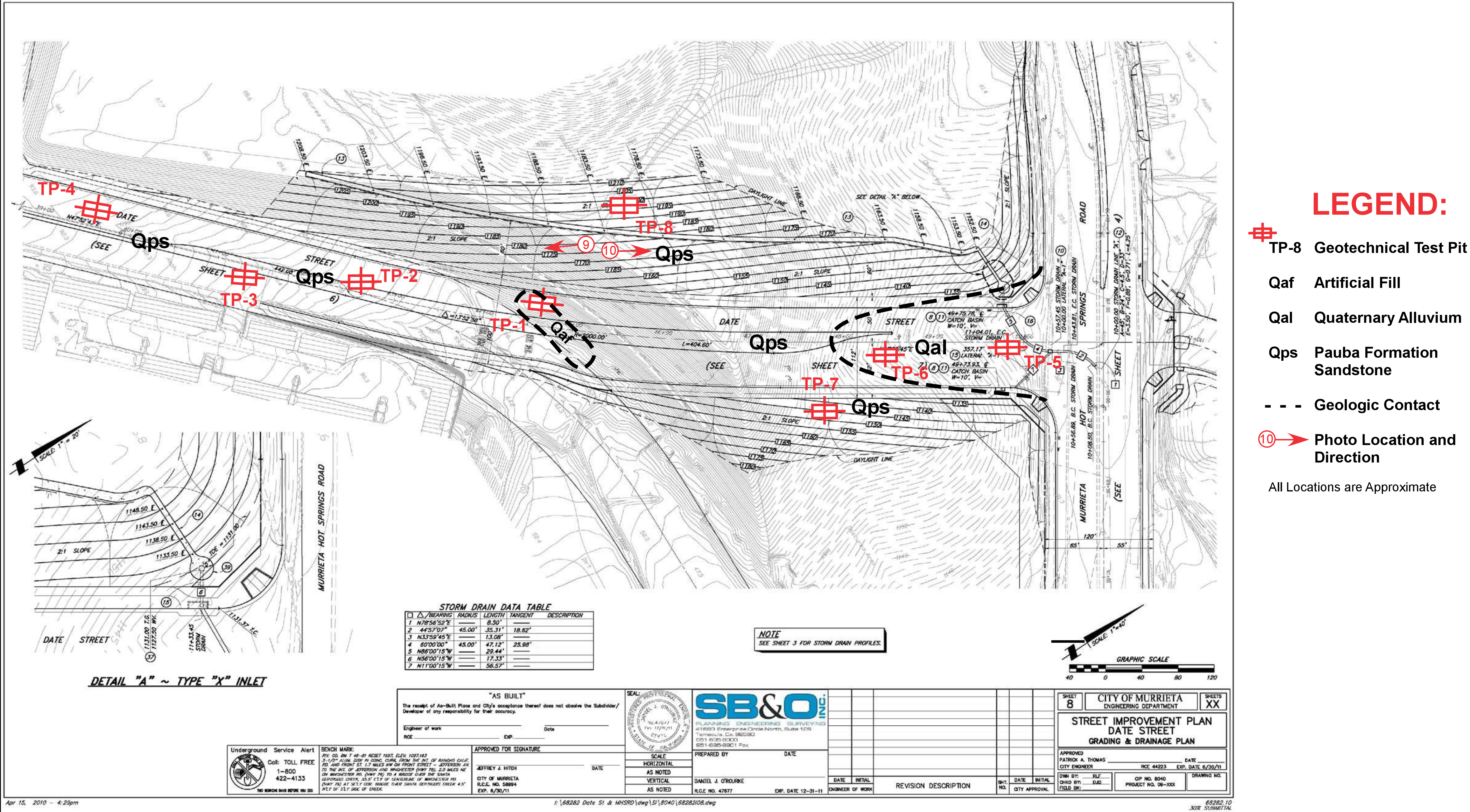


Date Street Improvement Murrieta, California	REGIONAL GEOLOGY MAP	Project No. **602804-001** Date **May 2010** Figure 2

\\geomatics\data2\Drafting\602804\001\GIS\of_2010-04-28\Figure2-GeologyMap.mxd

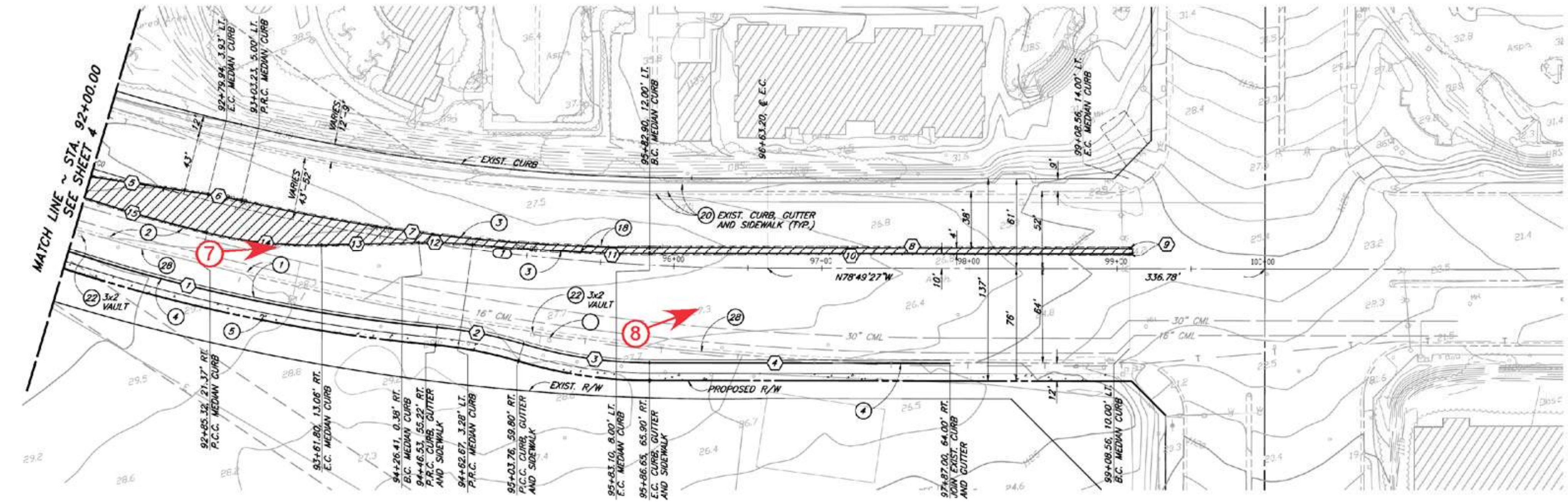


Project: 602804-001	Eng/Geol: SIS/LAB	**Test Pit Location Plan** Date Street Improvement Murrieta, California	FIGURE 3A
Scale: 1" = 100'	Date: 05/10		Leighton

Drafted by: BSS | Checked by: SIS | Base Map: SB&^O, Inc., Date St &^ MHSRD, Project No. 09-XXX, April 15, 2010, Sheet 8

CURB DATA TABLE

◯	△/BEARING	RADIUS	LENGTH	TANGENT	DESCRIPTION
1	12°41'11"	1154.35'	255.60'	128.32'	TYPE "A-6" CURB
2	11°22'19"	300.00'	59.54'	29.87'	TYPE "A-6" CURB
3	16°33'00"	300.00'	86.66'	43.63'	TYPE "A-6" CURB
4	N78°49'27"W	——	203.47'	——	TYPE "A-6" CURB
5	N70°22'01"W	——	80.57'	——	TYPE "D" CURB
6	4°25'56"	300.00'	23.21'	11.61'	TYPE "D" CURB
7	12°53'21"	1238.00'	278.50'	139.84'	TYPE "D" CURB
8	N78°49'27"W	——	325.02'	——	TYPE "D" CURB
9	180°00'00"	2.00'	6.28'	——	TYPE "D" CURB
10	N78°49'27"W	——	325.02'	——	TYPE "D" CURB
11	5°32'28"	1242.00'	120.11'	60.10'	TYPE "D" CURB
12	6°57'35"	300.00'	36.44'	18.24'	TYPE "D" CURB
13	N80°14'33"W	——	66.09'	——	TYPE "D" CURB
14	14°53'22"	300.00'	77.96'	39.20'	TYPE "D" CURB
15	4°26'14"	1116.35'	86.45'	43.25'	TYPE "D" CURB



LEGEND:

Photo Location and Direction

All Locations are Approximate

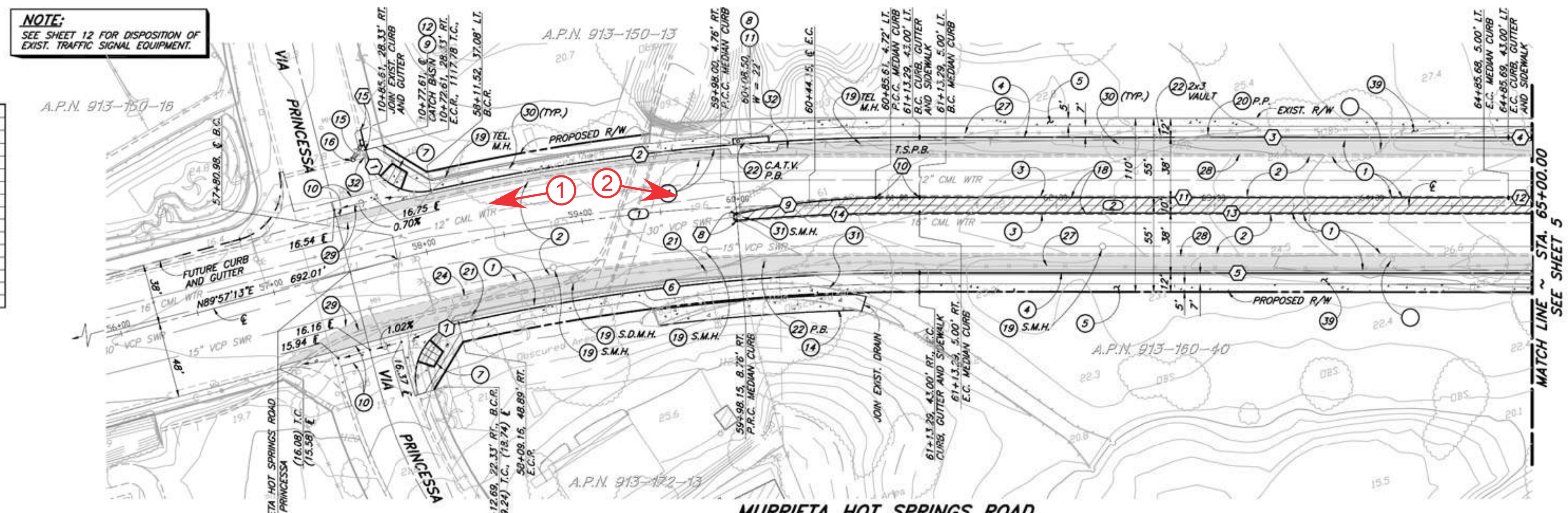
NOTE:
SEE SHEET 12 FOR DISPOSITION OF EXIST. TRAFFIC SIGNAL EQUIPMENT.

CURB DATA TABLE

◯	△/BEARING	RADIUS	LENGTH	TANGENT	DESCRIPTION
1	88°23'16"	35.00'	53.99'	34.03'	TYPE "A-6" CURB
2	12°32'06"	1420.17'	310.70'	155.97'	TYPE "A-6" CURB
3	N74°58'04"W	——	372.40'	——	TYPE "A-6" CURB
4	0°24'09"	2038.00'	14.32'	7.16'	TYPE "A-6" CURB
5	N74°58'04"W	——	386.71'	——	TYPE "A-6" CURB
6	12°34'48"	1334.17'	292.92'	147.06'	TYPE "A-6" CURB
7	95°33'33"	35.00'	58.37'	38.57'	TYPE "A-6" CURB
8	180°00'00"	2.00'	6.28'	——	TYPE "D" CURB
9	11°47'23"	428.42'	88.16'	44.23'	TYPE "D" CURB
10	1°08'51"	1382.17'	27.68'	13.84'	TYPE "D" CURB
11	N74°58'04"W	——	372.40'	——	TYPE "D" CURB
12	0°24'36"	2000.00'	14.32'	7.16'	TYPE "D" CURB
13	N74°58'04"W	——	386.71'	——	TYPE "D" CURB
14	4°47'44"	1372.17'	114.85'	57.46'	TYPE "D" CURB
15	N0°53'07"E	——	13.00'	——	TYPE "A-6" CURB

CENTERLINE DATA TABLE

⬭	△/BEARING	RADIUS	LENGTH	TANGENT
1	15°04'43"	1000.00'	263.17'	132.35'
2	N74°58'04"W	——	455.85'	——



MURRIETA HOT SPRINGS ROAD

"AS BUILT"
The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.
Engineer of work ____ Date ____
RCE ____ EXP. ____

Underground Service Alert
Call: TOLL FREE 1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK:
RIV. CO. BM T 46-81 RESET 1997, ELEV. 1097.163
3-1/2" ALUM. DISK IN CONC. CURB, FROM THE INT. OF RANCHO CALIF. RD. AND FRONT ST. 1.7 MILES NW ON FRONT STREET - JEFFERSON AV. TO THE INT. OF JEFFERSON AND WINCHESTER (HWY 79), 2.0 MILES NE ON WINCHESTER RD. (HWY 79) TO A BRIDGE OVER THE SANTA GERTRUDIS CREEK, 55.5' E'LY OF CENTERLINE OF WINCHESTER RD. (HWY 79) AT SE'LY COR. BRIDGE OVER SANTA GERTRUDIS CREEK 4.5' N'LY OF S'LY SIDE OF CREEK.

APPROVED FOR SIGNATURE
JEFFREY J. HITCH ____ DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/09

SEAL: REGISTERED PROFESSIONAL ENGINEER DANIEL J. O'ROURKE No. 47677 Exp. 12/31/11 CIVIL STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
AS NOTED

SB&O INC.
PLANNING ENGINEERING SURVEYING
41880 Enterprise Circle North, Suite 125
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY ____ DATE
DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-11

DATE	INITIAL	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL
ENGINEER OF WORK				CITY APPROVAL	

SHEET 4
CITY OF MURRIETA
ENGINEERING DEPARTMENT
SHEETS XX

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
VIA PRINCESSA TO STA. 65+00.00

APPROVED
PATRICK A. THOMAS ____ DATE
CITY ENGINEER RCE 44223 EXP. DATE 6/30/11
DWN BY: KJC, RLF
CHKD BY: DLW, DJO
FIELD BK:
CIP NO. 8079
PROJECT NO. 09-XXX
DRAWING NO.

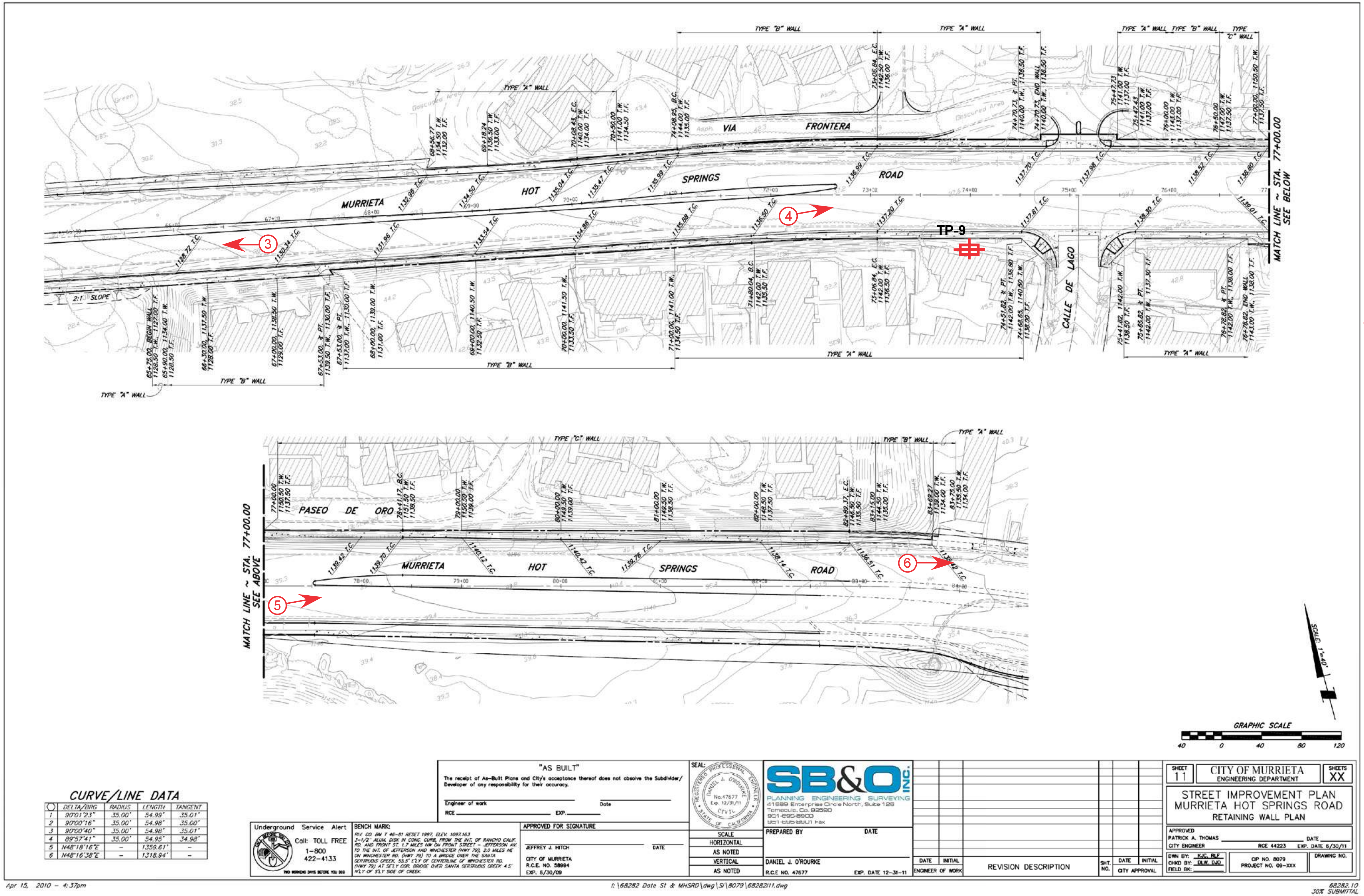
Apr 26, 2010 - 11:56am

I:\68282 Date St & MHSRD\dwg\SI\8079\68282I04.dwg

68282.10
30% SUBMITTAL

Project: 602804-001	Eng/Geol: SIS/LAB	**Test Pit Location Plan** Date Street Improvement Murrieta, California	FIGURE 3B
Scale: 1" = 100'	Date: 05/10		Leighton

Drafted by: BSS | Checked by: SIS | Base Map: SB&^O, Inc., Date St &^ MHSRD, Project No. 09-XXX, April 15, 2010, Sheet 8



LEGEND:

TP-9 **Geotechnical Test Pit**

6 **Photo Location and Direction**

All Locations are Approximate

Project: 602804-001	Eng/Geol: SIS/LAB	**Test Pit Location Plan** Date Street Improvement Murrieta, California	FIGURE 3C
Scale: 1" = 100'	Date: 05/10		Leighton

Drafted by: BSS | Checked by: SIS | Base Map: SB&^O, Inc., Date St &^ MHSRD, Project No. 09-XXX, April 15, 2010, Sheet 8

APPENDIX A

Field Exploration and Photos

GEOTECHNICAL TEST PIT LOG TP-1

Project No.	602804001	**Date Excavated**	4-20-10
Project	Date Street Extension	**Logged By**	LAB
Equipment Comp.	Cut-N-Core	**Bucket Size**	24-inch
Excavation Method	Backhoe	**Ground Elevation**	1165-1170'
Location	See Figure 2	**Sampled By**	LAB

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	0							PAUBA FORMATION (Qps).	
				B1			SM	SILTY SANDSTONE, light yellow brown, dense to medium dense, moist, predominantly fine to medium with abundant silt and trace coarse sand.	MD, SA
				R1	106.0	7			DS
							SP	SAND, very light yellow brown, very dense to hard, dry to slightly moist, coarse sand with trace silt, very friable.	
	5							Dense, moist.	
								Total Depth 4' 9", No Groundwater Encountered, Backfilled. Horizontal contacts slightly gradational.	
	10								
	15								
	20								
	25								
	30								

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL TEST PIT LOG TP-2

Project No.	602804001	**Date Excavated**	4-20-10
Project	Date Street Extension	**Logged By**	LAB
Equipment Comp.	Cut-N-Core	**Bucket Size**	24-inch
Excavation Method	Backhoe	**Ground Elevation**	1176'
Location	See Figure 2	**Sampled By**	LAB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0						SP	PAUBA FORMATION (Qps). SANDSTONE, light yellow brown, dense, moist, coarse sand, moderately friable, some roots.	
1175				B1			SC/SM	Yellow brown, dense, moist, medium to coarse sand with silt and clay - blocky.	RV
								Total Depth 3', No Groundwater Encountered, Backfilled.	
								Generally horizontal contact - not sharp, slight gradational.	
	5								
1170									
	10								
1165									
	15								
1160									
	20								
1155									
	25								
1150									
	30								

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL TEST PIT LOG TP-3

Project No.	602804001	**Date Excavated**	4-20-10
Project	Date Street Extension	**Logged By**	LAB
Equipment Comp.	Cut-N-Core	**Bucket Size**	24-inch
Excavation Method	Backhoe	**Ground Elevation**	1183'
Location	See Figure 2	**Sampled By**	LAB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							6" AC over.	
								6" Base.	
				B1			SM	PAUBA FORMATION (Qps). SANDSTONE, red brown, medium dense, moist, fine to coarse sand with abundant silt and trace clay, slightly blocky.	
1180									
								Total Depth 2' 4", No Groundwater Encountered, Backfilled.	
	5								
1175									
	10								
1170									
	15								
1165									
	20								
1160									
	25								
1155									
	30								

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL TEST PIT LOG TP-4

Project No.	602804001	**Date Excavated**	4-20-10
Project	Date Street Extension	**Logged By**	LAB
Equipment Comp.	Cut-N-Core	**Bucket Size**	24-inch
Excavation Method	Backhoe	**Ground Elevation**	1192'
Location	See Figure 2	**Sampled By**	LAB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							5" AC over.	
								7" base.	
1190				B1			SM	PAUBA FORMATION (Qps). SILTY SAND, red brown, dense, moist, fine to coarse sand with abundant silt, trace clay, blocky.	
								Total Depth 2' 8", No Groundwater Encountered, Backfilled.	
	5								
1185									
	10								
1180									
	15								
1175									
	20								
1170									
	25								
1165									
	30								

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL TEST PIT LOG TP-5

Project No.	602804001	**Date Excavated**	4-20-10
Project	Date Street Extension	**Logged By**	LAB
Equipment Comp.	Cut-N-Core	**Bucket Size**	24-inch
Excavation Method	Backhoe	**Ground Elevation**	1140'
Location	See Figure 2	**Sampled By**	LAB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
1140	0							QUATERNARY ALLUVIUM (Qal). SILTY SAND, dark brown, medium dense, moist, slightly porous, dry in the upper 1'.	
				B1			SM		CR, RV
							SM	PAUBA FORMATION (Qps). SILTY SAND, red brown, dense, moist, coarse sand.	
1135	5							Total Depth 5', No Groundwater Encountered, Backfilled.	
1130	10								
1125	15								
1120	20								
1115	25								
1110	30								

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

* * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * *

GEOTECHNICAL TEST PIT LOG TP-6

Project No.	602804001	**Date Excavated**	4-20-10
Project	Date Street Extension	**Logged By**	LAB
Equipment Comp.	Cut-N-Core	**Bucket Size**	24-inch
Excavation Method	Backhoe	**Ground Elevation**	1162'
Location	See Figure 2	**Sampled By**	LAB

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Graphic Log: N S

Elevation Feet	Depth Feet	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1162	0						QUATERNARY ALLUVIUM (Qal).	
1160						SM	SILTY SAND, dark brown, loose to medium dense, moist, dry in upper 1'.	
							Coarse sand increases.	
1157	5					SM	PAUBA FORMATION (Qps). SILTY SAND, yellow brown, dense to medium dense, damp to moist, coarse, trace clay, trace carbonate, blocky, weathered in upper 1'. @ 7': dense.	
1155								
1152	10						@11': SILTY SAND, light yellow brown, dense, damp, becomes less cemented to more coarse, slightly friable.	
1150								
1147	15					SP/SM	SAND with some silt, very light yellow gray, dense, damp, coarse, friable.	
1145							Total Depth 16', No Groundwater Encountered, Backfilled.	
1142	20							
1140								
1137	25							
1135								
	30							

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL TEST PIT LOG TP-7

Project No.	602804001	**Date Excavated**	4-20-10
Project	Date Street Extension	**Logged By**	LAB
Equipment Comp.	Cut-N-Core	**Bucket Size**	24-inch
Excavation Method	Backhoe	**Ground Elevation**	1178'
Location	See Figure 2	**Sampled By**	LAB

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0						SM	QUATERNARY COLLUVIUM (Qcol). SILTY SAND, dark brown, loose to medium dense, damp to moist.	
1175							SM	PAUBA FORMATION (Qps). SILTY SAND, light yellow brown, dense to medium dense, moist, coarse, trace roots. @3': SILTY SAND with clay, yellow brown, medium dense, moist, blocky, trace roots.	
	5							Total Depth 5', No Groundwater Encountered, Backfilled. Relatively horizontal, slightly gradational contact.	
1170									
	10								
1165									
	15								
1160									
	20								
1155									
	25								
1150									
	30								

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL TEST PIT LOG TP-8

Project No.	602804001	**Date Excavated**	4-20-10
Project	Date Street Extension	**Logged By**	LAB
Equipment Comp.	Cut-N-Core	**Bucket Size**	24-inch
Excavation Method	Backhoe	**Ground Elevation**	1214'
Location	See Figure 2	**Sampled By**	LAB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	0						SM/SC	PAUBA FORMATION (Qps). SILTY SAND with clay, red brown, dense, damp, corse, blocky, fine roots to 2', tract roots below, becomes more coarse less silty.	
1210	5								
								Total Depth 5', No Groundwater Encountered, Backfilled.	
1205	10								
1200	15								
1195	20								
1190	25								
1185	30								

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL TEST PIT LOG TP-9

Project No.	602804001	**Date Excavated**	4-9-10
Project	Date Street Extension	**Logged By**	LRM
Equipment Comp.	N/A	**Bucket Size**	N/A
Excavation Method	Hand Auger	**Ground Elevation**	~1214'
Location	MHSR - Sta ~ 74+00 (south slope)	**Sampled By**	LAB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	0						SC	ARTIFICIAL FILL (Af). Clayey SAND, brown, loose, very moist, trace roots.	
	5							Total Depth 3.5', No Groundwater Encountered, Backfilled.	
	10								
	15								
	20								
	25								
	30								

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

PHOTO NO. 1:
MHSR / Sta. ~ 59+00 (northwest)

PHOTO NO. 2:
MHSR / Sta. ~ 59+00

PHOTO NO. 3:
MHSR / Sta. ~ 67+00 (west direction)

PHOTO NO. 4:
MHSR / Sta. ~ 72+00 (east direction)

PHOTO NO. 5:
MHSR / Sta. ~ 77+00 (east direction)

PHOTO NO. 6:
MHSR / Sta. ~ 83+50 (east)

PHOTO NO. 7:
MHSR / Sta. ~ 93+00 (east)

PHOTO NO. 8
MHSR / Sta. ~ 96+00 (east)

PHOTO NO. 9:
Date Street (west)

PHOTO NO. 10
Date Street (east)

APPENDIX B

Geotechnical Laboratory Testing Results

MODIFIED PROCTOR COMPACTION TEST

Leighton

ASTM D 1557

Project Name:	DATE ST. EXTENSION	Tested By :	JRH	Date:	4/23/10
Project No.:	602804-001	Input By :	JMB	Date:	4-26-10
Location:	**TP-1**	Depth (ft.)	1-3.0		
Sample No. :	**B-1**				
Soil Identification:	SILTY SAND (SM), fine to coarse grain, pale brown.				

Preparation Method: [X] Moist [ ] Dry [ ] Mechanical Ram [X] Manual Ram

Mold Volume (ft³) 0.03328 *Ram Weight = 10 lb.; Drop = 18 in.*

Moisture Added (ml)	0	50	100	150		
TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	6237	6366	6385	6322		
Weight of Mold (g)	4320	4320	4320	4320		
Net Weight of Soil (g)	1917	2046	2065	2002		
Wet Weight of Soil + Cont. (g)	413.0	612.4	551.7	490.1		
Dry Weight of Soil + Cont. (g)	399.3	580.0	516.2	453.3		
Weight of Container (g)	118.7	118.7	118.7	118.7		
Moisture Content (%)	4.9	7.0	8.9	11.0		
Wet Density (pcf)	127.0	135.6	136.8	132.6		
Dry Density (pcf)	121.1	126.7	125.6	119.5		

Maximum Dry Density (pcf) 127.0 **Optimum Moisture Content (%)** 7.5

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

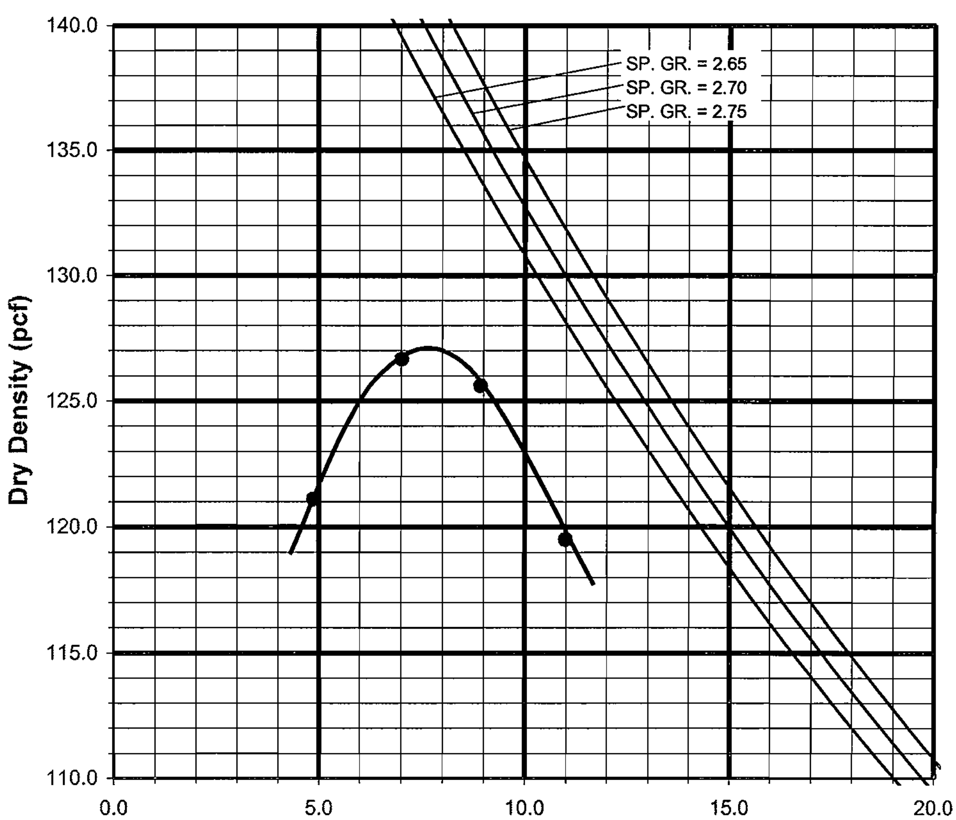
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



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PARTICLE-SIZE ANALYSIS of SOILS
ASTM D 422

Project Name:	DATE ST. EXTENSION	Tested By:	JAP	Date:	04/23/10
Project No.:	602804-001	Checked By:	JMB	Date:	04/26/10
Boring No.:	**TP-1**	Depth (ft.):	1-3.0		
Sample No.:	**B-1**				

Visual Sample Description: SILTY SAND (SM), fine to coarse grain, pale brown.

		Moisture Content of Total Air - Dry Soil	
Container No.:	RBT	Wt. of Air-Dry Soil + Cont. (gm.)	1058.2
Wt. of Air Dry Soil+Cont.(gm.)	1058.2	Wt. of Dry Soil + Cont. (gm.)	1058.2
Wt. of Container (gm.)	578.9	Wt. of Container No. RBT (gm.)	578.9
Dry Wt. of Soil (gm.)	479.3	Moisture Content (%)	0.0

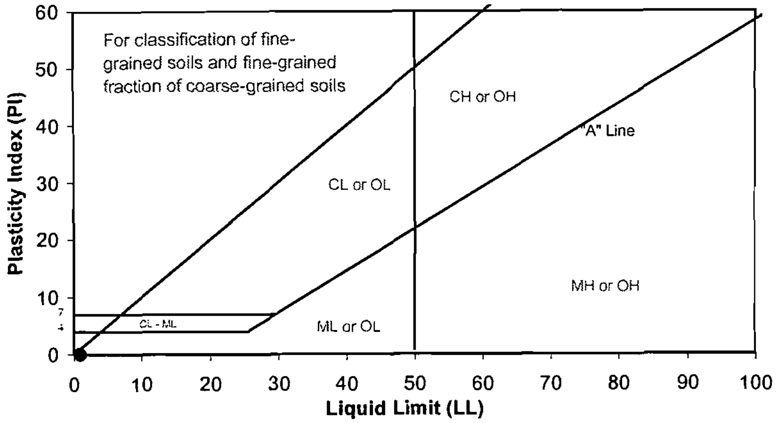
After Wet Sieve	Container No.	RBT
	Wt. of Dry Soil + Container (gm.)	880.2
	Wt. of Container (gm.)	578.9
	Dry Wt. of Soil Retained on # 200 Sieve (gm.)	301.3

U. S. Sieve Size (in.)	U. S. Sieve Size (mm.)	Cumulative Weight Dry Soil Retained (gm.)	Percent Passing %	Spec.
6"	152.400		100.0	**
3"	75.000		100.0	**
1"	25.000		100.0	**
3/4"	19.000		100.0	**
3/8"	9.500		100.0	**
#4	4.750	0.0	100.0	**
#8	2.360	10.5	97.8	**
#16	1.180	37.1	92.3	**
#30	0.600	85.9	82.1	**
#50	0.300	158.9	66.8	**
#100	0.150	238.4	50.3	**
#200	0.075	298.5	37.7	**
PAN				

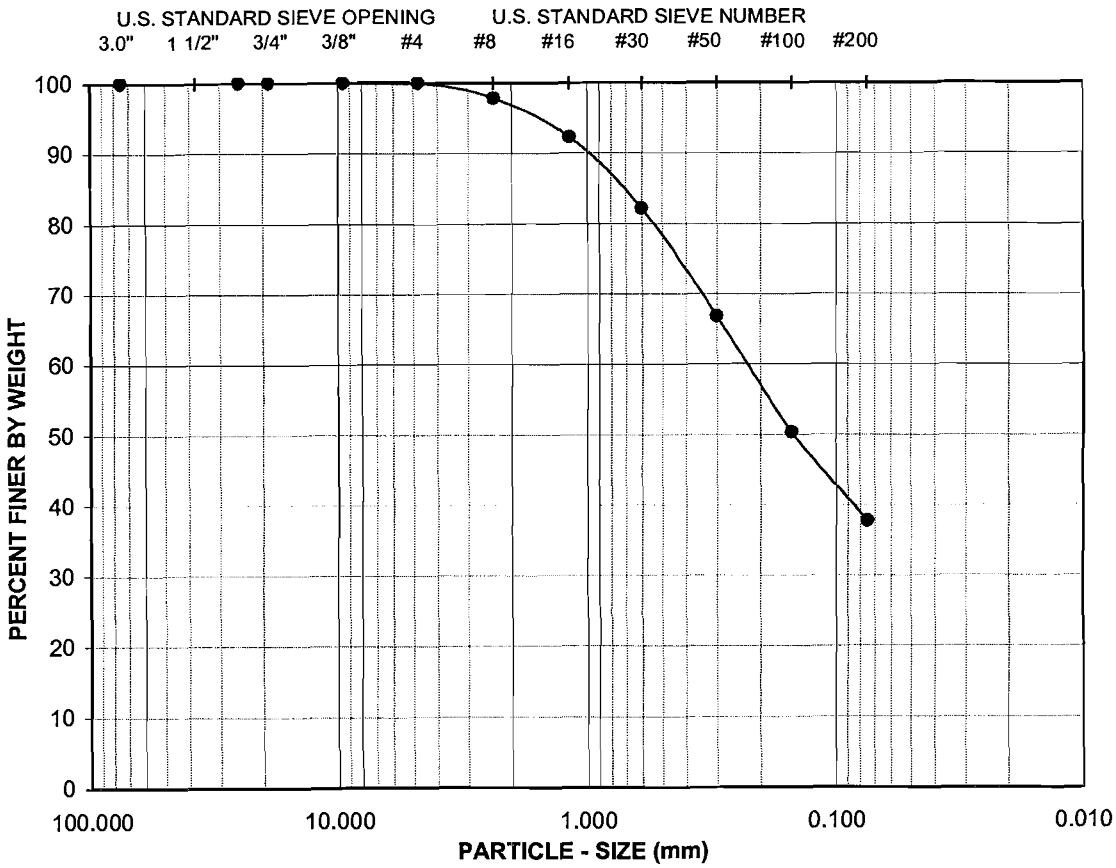
GRAVEL:	**0 %**	Liquid Limit:	**
SAND:	**62 %**	Plastic Limit	**
FINES:	**38 %**	Plasticity Index:	**
GRP. SYMBOL:	**SM**	Cu = D60/D10 =	N/A
		Cc = (D30)²/(D60*D10) =	N/A

Remarks: **

Rev. 08-04



GRAVEL		SAND			FINES
COARSE	FINE	CRSE	MEDIUM	FINE	SILT / CLAY



Boring No.:	Sample No.:	Depth (ft.):	Soil Type	GR:SA:FI	LL,PL,PI
TP-1	**B-1**	1-3.0	SM	0 : 62 : 38	** : ** : ** :

Visual Sample Description:
SILTY SAND (SM), fine to coarse grain, pale brown.

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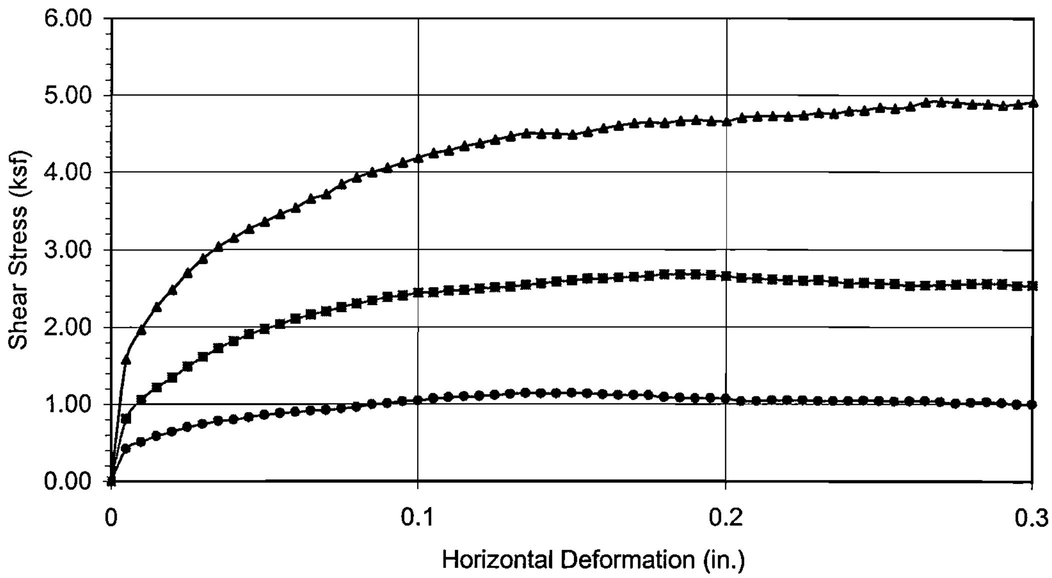
Project No.: 602804-001

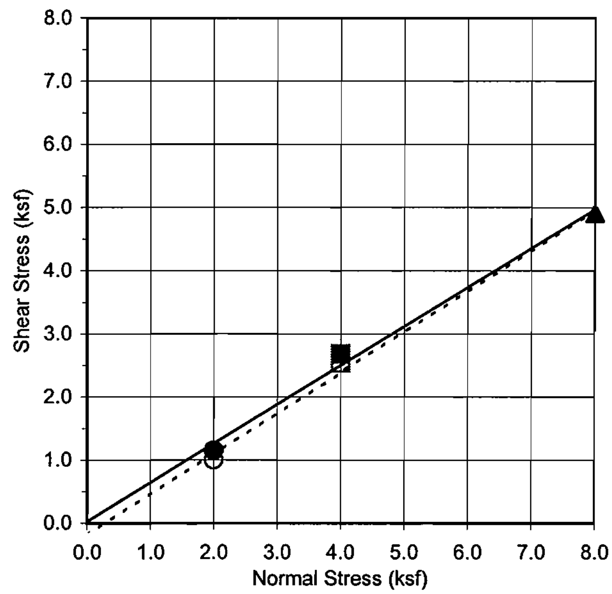
DATE ST. EXTENSION

PARTICLE - SIZE CURVE

ASTM D 422

Sieve; TP-1, B-1 Rev. 08-04





Boring No.	**TP-1**
Sample No.	**R-1**
Depth (ft)	**2.5**
Sample Type:	Drive
Soil Identification: Light olive brown sandy lean clay s(CL)	

Strength Parameters

	C (psf)	ϕ (°)
Peak	26.0	31.7
Ultimate	-191.5	32.8

Normal Stress (kip/ft²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 1.144	■ 2.678	▲ 4.914
Shear Stress @ End of Test (ksf)	○ 0.997	□ 2.537	△ 4.914
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	6.96	6.96	6.96
Dry Density (pcf)	100.0	106.1	106.4
Saturation (%)	27.4	31.9	32.2
Soil Height Before Shearing (in.)	0.9511	0.9509	0.9245
Final Moisture Content (%)	21.3	19.5	17.2

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DIRECT SHEAR TEST RESULTS

Consolidated Undrained

Project No.: 602804-001

Date Street Extension

04-10

R-VALUE TEST RESULTS

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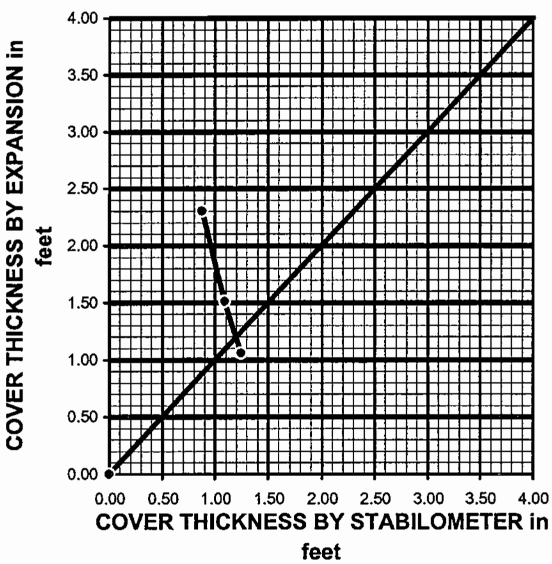
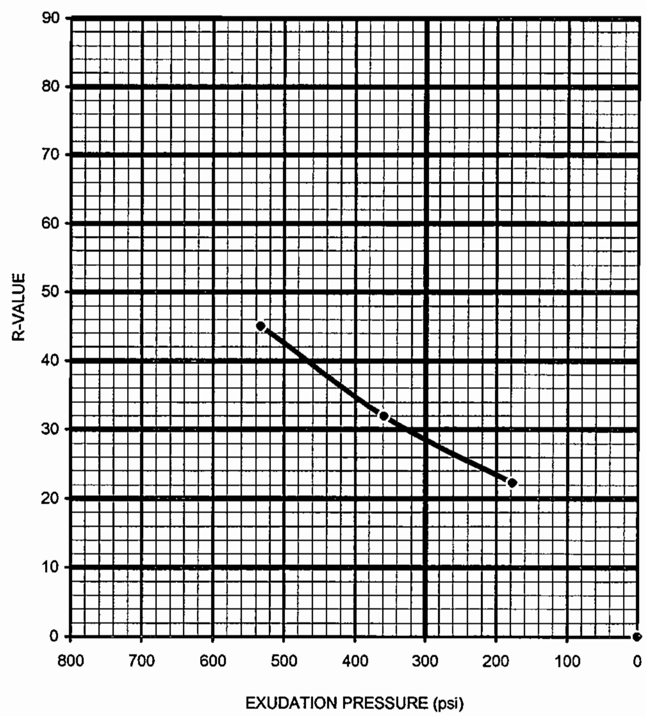
Project Name:	DATE ST. EXTENSION	Date:	4/22/10
Project Number:	602804-001	Technician:	JRH
Boring Number:	**TP-2**	Depth (ft.):	1-3.0
Sample Number:	**B-1**	Sample Location:	** —
Sample Description:	CLAYEY SAND (SC), fine to coarse grain, pale brown.		

TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	12.0	13.2	14.3
HEIGHT OF SAMPLE, Inches	2.41	2.50	2.55
DRY DENSITY, pcf	118.7	123.8	119.6
COMPACTOR AIR PRESSURE, psi	150	100	50
EXUDATION PRESSURE, psi	533	358	177
EXPANSION, Inches x 10exp-4	61	40	28
STABILITY Ph 2,000 lbs (160 psi)	70	92	108
TURNS DISPLACEMENT	3.56	3.95	4.22
R-VALUE UNCORRECTED	47	32	22
R-VALUE CORRECTED	45	32	22

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.88	1.09	1.24
EXPANSION PRESSURE THICKNESS, ft.	2.30	1.51	1.06





R-VALUE BY EXPANSION:	26
R-VALUE BY EXUDATION:	29
EQUILIBRIUM R-VALUE:	26

Rev. 08-04

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Soluble Sulfates
(Hach Sulfate Test Kit)

Project Name: DATE ST. EXTENSION
Project Number: 602804-001
Date: 4/23/10
Technician: JRH

Sample Identification		Dilution	Reading (PPM) Water Fraction	Tube Reading	% Sulfates
Boring No.:	TP-5	3 :1	3	65	0.0195
Sample No:	B-1		=	195	
Depth (ft.):	2-4.0				

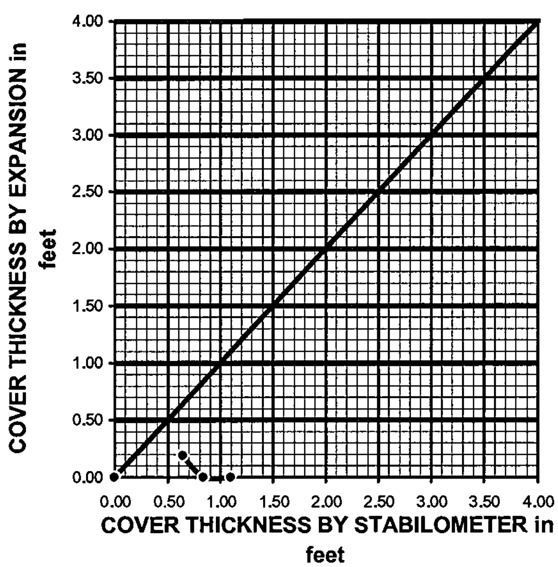
R-VALUE TEST RESULTS

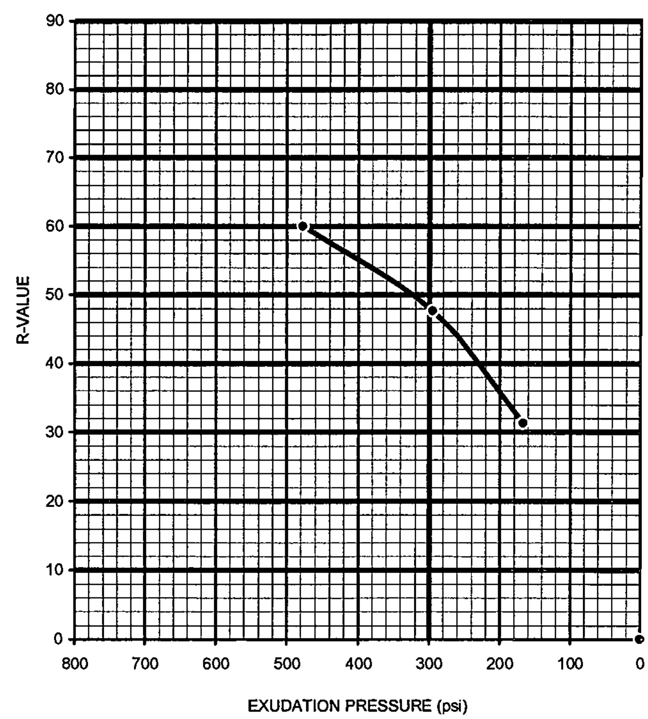
Leighton

Project Name:	DATE ST. EXTENSION	Date:	4/22/10
Project Number:	602804-001	Technician:	JRH
Boring Number:	TP-5	Depth (ft.):	2-4.0
Sample Number:	B-1	Sample Location:	** —
Sample Description:	SILTY SAND (SM), fine to coarse grain, pale brown.		

TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	9.4	10.5	11.6
HEIGHT OF SAMPLE, Inches	2.40	2.54	2.54
DRY DENSITY, pcf	127.1	125.8	124.0
COMPACTOR AIR PRESSURE, psi	125	100	50
EXUDATION PRESSURE, psi	477	294	167
EXPANSION, Inches x 10exp-4	5	0	0
STABILITY Ph 2,000 lbs (160 psi)	44	63	84
TURNS DISPLACEMENT	4.02	4.23	4.96
R-VALUE UNCORRECTED	62	48	31
R-VALUE CORRECTED	60	48	31

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.64	0.84	1.10
EXPANSION PRESSURE THICKNESS, ft.	0.19	0.00	0.00





R-VALUE BY EXPANSION:	N/A
R-VALUE BY EXUDATION:	49
EQUILIBRIUM R-VALUE:	49

APPENDIX C

Slope Stability Analysis

Date Street Extension - Murrieta Slope Stability - Seismic

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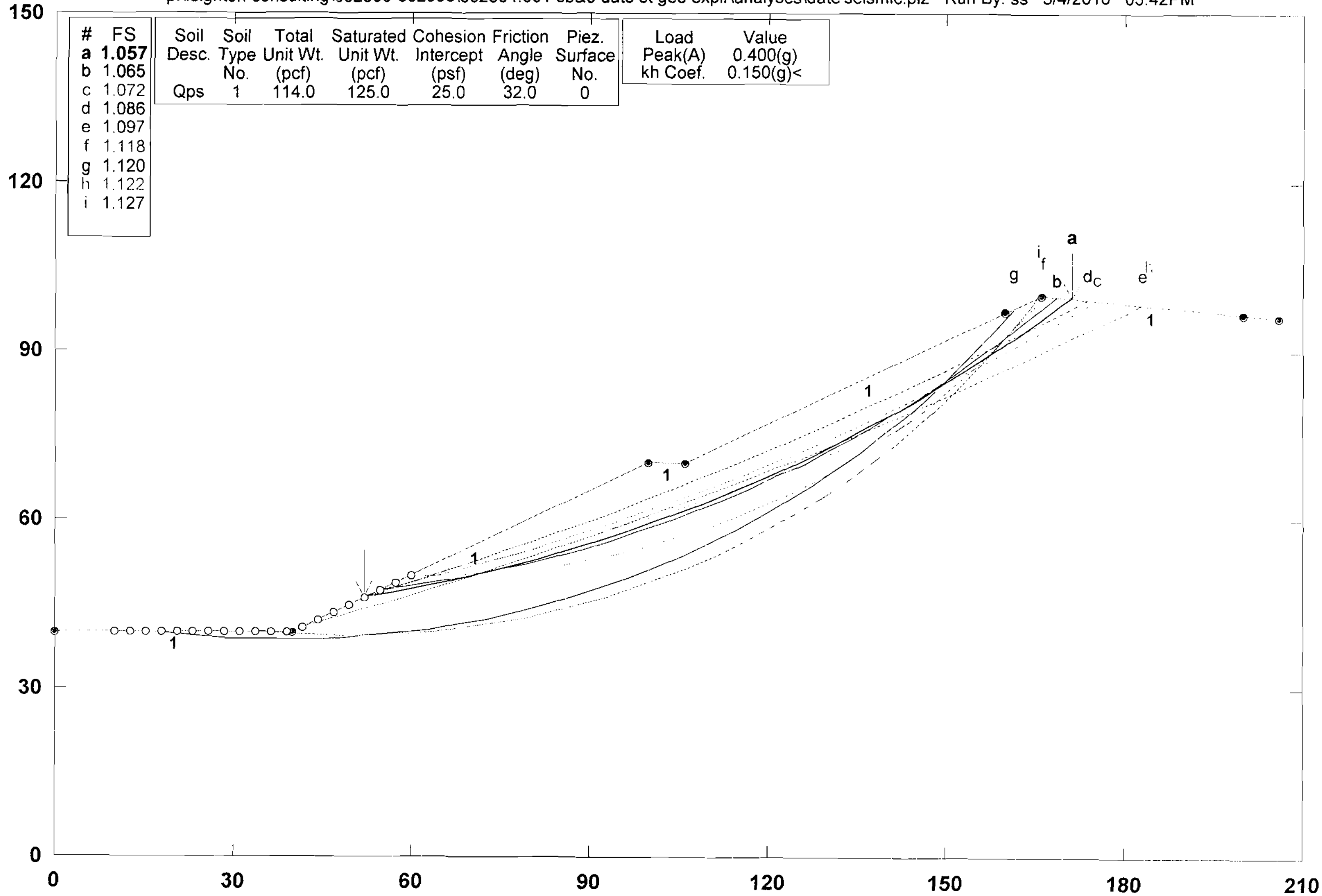

GSTABL7 v.2 FSmin=1.057

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Date Street Extension - Murrieta Slope Stability - Static

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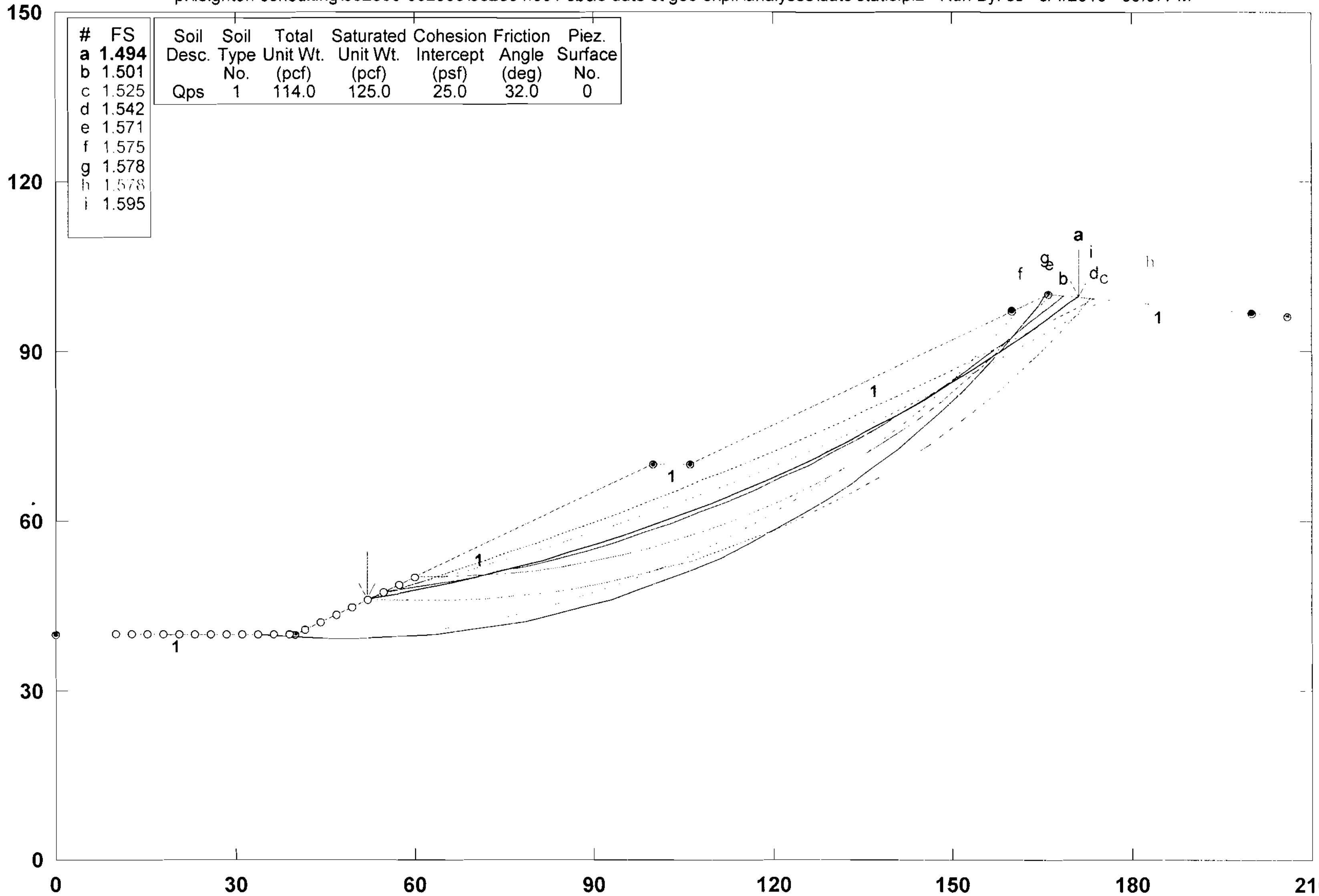

GSTABL7 v.2 FSmin=1.494
Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

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                       ***  GSTABL7  ***
             ** GSTABL7 by Garry H. Gregory, P.E. **
  ** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **
           (All Rights Reserved-Unauthorized Use Prohibited)
  *********************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
  *********************************************************************************
   Analysis Run Date:        5/4/2010
   Time of Run:              03:37PM
   Run By:                   ss
   Input Data Filename:      P:\Leighton Consulting\602500-602999\602804.001 SB&O DATE ST
GEO EXPLR\Analyses\date'static.in
   Output Filename:          P:\Leighton Consulting\602500-602999\602804.001 SB&O DATE ST
GEO EXPLR\Analyses\date'static.OUT
   Unit System:              English
   Plotted Output Filename:  P:\Leighton Consulting\602500-602999\602804.001 SB&O DATE ST
GEO EXPLR\Analyses\date'static.PLT
   PROBLEM DESCRIPTION:  Date Street Extension - Murrieta
                         Slope Stability - Static
   BOUNDARY COORDINATES
```

5 Top Boundaries
5 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	40.00	40.00	40.00	1
2	40.00	40.00	100.00	70.00	1
3	100.00	70.00	106.00	70.00	1
4	106.00	70.00	166.00	100.00	1
5	166.00	100.00	206.00	96.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	114.0	125.0	25.0	32.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
400 Trial Surfaces Have Been Generated.
20 Surface(s) Initiate(s) From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 10.00(ft)
and X = 60.00(ft)
Each Surface Terminates Between X = 160.00(ft)
and X = 200.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 10.00(ft)
5.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 400
Number of Trial Surfaces With Valid FS = 400
Statistical Data On All Valid FS Values:
FS Max = 3.109 FS Min = 1.494 FS Ave = 2.287
Standard Deviation = 0.442 Coefficient of Variation = 19.32 %
Failure Surface Specified By 28 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	52.105	46.053
2	57.023	46.955
3	61.923	47.951
4	66.803	49.039
5	71.662	50.219
6	76.498	51.490
7	81.308	52.853
8	86.092	54.306
9	90.848	55.850
10	95.574	57.483
11	100.268	59.205
12	104.929	61.016
13	109.554	62.914
14	114.143	64.899
15	118.694	66.971
16	123.204	69.129
17	127.673	71.371
18	132.099	73.698
19	136.480	76.107
20	140.815	78.599
21	145.102	81.173
22	149.339	83.827
23	153.526	86.560
24	157.660	89.373
25	161.740	92.263
26	165.765	95.229

27	169.733	98.271
28	171.244	99.476

Circle Center At X = 6.863 ; Y = 306.504 ; and Radius = 264.351

Factor of Safety

*** 1.494 ***

Individual data on the 30 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.9	436.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.9	1275.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	4.9	2051.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	4.9	2762.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	4.8	3409.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	4.8	3992.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	4.8	4510.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	4.8	4964.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	4.7	5354.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	4.4	5347.7	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.3	331.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	4.7	5254.5	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.1	1070.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	3.6	3526.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	4.6	4717.4	0.0	0.0	0.	0.	0.0	0.0	0.0
16	4.6	4810.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	4.5	4846.1	0.0	0.0	0.	0.	0.0	0.0	0.0
18	4.5	4824.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	4.4	4747.1	0.0	0.0	0.	0.	0.0	0.0	0.0
20	4.4	4616.1	0.0	0.0	0.	0.	0.0	0.0	0.0
21	4.3	4432.9	0.0	0.0	0.	0.	0.0	0.0	0.0
22	4.3	4199.5	0.0	0.0	0.	0.	0.0	0.0	0.0
23	4.2	3917.9	0.0	0.0	0.	0.	0.0	0.0	0.0
24	4.2	3590.3	0.0	0.0	0.	0.	0.0	0.0	0.0
25	4.1	3218.8	0.0	0.0	0.	0.	0.0	0.0	0.0
26	4.1	2805.8	0.0	0.0	0.	0.	0.0	0.0	0.0
27	4.0	2353.9	0.0	0.0	0.	0.	0.0	0.0	0.0
28	0.2	123.9	0.0	0.0	0.	0.	0.0	0.0	0.0
29	3.7	1265.1	0.0	0.0	0.	0.	0.0	0.0	0.0
30	1.5	116.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	54.737	47.368
2	59.688	48.066
3	64.621	48.882
4	69.533	49.815
5	74.422	50.864
6	79.284	52.030
7	84.117	53.311
8	88.918	54.706
9	93.685	56.216
10	98.415	57.838
11	103.104	59.572
12	107.751	61.418
13	112.353	63.374
14	116.907	65.438
15	121.410	67.611
16	125.860	69.890
17	130.255	72.274
18	134.592	74.762
19	138.869	77.353
20	143.082	80.045
21	147.231	82.836
22	151.312	85.725
23	155.322	88.710
24	159.261	91.790

```
   25        163.125        94.963
   26        166.913        98.227
   27        168.588        99.741
Circle Center At X =    27.886 ; Y =   255.732 ; and Radius =   210.086
       Factor of Safety
      ***    1.501   ***
Failure Surface Specified By 28 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         54.737      47.368
    2         59.578      48.618
    3         64.404      49.926
    4         69.214      51.292
    5         74.007      52.715
    6         78.783      54.195
    7         83.541      55.732
    8         88.280      57.327
    9         92.999      58.978
   10         97.699      60.685
   11        102.377      62.449
   12        107.035      64.269
   13        111.670      66.144
   14        116.282      68.074
   15        120.871      70.060
   16        125.435      72.101
   17        129.975      74.196
   18        134.489      76.345
   19        138.978      78.549
   20        143.439      80.806
   21        147.874      83.116
   22        152.280      85.479
   23        156.658      87.895
   24        161.006      90.363
   25        165.325      92.883
   26        169.613      95.454
   27        173.869      98.077
   28        175.420      99.058
Circle Center At X =   -47.069 ; Y =   451.788 ; and Radius =   417.037
       Factor of Safety
      ***    1.525   ***
Failure Surface Specified By 28 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         52.105      46.053
    2         56.852      47.624
    3         61.587      49.229
    4         66.311      50.868
    5         71.023      52.541
    6         75.723      54.248
    7         80.410      55.988
    8         85.085      57.761
    9         89.747      59.569
   10         94.396      61.409
   11         99.031      63.283
   12        103.653      65.190
   13        108.262      67.130
   14        112.856      69.103
   15        117.436      71.109
   16        122.001      73.148
   17        126.552      75.219
   18        131.088      77.323
   19        135.608      79.460
   20        140.114      81.628
   21        144.603      83.829
   22        149.077      86.062
   23        153.534      88.327
   24        157.976      90.624
```

25	162.400	92.953
26	166.808	95.313
27	171.199	97.705
28	173.912	99.209

Circle Center At X = -164.618 ; Y = 708.811 ; and Radius = 697.293

Factor of Safety

*** 1.542 ***

Failure Surface Specified By 26 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	60.000	50.000
2	65.000	49.974
3	69.997	50.138
4	74.985	50.492
5	79.955	51.035
6	84.901	51.766
7	89.816	52.684
8	94.693	53.788
9	99.524	55.076
10	104.303	56.547
11	109.023	58.198
12	113.676	60.027
13	118.257	62.031
14	122.758	64.207
15	127.174	66.553
16	131.497	69.065
17	135.722	71.739
18	139.842	74.571
19	143.852	77.558
20	147.746	80.695
21	151.518	83.977
22	155.162	87.400
23	158.674	90.959
24	162.048	94.649
25	165.280	98.464
26	166.449	99.955

Circle Center At X = 63.198 ; Y = 181.579 ; and Radius = 131.618

Factor of Safety

*** 1.571 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.895	40.000
2	22.861	39.421
3	27.843	39.000
4	32.837	38.738
5	37.835	38.635
6	42.835	38.691
7	47.831	38.905
8	52.817	39.278
9	57.788	39.809
10	62.741	40.499
11	67.668	41.345
12	72.567	42.347
13	77.431	43.504
14	82.256	44.816
15	87.037	46.280
16	91.769	47.895
17	96.447	49.660
18	101.067	51.573
19	105.623	53.632
20	110.112	55.834
21	114.529	58.178
22	118.869	60.661
23	123.127	63.280
24	127.301	66.034
25	131.384	68.919

26	135.374	71.932
27	139.267	75.071
28	143.057	78.332
29	146.742	81.711
30	150.318	85.206
31	153.781	88.813
32	157.127	92.528
33	160.354	96.347
34	161.442	97.721

Circle Center At X = 38.595 ; Y = 195.874 ; and Radius = 157.242
Factor of Safety
*** 1.575 ***
Failure Surface Specified By 32 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	33.684	40.000
2	38.665	39.557
3	43.657	39.288
4	48.656	39.195
5	53.656	39.276
6	58.649	39.532
7	63.631	39.962
8	68.594	40.567
9	73.533	41.344
10	78.442	42.294
11	83.315	43.415
12	88.145	44.706
13	92.928	46.164
14	97.656	47.790
15	102.325	49.579
16	106.928	51.531
17	111.461	53.642
18	115.916	55.911
19	120.290	58.334
20	124.576	60.909
21	128.770	63.632
22	132.865	66.500
23	136.858	69.510
24	140.743	72.657
25	144.516	75.938
26	148.172	79.349
27	151.706	82.886
28	155.114	86.545
29	158.392	90.320
30	161.537	94.208
31	164.543	98.203
32	165.691	99.846

Circle Center At X = 48.849 ; Y = 182.062 ; and Radius = 142.869
Factor of Safety
*** 1.578 ***
Failure Surface Specified By 32 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	41.579	40.789
2	46.373	42.211
3	51.157	43.665
4	55.931	45.150
5	60.695	46.666
6	65.450	48.215
7	70.194	49.794
8	74.927	51.405
9	79.650	53.047
10	84.362	54.720
11	89.062	56.424
12	93.751	58.160
13	98.429	59.926
14	103.095	61.723

15	107.749	63.551
16	112.390	65.410
17	117.020	67.299
18	121.636	69.219
19	126.240	71.170
20	130.831	73.150
21	135.409	75.161
22	139.973	77.203
23	144.524	79.274
24	149.061	81.376
25	153.584	83.507
26	158.093	85.668
27	162.587	87.859
28	167.067	90.080
29	171.532	92.330
30	175.982	94.610
31	180.417	96.919
32	183.023	98.298

Circle Center At X = -170.994 ; Y = 766.319 ; and Radius = 756.030

Factor of Safety

*** 1.578 ***

Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	52.105	46.053
2	57.099	45.805
3	62.099	45.732
4	67.098	45.833
5	72.090	46.109
6	77.070	46.560
7	82.030	47.184
8	86.967	47.981
9	91.872	48.950
10	96.740	50.090
11	101.566	51.400
12	106.342	52.877
13	111.065	54.520
14	115.727	56.327
15	120.323	58.296
16	124.847	60.424
17	129.294	62.709
18	133.659	65.148
19	137.936	67.738
20	142.120	70.476
21	146.205	73.359
22	150.188	76.382
23	154.062	79.543
24	157.823	82.837
25	161.467	86.260
26	164.990	89.809
27	168.386	93.479
28	171.652	97.265
29	173.265	99.273

Circle Center At X = 61.692 ; Y = 188.811 ; and Radius = 143.080

Factor of Safety

*** 1.595 ***

Failure Surface Specified By 36 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.158	40.000
2	28.121	39.393
3	33.100	38.931
4	38.090	38.615
5	43.087	38.444
6	48.087	38.419
7	53.085	38.539
8	58.078	38.806

9	63.061	39.218
10	68.030	39.775
11	72.980	40.476
12	77.908	41.322
13	82.809	42.311
14	87.680	43.443
15	92.515	44.716
16	97.311	46.130
17	102.064	47.682
18	106.769	49.373
19	111.423	51.201
20	116.022	53.163
21	120.562	55.258
22	125.038	57.485
23	129.448	59.842
24	133.787	62.326
25	138.052	64.936
26	142.239	67.669
27	146.345	70.523
28	150.365	73.495
29	154.298	76.584
30	158.138	79.785
31	161.883	83.098
32	165.531	86.518
33	169.077	90.043
34	172.518	93.670
35	175.853	97.396
36	177.112	98.889

Circle Center At X = 46.456 ; Y = 209.780 ; and Radius = 171.371

Factor of Safety

*** 1.603 ***

**** END OF GSTABL7 OUTPUT ****

APPENDIX D

General Earthwork and Grading Specifications

APPENDIX D

EARTHWORK AND GRADING SPECIFICATIONS

TABLE OF CONTENTS

STANDARD DETAIL

D-1.0 GENERAL

D-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

D-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

D-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish earthwork and grading in accordance with the applicable grading codes and agency ordinances, these Guide Specifications, and recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of Leighton Consulting, Inc., unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, Leighton Consulting, Inc. shall reject the work and may recommend to the owner that earthwork and grading be stopped until unsatisfactory condition(s) are rectified.

D-2.0 PREPARATION OF AREAS TO BE FILLED

D-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc.. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974-00). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

D-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be overexcavated as specified in the following Section D-2.3. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

D-2.3 Overexcavation

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

D-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc.. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc.. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

D-2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by Leighton Consulting, Inc. as suitable to receive fill. The Contractor shall obtain a written acceptance (*Daily Field Report*) from Leighton Consulting, Inc. prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

D-3.0 FILL MATERIAL

D-3.1 Fill Quality

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by Leighton Consulting, Inc. prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to Leighton Consulting, Inc. or mixed with other soils to achieve satisfactory fill material.

D-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and placement methods are specifically accepted by Leighton Consulting, Inc.. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

D-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section D-3.1, and be free of hazardous materials ("contaminants") and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than (≤) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

D-4.0 FILL PLACEMENT AND COMPACTION

D-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section D-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

D-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557.

D-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density as determined by ASTM Test Method D 1557. For fills thicker than 15 feet (4.5 m), the portion of the fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

D-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc.. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557 laboratory maximum density.

D-4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by Leighton Consulting, Inc.. Location and frequency of tests shall be at our field representative(s) discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

D-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

D-5.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by Leighton Consulting, Inc. during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by Leighton Consulting, Inc. based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by Leighton Consulting, Inc. prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by Leighton Consulting, Inc..

D-6.0 TRENCH BACKFILLS

D-6.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, 2003 Edition or more current.

D-6.2 Bedding and Backfill

All bedding and backfill of utility trenches shall be performed in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of relative compaction (ASTM D 1557) from 1 foot (0.3 m) above the top of the conduit to the surface. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc..

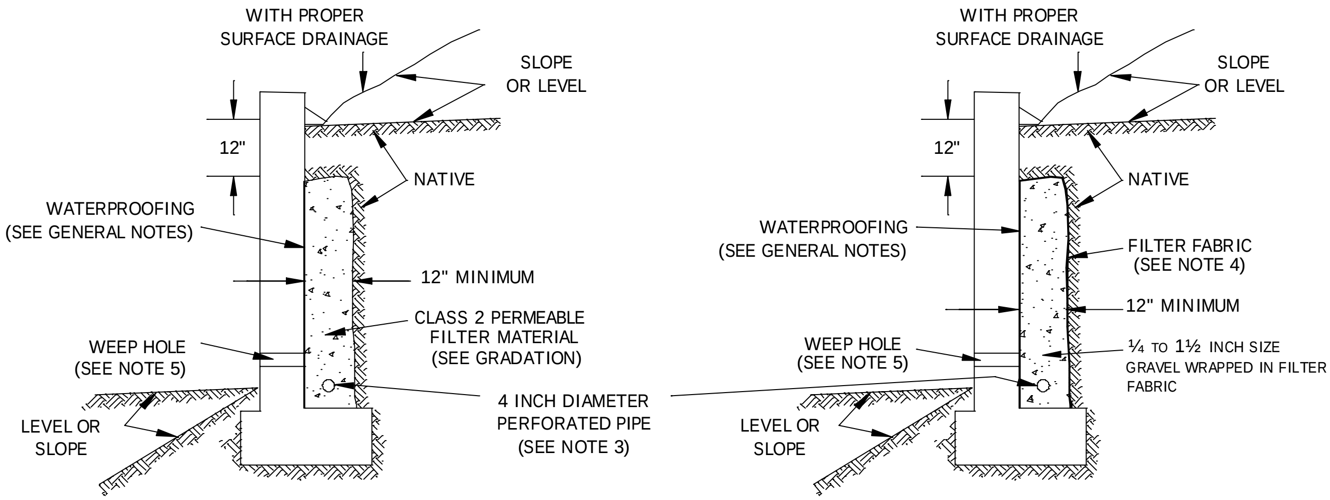
D-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.

SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

OPTION 1: PIPE SURROUNDED WITH CLASS 2 PERMEABLE MATERIAL

OPTION 2: GRAVEL WRAPPED IN FILTER FABRIC



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

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

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
* Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
* Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

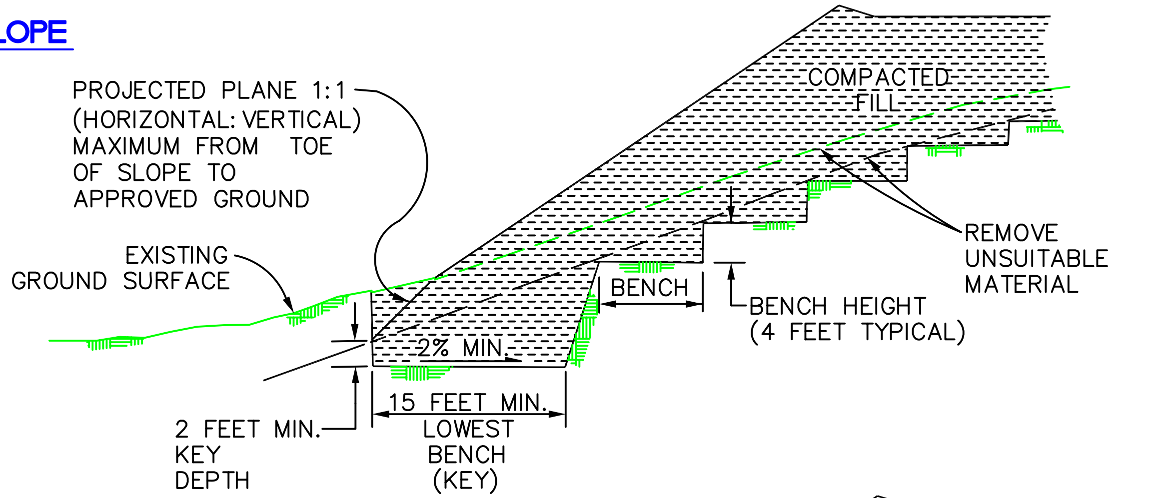
Notes:

1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

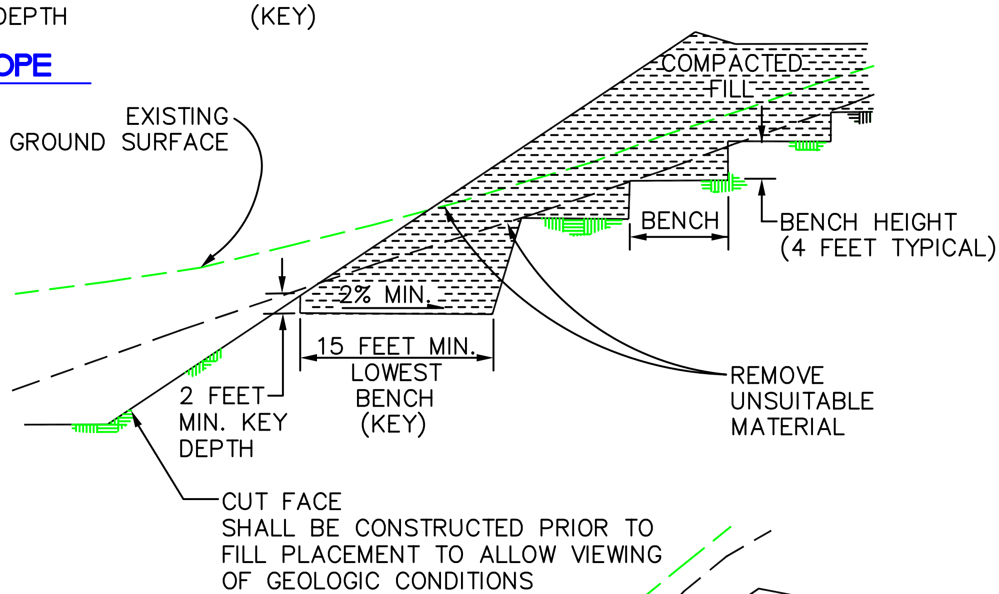
RETAINING WALL BACKFILL AND SUBDRAIN DETAIL FOR WALLS 6 FEET OR LESS IN HEIGHT

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

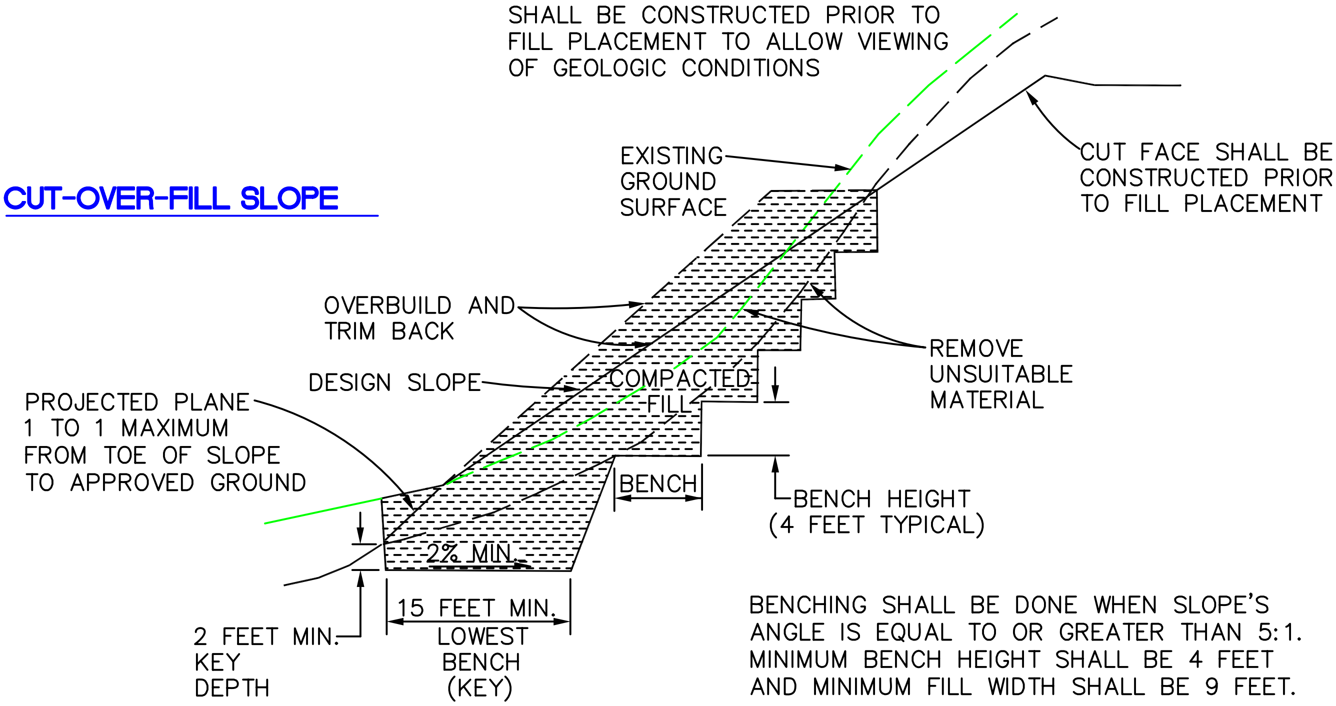
FILL SLOPE



FILL-OVER-CUT SLOPE

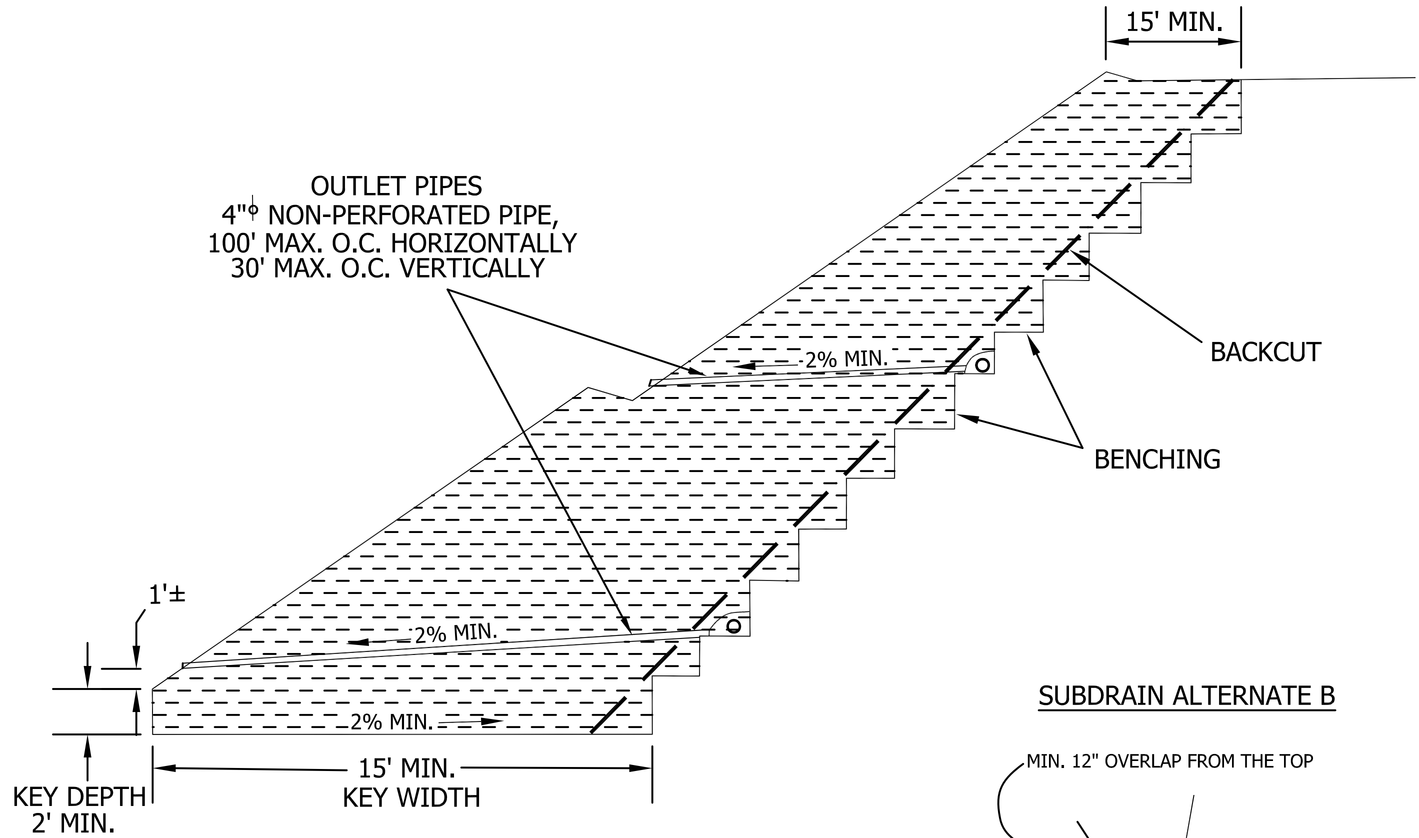


CUT-OVER-FILL SLOPE

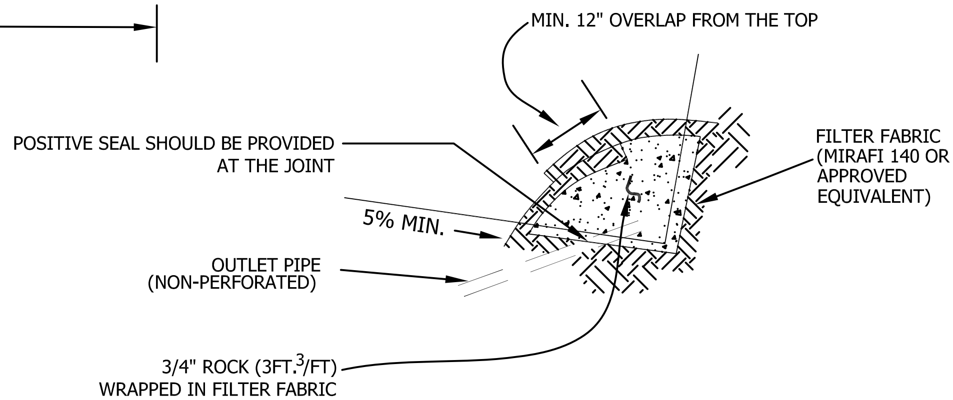


BENCHING SHALL BE DONE WHEN SLOPE'S ANGLE IS EQUAL TO OR GREATER THAN 5:1. MINIMUM BENCH HEIGHT SHALL BE 4 FEET AND MINIMUM FILL WIDTH SHALL BE 9 FEET.

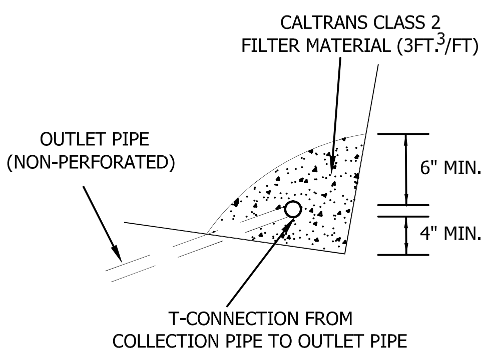
KEYING AND BENCHING	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS A	Leighton



SUBDRAIN ALTERNATE B



SUBDRAIN ALTERNATE A



- SUBDRAIN INSTALLATION - Subdrain collector pipe shall be installed with perforations down or, unless otherwise designated by the geotechnical consultant. Outlet pipes shall be non-perforated pipe. The subdrain pipe shall have at least 8 perforations uniformly spaced per foot. Perforation shall be 1/4" to 1/2" if drilled holes are used. All subdrain pipes shall have a gradient at least 2% towards the outlet.
- SUBDRAIN PIPE - Subdrain pipe shall be ASTM D2751, ASTM D1527 (Schedule 40) or SDR 23.5 ABS pipe or ASTM D3034 (Schedule 40) or SDR 23.5 PVC pipe.
- All outlet pipe shall be placed in a trench and, after fill is placed above it, rodded to verify integrity.

BUTTRESS OR REPLACEMENT FILL SUBDRAINS	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS D	Leighton

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APPENDIX E

ASFE Important Information About Your Geotechnical Report

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

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IIGER08041.0MRP

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

October 18, 2019

Project No. 12453.001

SB&O, Inc.
41689 Enterprise Circle N., Suite 126
Temecula CA 92590

Attention: Mr. Daniel O'Rourke, P.E., Vice President

Subject: Results of Field Infiltration/Percolation Testing WQMP Curb-Adjacent BMPs Murrieta Hots Springs Road Widening, Murrieta, California

References: Design Handbook for Low Impact Development Best Management Practices, (LIDBMP) Riverside County Flood Control and Water Conservation District (District), dated June 2018.

SB&O, 2018, Proposed Water Quality Site Map, Murrieta Hot Springs Road, Murrieta California, 4 Sheets, Dated May 22nd, 2018.

SB&O, 2019, Street Improvement Plan, Murrieta Hot Springs Road, Murrieta California, Sheet 4 of 7 Sheets, Dated May 13th, 2019.

In accordance with your request, we are pleased to present herewith the results of our preliminary field infiltration testing performed for the subject project. As indicated in our proposal, this testing was preformed to provide general infiltration/percolation characteristics of onsite soils at the proposed basin locations.

INTRODUCTION AND SCOPE OF WORK

Based on our discussion with Mr. Brad Knepp (SB&O) and review of site plans, we performed infiltration testing at each of the seven specified locations along Murrieta Hot Springs Road (MHSR). More specifically, services provided are as follows:

- Excavating, sampling and logging of 2 deep exploratory borings (B-1 and B-2) within the general basin areas and 8 percolation test holes.
- Field percolation tests (P-1 through P-8) at 7 locations, approximately 5 feet below the existing grade to represent planned maximum basin water elevations. The field-testing was performed in October.
- Laboratory testing to determine grain size distribution of site soils. The lab results are presented on the boring logs (Appendix A).
- Compilation of this report that presents the results of our field percolation/infiltration testing.

SITE DESCRIPTION

The proposed Murrieta Hot Springs Road improvement project is located west of Winchester Road (SR79) in the City of Murrieta, California (See Figure 1). The site/test locations are within existing MHSR shoulders (see Figures 2, 3 and 4). The basin areas are to occupy both north and south sides of the existing roadway and are boarded by curb and gutter along the existing road margins.

FIELD EXPLORATION

Our field exploration consisted of excavating two exploratory borings and eight (8) percolation test holes. Due to access limitations and existing utility conflicts, the borings were excavated with hand auger equipment. The exploratory borings were logged and sampled to depths of approximately 15 feet below existing surface (BGS) and percolation test holes were excavated with an 8-inch diameter auger to a depth of 5 feet BGS. Representative samples were collected for further laboratory classification. A technical staff from our office logged and observed all excavations. The locations of the exploratory borings and percolation test holes are shown on Figures 2 through 4. One of the two proposed test holes located southeast of the intersection of Via Princesa and MHSR was unsuccessful after multiple attempts in this area (P-X on figure 3) due to encountered excavation refusal on a concrete structure at a depth of approximately 20 inches BGS. The logs of the exploratory borings are included in Appendix A.

SOILS AND GROUNDWATER CONDITIONS

Based on the results of this field exploration and review of our previous geotechnical investigation reports for this area, the proposed basins are underlain by Pauba Formation, and/or artificial fill soils. Based on this exploration, published groundwater data, and previous investigations, groundwater does not exist within a depth of 10 feet below bottom of the proposed basins.

TEST RESULTS

The tests were performed in general accordance with the procedures of the Riverside County Flood Control and Water Conservation District Design Handbook (referenced above). Results reported below are the most conservative readings in inch per hour. The infiltration rates were estimated using the “Porchet Method”. No factor of safety is applied to these rates. Field test data are included in Appendix A and the test results are summarized below:

Summary of Infiltration Test Results

Test Hole #	Depth BGS (ft)	Infiltration Rate (in/hr)	Soil Description
P-1	5.0/3.3	0.01	Silty Clayey SAND (SM-SC)
P-2	5.0	0.23	Silty SAND (SM)
P-3	5.0	0.05	Clayey SAND (SC)
P-4	5.0	0.15	Silty SAND (SM)
P-5	5.0	0.06	Silty Clayey SAND (SM-SC)
P-6	5.0	0.36	Silty SAND (SM)
P-7	5.0	0.23	Silty SAND (SM)
P-8	5.0	0.06	Silty Clayey SAND (SM-SC)

LIMITATIONS

This report was based in part on data obtained from a limited number of observations, site visits, samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time.

This report was prepared for the sole use of Client and their design team, for application to design of the proposed development, in accordance with generally accepted geotechnical engineering practices at this time in California. Any unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton Consulting, Inc. from and against any liability, which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton Consulting, Inc.

If you have any questions regarding this report, please do not hesitate to contact the undersigned. We appreciate this opportunity to be of service on this project.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

PROFESSIONAL GEOLOGIST MITCHEL S. BORNYASZ No. 2416 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

PROFESSIONAL ENGINEER SIMON I SAIID 2641 GEOTECHNICAL STATE OF CALIFORNIA

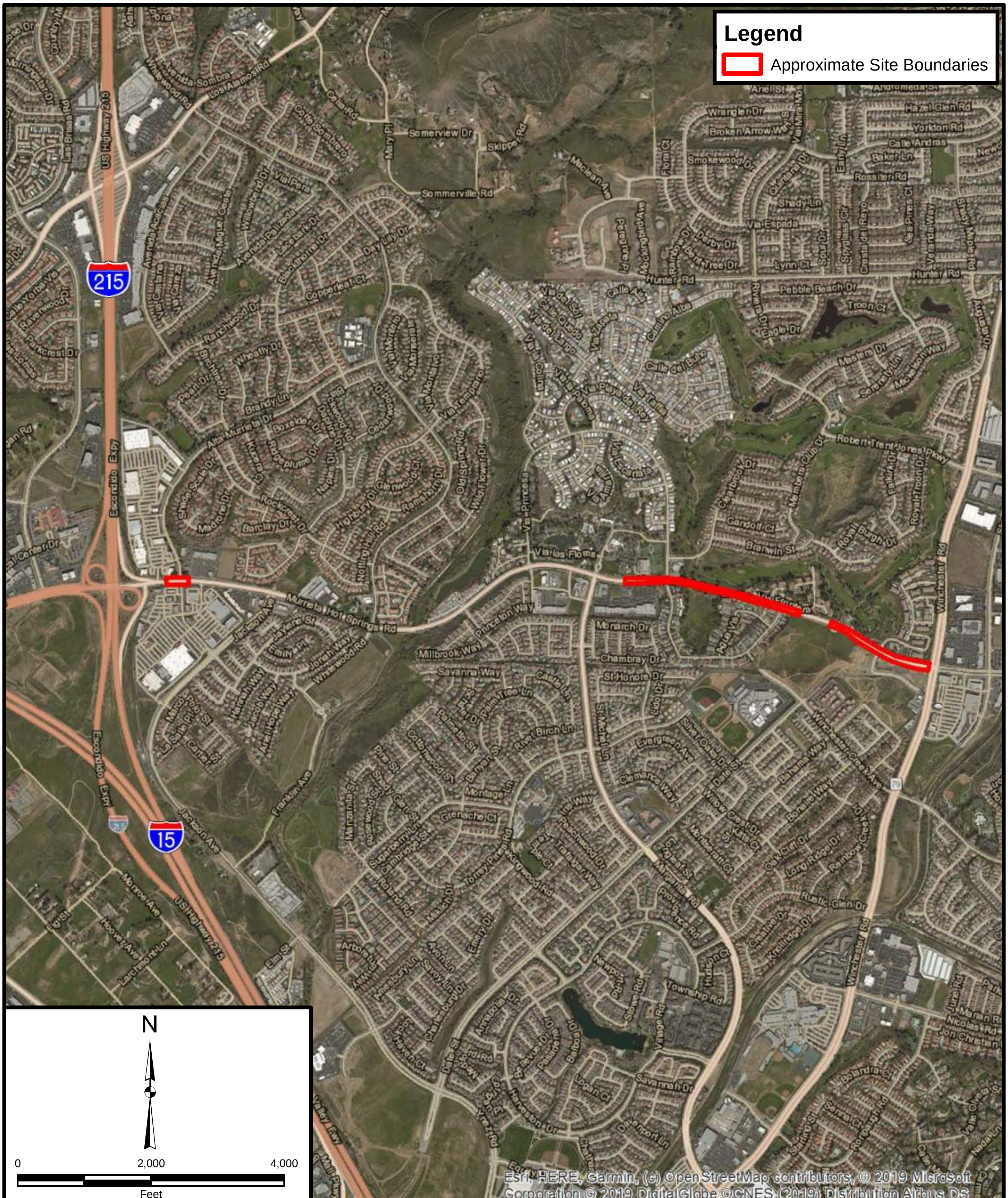
Mitchel S. Bornyasz, CEG 2416
Project Geologist

Simon Saiid, GE 2641
Principal Engineer

Attachment: Figure 1 – Site Location Map
Figures 2-4 – Boring/Perc Test Location Maps
Appendix A – Perc Data Test Sheets, Log of Exploratory Borings & Laboratory Test Results

Distribution: (1) Addressee (PDF copy via email)

Leighton



Project: 12453.001	Eng/Geol: SIS/MSB
Scale:1 " = 2,000 '	Date: October 2019

Base Map: ESRI ArcGIS Online 2019
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

SITE LOCATION MAP

Murrieta Hot Springs Road Improvements Percolation Study
City of Murrieta California

Figure 1

Leighton

Map Saved as V:\Drafting\12453\001\Maps\12453-001_F01_SLM_2019-10-07.mxd on 10/7/2019 4:59:22 PM

CONSTRUCTION NOTES

○ DESCRIPTION

1 CONSTRUCT 5" A.C. PAVEMENT OVER 6" CLASS II BASE (PRELIM, R=50).
2 GRIND & OVERLAY 0.1' MIN. TO FORM SMOOTH JOIN PER DETAIL ON SHEET 2.
3 GRIND & OVERLAY 0.1' MIN.
4 CONSTRUCT TYPE "D" MEDIAN CURB CASE A PER C.O.M. STD. NO. 305.
6 CONSTRUCT TYPE "A-8" CURB AND GUTTER PER C.O.M. STD. NO. 302
7 CONSTRUCT P.C.C. SIDEWALK PER C.O.M. STD. NO. 320.
8 CONSTRUCT P.C.C. ACCESS RAMP PER C.O.M. STD. NO. 321A AND 321B.
9 CONSTRUCT CROSS GUTTER AND SPANDREL PER C.O.M. STD. NO. 311 AND 312.

CONSTRUCTION NOTES

○ DESCRIPTION

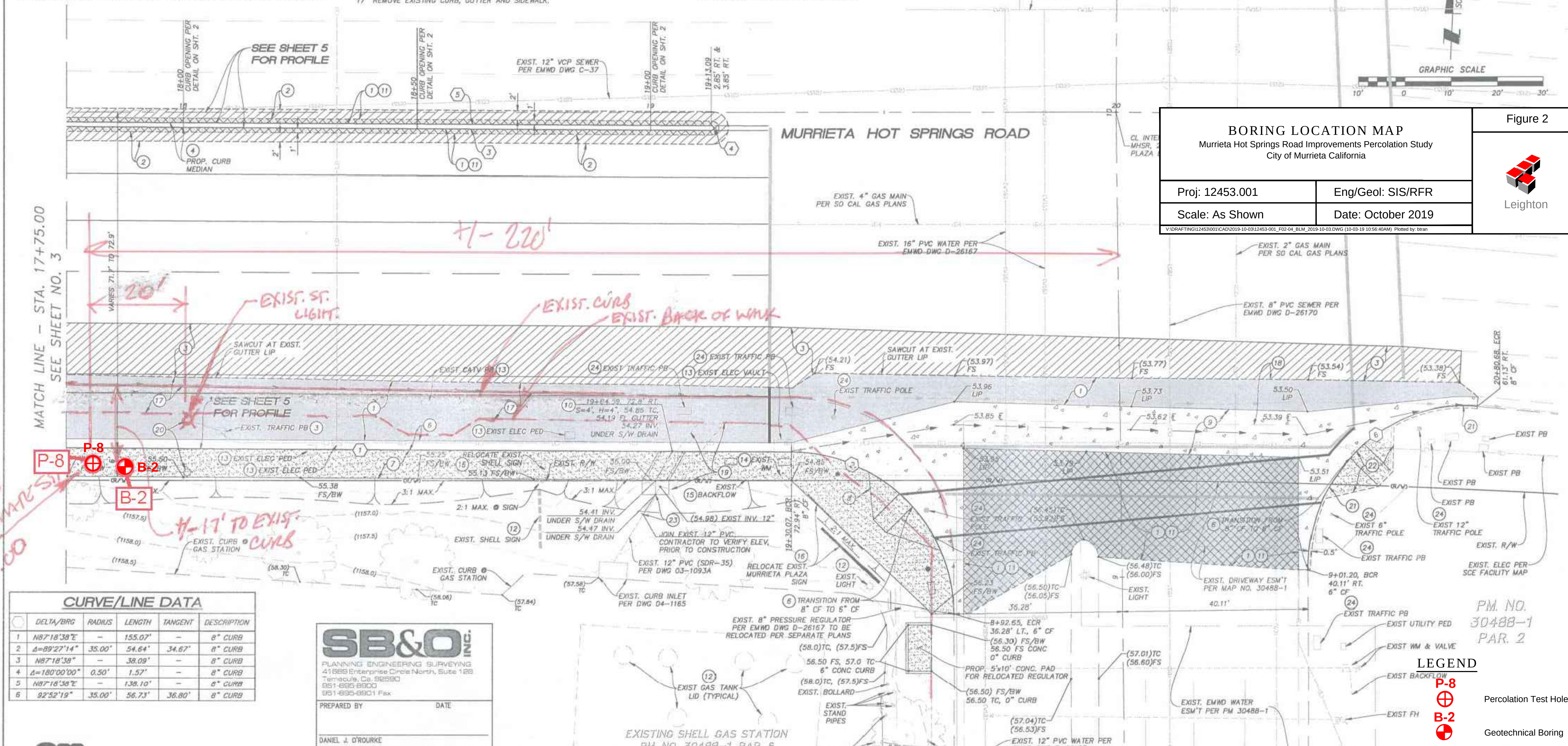
10 CONSTRUCT PARKWAY CULVERT (TYPE B) PER C.O.M. STD NO. 409B & 409D.
11 SAWCUT AND REMOVE EXISTING A.C. PAVEMENT.
12 PROTECT IN PLACE (ITEM AS INDICATED).
13 RELOCATE DRY UTILITY (BY OTHERS, ITEM AS INDICATED).
14 RELOCATE WATER METER (BY OTHERS).
15 RELOCATE EXISTING BACKFLOW DEVICE (BY OTHERS).
16 RELOCATE/RECONSTRUCT SIGN, IN-KIND.
17 REMOVE EXISTING CURB, GUTTER AND SIDEWALK.

CONSTRUCTION NOTES

○ DESCRIPTION

18 REMOVE EXISTING CROSS GUTTER AND SPANDREL.
19 REMOVE EXISTING CONCRETE.
20 RELOCATE EXIST. STREET LIGHT PER C.O.M. STD. NO. 620.
21 SAWCUT AT BACK OF CURB, REMOVE & REPLACE CURB RETURN AT EXIST. GRADE PER C.O.M. STD. NO. 302.
22 SAWCUT, REMOVE & REPLACE EXIST. P.C.C. ACCESS RAMP PER C.O.M. STD. NO. 321A AND 321B
23 REMOVE & REPLACE 5.0 LF ~ 12" PVC (SDR-35)
24 RELOCATE PER TRAFFIC SIGNAL PLANS.

Figure 2	
BORING LOCATION MAP Murrieta Hot Springs Road Improvements Percolation Study City of Murrieta California	Leighton
Proj: 12453.001	Eng/Geol: SIS/RFR
Scale: As Shown	Date: October 2019



LEGEND

P-8 Percolation Test Holes

B-2 Geotechnical Boring

CURVE/LINE DATA

	DELTA/BRG	RADIUS	LENGTH	TANGENT	DESCRIPTION
1	N87°18'38"E	–	155.07'	–	8" CURB
2	Δ=89°27'14"	35.00'	54.64'	34.67'	8" CURB
3	N87°18'38"	–	38.09'	–	8" CURB
4	Δ=180°00'00"	0.50'	1.57'	–	8" CURB
5	N87°18'38"E	–	138.10'	–	8" CURB
6	92°52'19"	35.00'	56.73'	36.80'	8" CURB

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-6900
951-695-6901 Fax

PREPARED BY DATE

DANIEL J. O'ROURKE
R.C.E NO. 47677 EXP. DATE 12-31-19

811 Know what's below. Call before you dig.

"AS BUILT"
The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.
Engineer of work Date
RCE EXP.

BENCH MARK:
RIV. CO. BM 600-14-68 DATED 1970, ELEV. 1155.385

APPROVED FOR SIGNATURE
JEFFREY J. HITCH DATE
CITY OF MURRIETA
R.C.E. NO. 58994
EXP. 6/30/19

SCALE
HORIZONTAL AS NOTED
VERTICAL AS NOTED

DATE | INITIAL | ENGINEER OF WORK | REVISION DESCRIPTION | SHT. NO. | DATE | INITIAL | CITY APPROVAL

SHEET 4 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 7

STREET IMPROVEMENT PLAN
MURRIETA HOT SPRINGS ROAD
PLAN VIEW (17+75.00 TO 20+80.68)

APPROVED
ROBERT K. MOEHLING DATE
CITY ENGINEER RCE 53056

DWN BY: RLF
CHKD BY: DJO
FIELD BK:
CIP NO. 13027
PROJECT NO. XX-XXX
DRAWING NO.

May 13, 2019 — 3:18pm
I:\74382 Murrieta Plaza\Dwg\Z-74382-SI.dwg
74382.10
-X SUBMITTAL

Figure 3

Leighton

BORING LOCATION MAP

Murrieta Hot Springs Road Improvements Percolation Study
City of Murrieta California

Proj: 12453.001	Eng/Geol: SIS/MSB
Scale: As Shown	Date: October 2019

LEGEND

P-7 ⊕ Percolation Test Holes

DMA NAME	(2) TOTAL PROP AREA (sf)	TOTAL PROP AREA (ac)	(3) NEW (INCL REPLACED) PERVIOUS AREA (sf)	(4) NEW (INCL REPLACED) IMPERV AREA (sf)	NEW (INCL REPLACED) IMPERV AREA (ac)	% NEW (INCL REPLACED) IMPERV VS. EX TOTAL [50% RULE: (4)/(1)] (%)	(5) TOTAL PROP DISTURB AREA [(3)+(4)] (sf)	(5) TOTAL PROP DISTURB AREA [(3)+(4)] (ac)	IMPERV FRACTION [50% RULE: (4)/(5)] (dec)	BMP NAME	DESIGN CAPTURE VOLUME (cf)	PROVIDED CAPTURE VOLUME (cf)	DRAW-DOWN TIME (hrs)
NW	170841	3.922	9329	62137	1.426	42%	71466	1.641	0.87	BIO-SWALE NW	3038		
SW	165002	3.788	10279	58113	1.334	40%	68392	1.570	0.85	BIO-SWALE SW	2793		
NE	113472	2.605	5118	24666	0.566	23%	29784	0.684	0.83	BIO-SWALE NE	1167		
SE	56568	1.299	13317	23238	0.533	58%	36555	0.839	0.64	BIO-SWALE SE	1005		
SE2	27276	0.626	6209	6725	0.154	35%	12934	0.297	0.52	BIO-SWALE SE2	280		
SE3	57735	1.325	3983	11356	0.261	24%	15339	0.352	0.74	BIO-SWALE SE3	511		
ALL:	590894	13.565	48235	186235	4.275	37% (<50%)	234470	5.383	0.79		8794		

LEGEND

- STREET CENTERLINE
- EXISTING RIGHT OF WAY LINE
- PROPOSED RIGHT OF WAY LINE
- DMA BOUNDARY
- SURFACE FLOW DIRECTION

PROP DISTURBED AREAS:

- PROP IMPERVIOUS AREA HATCH
- PROP PERVIOUS AREA HATCH
- PROP UNDISTURBED AREA (NO HATCH)

SHEET 3	CITY OF MURRIETA ENGINEERING DEPARTMENT	SHEETS 4

PROPOSED WATER QUALITY SITE MAP
MURRIETA HOT SPRINGS ROAD
DMAs NW & SW

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BORING LOCATION MAP
Murrieta Hot Springs Road Improvements Percolation Study
City of Murrieta California

Figure 4

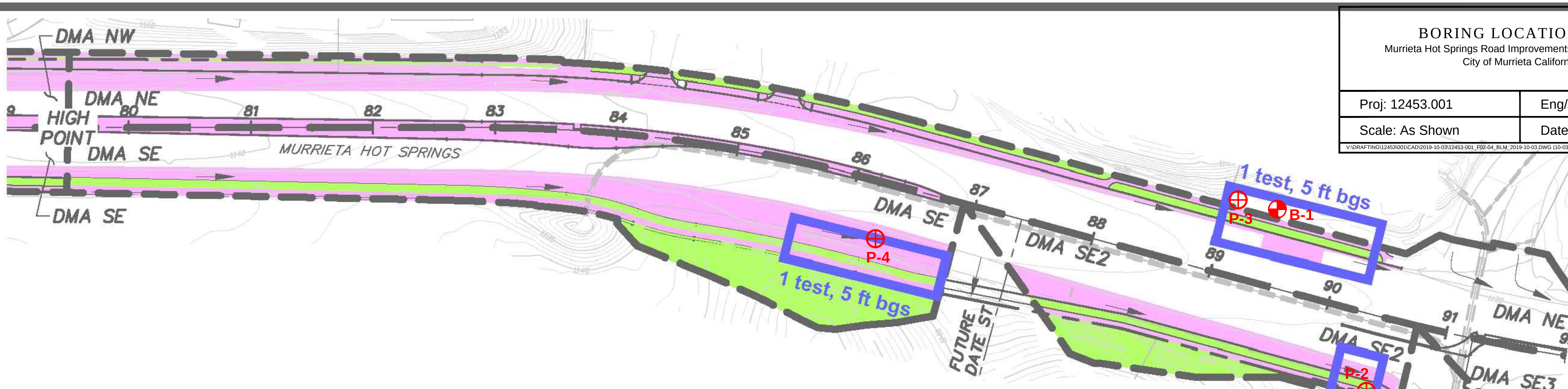
Leighton

Proj: 12453.001	Eng/Geol: SIS/RFR
Scale: As Shown	Date: October 2019

LEGEND

P-4 Percolation Test Holes

B-1 Geotechnical Boring



DMA NAME	(2) TOTAL PROP AREA (sf)	TOTAL PROP AREA (ac)	(3) NEW (INCL REPLACED) PERVIOUS AREA (sf)	(4) NEW (INCL REPLACED) IMPERV AREA (sf)	NEW (INCL REPLACED) IMPERV AREA (ac)	% NEW (INCL REPLACED) IMPERV VS. EX TOTAL [50% RULE: (4)/(1)] (%)	(5) TOTAL PROP DISTURB AREA [(3)+(4)] (sf)	(5) TOTAL PROP DISTURB AREA [(3)+(4)] (ac)	IMPERV FRACTION [50% RULE: (4)/(5)] (dec)	BMP NAME	DESIGN CAPTURE VOLUME (cf)	PROVIDED CAPTURE VOLUME (cf)	DRAW-DOWN TIME (hrs)
NW	170841	3.922	9329	62137	1.426	42%	71466	1.641	0.87	BIO-SWALE NW	3038		
SW	165002	3.788	10279	58113	1.334	40%	68392	1.570	0.85	BIO-SWALE SW	2793		
NE	113472	2.605	5118	24666	0.566	23%	29784	0.684	0.83	BIO-SWALE NE	1167		
SE	56568	1.299	13317	23238	0.533	58%	36555	0.839	0.64	BIO-SWALE SE	1005		
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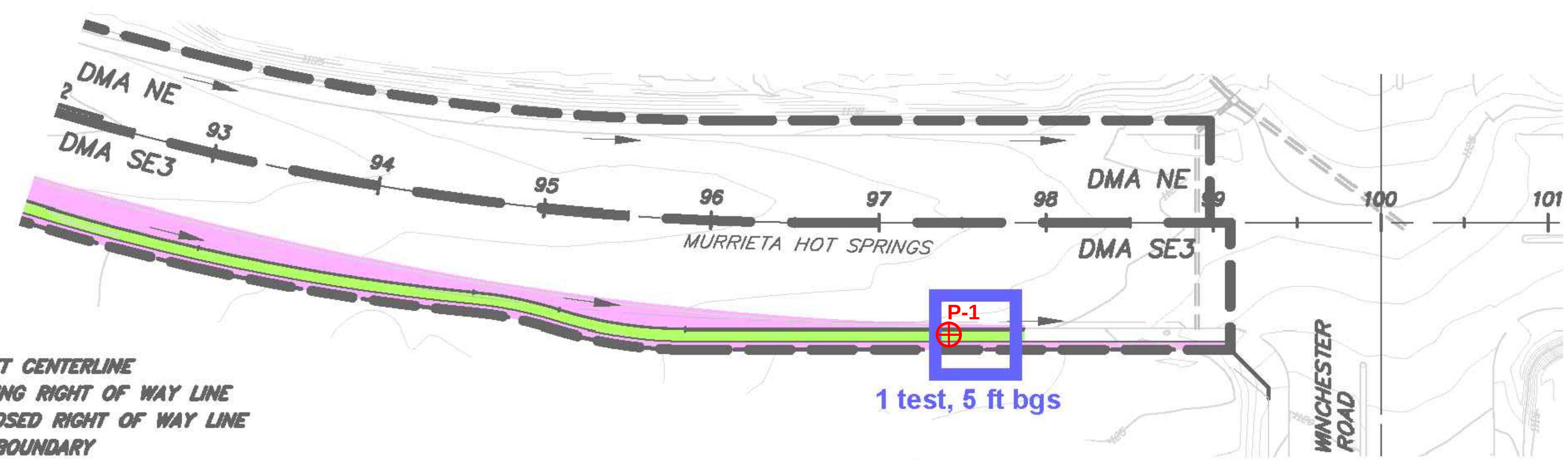
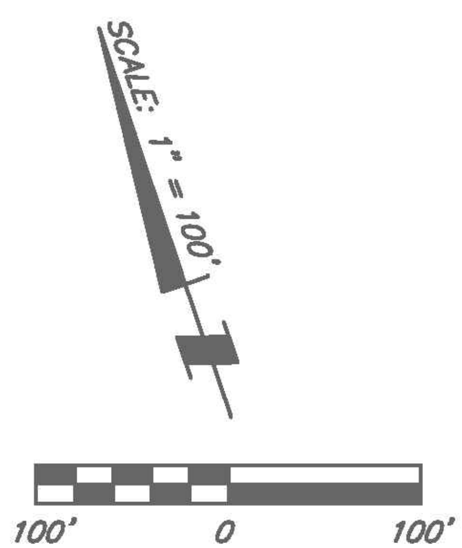
SE3	57735	1.325	3983	11356	0.261	24%	15339	0.352	0.74	BIO-SWALE SE3	511		
ALL:	590894	13.565	48235	186235	4.275	37% (<50%)	234470	5.383	0.79		8794		





LEGEND

- STREET CENTERLINE
- EXISTING RIGHT OF WAY LINE
- PROPOSED RIGHT OF WAY LINE
- DMA BOUNDARY
- SURFACE FLOW DIRECTION
- PROP DISTURBED AREAS:
- PROP IMPERVIOUS AREA HATCH
- PROP PERVIOUS AREA HATCH
- PROP UNDISTURBED AREA (NO HATCH)

SHEET 4 | CITY OF MURRIETA ENGINEERING DEPARTMENT | SHEETS 4

PROPOSED WATER QUALITY SITE MAP
MURRIETA HOT SPRINGS ROAD
DMAs NE, SE, SE2 & SE3

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APPENDIX A

GEOTECHNICAL BORING LOG B-1

Project No.	12453.001	**Date Drilled**	10-1-19
Project	Murrieta Hot Springs Rd Improvements	**Logged By**	MSB
Drilling Co.	LCI	**Hole Diameter**	3.5"
Drilling Method	Hand Auger	**Ground Elevation**	'
Location	Murrieta	**Sampled By**	MSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0			B1				SC	**ARTIFICIAL FILL (Afu)** SANDY GRAVEL & CLAYEY SAND, loose to medium dense, light gray, moist	
								SC	**QUATERNARY PAUBA FORMATION (Qps)** CLAYEY SAND, loose, light gray to light brown, moist	
	5									
	10							SW	Well graded SAND, medium dense, light brown	
	15								Total Depth 15' No Groundwater Encountered	
	20									
	25									
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG B-2

Project No.	12453.001	**Date Drilled**	10-1-19
Project	Murrieta Hot Springs Rd Improvements	**Logged By**	MSB
Drilling Co.	LCI	**Hole Diameter**	3.5"
Drilling Method	Hand Auger	**Ground Elevation**	'
Location	Murrieta	**Sampled By**	MSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0								**ARTIFICIAL FILL (Afu)** landscape mulch and mixed sand	
									QUATERNARY PAUBA FORMATION (Qps)	
	5			B1				SC	CLAYEY SAND, light brown, dry	
	10			B2					CLAYEY SAND, brown, moist	
	15			B3				SW-SM	Well graded SAND, medium dense, light brown, moist	
	20								Total Depth 15' No Groundwater Encountered	
	25									
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG P-1

Project No.	12453.001	**Date Drilled**	10-1-19
Project	Murrieta Hot Springs Rd Improvements	**Logged By**	MSB
Drilling Co.	LCI	**Hole Diameter**	8"
Drilling Method	Hand Auger	**Ground Elevation**	'
Location	Murrieta	**Sampled By**	MSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0							gSM	**ARTIFICAL FILL (Afu)** compacted AB mixed with SAND	
								SW-SC	SAND AND SILTY CLAYEY SAND, dense, light brown, dry	
				B1						
	5									
									Total Depth 5' No Groundwater Encountered	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG P-2

Project No.	12453.001	**Date Drilled**	10-1-19
Project	Murrieta Hot Springs Rd Improvements	**Logged By**	MSB
Drilling Co.	LCI	**Hole Diameter**	8"
Drilling Method	Hand Auger	**Ground Elevation**	'
Location	Murrieta	**Sampled By**	MSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0							SM	**ARTIFICIAL FILL (Afu)** SILTY SAND, compacted dense, dry	
				B1				SM	**QUATERNARY PAUBA FORMATION (Qps)** SILTY SAND, medium dense, light brown, dry	
								ML/SM	SILTY SAND to SANDY SILT, medium dense, gray, dry	SA
	5									
									Total Depth 5' No Groundwater Encountered	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG P-3

Project No.	12453.001	**Date Drilled**	10-1-19
Project	Murrieta Hot Springs Rd Improvements	**Logged By**	MSB
Drilling Co.	LCI	**Hole Diameter**	8"
Drilling Method	Hand Auger	**Ground Elevation**	'
Location	Murrieta	**Sampled By**	MSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SC	**ARTIFICIAL FILL (Afu)** CLAYEY SAND with gravel, loose, light gray, moist	
								SM-SC	**QUATERNARY PAUBA FORMATION (Qps)** SILTY CLAYEY SAND, loose to medium dense, light gray, moist	
				B1						SA
	5									
									Total Depth 5' No Groundwater Encountered	
	10									
	15									
	20									
	25									
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG P-4

Project No.	12453.001	**Date Drilled**	10-1-19
Project	Murrieta Hot Springs Rd Improvements	**Logged By**	MSB
Drilling Co.	LCI	**Hole Diameter**	8"
Drilling Method	Hand Auger	**Ground Elevation**	'
Location	Murrieta	**Sampled By**	MSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**QUATERNARY PAUBA FORMATION (Qps)** SILTY SAND, medium dense, light brown, dry	
				B1						
	5								Total Depth 5' No Groundwater Encountered	
	10									
	15									
	20									
	25									
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
B BULK SAMPLE
C CORE SAMPLE
G GRAB SAMPLE
R RING SAMPLE
S SPLIT SPOON SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:
-200 % FINES PASSING
AL ATTERBERG LIMITS
CN CONSOLIDATION
CO COLLAPSE
CR CORROSION
CU UNDRAINED TRIAXIAL
DS DIRECT SHEAR
EI EXPANSION INDEX
H HYDROMETER
MD MAXIMUM DENSITY
PP POCKET PENETROMETER
RV R VALUE
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
SG SPECIFIC GRAVITY
UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG P-5

Project No.	12453.001	**Date Drilled**	10-1-19
Project	Murrieta Hot Springs Rd Improvements	**Logged By**	MSB
Drilling Co.	LCI	**Hole Diameter**	8"
Drilling Method	Hand Auger	**Ground Elevation**	'
Location	Murrieta	**Sampled By**	MSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	0								**ARTIFICIAL FILL (Afu)** fill slope adjacent road, utilities both sides	
								SM-SC	**QUATERNARY PAUBA FORMATION (Qps)** SILTY CLAYEY SAND, medium dense, gray to brown	
				B1						
	5								Total Depth 5' No Groundwater Encountered	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG P-6

Project No.	12453.001	**Date Drilled**	10-1-19
Project	Murrieta Hot Springs Rd Improvements	**Logged By**	MSB
Drilling Co.	LCI	**Hole Diameter**	8"
Drilling Method	Hand Auger	**Ground Elevation**	'
Location	Murrieta	**Sampled By**	MSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	0							SM	**ARTIFICIAL FILL (Afu)** very dense, dry, utilities? fill adjacent road	
				B1				SW-SM	**QUATERNARY PAUBA FORMATION (Qps)** Well-Graded SAND and SILTY SAND, medium dense, light brown, dry	SA
	5									
									Total Depth 5' No Groundwater Encountered	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG P-7

Project No.	12453.001	**Date Drilled**	10-1-19
Project	Murrieta Hot Springs Rd Improvements	**Logged By**	MSB
Drilling Co.	LCI	**Hole Diameter**	8"
Drilling Method	Hand Auger	**Ground Elevation**	'
Location	Murrieta	**Sampled By**	MSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	0							SM	**QUATERNARY PAUBA FORMATION (Qps)** slightly SILTY SAND, loose to medium dense, light brown, dry	
				B1						SA
	5									
									Total Depth 5' No Groundwater Encountered	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

* * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * *

GEOTECHNICAL BORING LOG P-8

Project No.	12453.001	**Date Drilled**	10-1-19
Project	Murrieta Hot Springs Rd Improvements	**Logged By**	MSB
Drilling Co.	LCI	**Hole Diameter**	8"
Drilling Method	Hand Auger	**Ground Elevation**	'
Location	Murrieta	**Sampled By**	MSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	**SOIL DESCRIPTION** *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	0								**ARTIFICIAL FILL (Afu)** mulch and sand mixed loose	
								SM-SC	**QUATERNARY PAUBA FORMATION (Qps)** SILTY CLAYEY SAND, loose, light brown, dry	
				B1						SA
	5									
									Total Depth 5' No Groundwater Encountered	
	10									
	15									
	20									
	25									
	30									

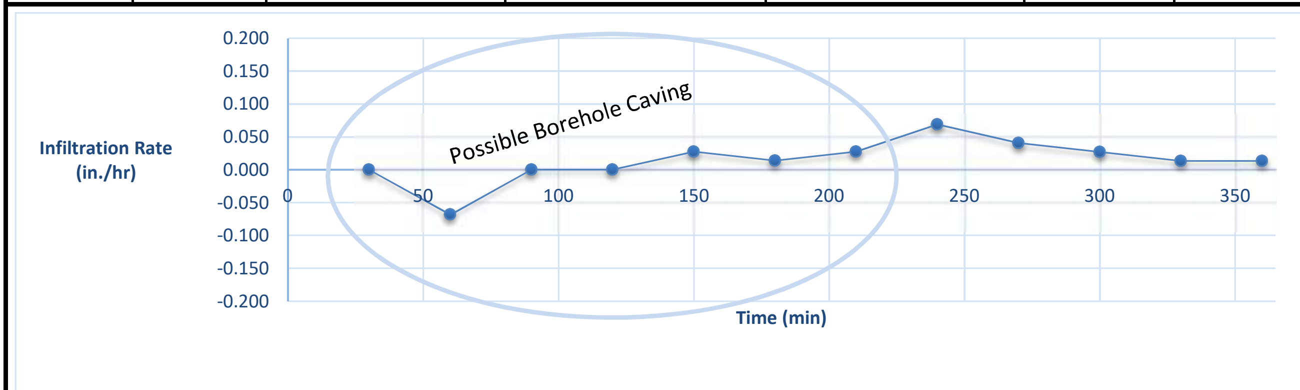
SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

Test Hole Number:	P-1	Project	MHS Rd. Improvements	
Date Excavated:	10/1/2019	Project Number	12453.001	
Tested by:	MSB	Date Tested	10.3.19	
Soil Unit:	Afu	Depth of Test Hole (in.)	40	*after partial caving*
USCS Soil Type:	Silty Clayey SAND	Diameter (in.)	8	

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:20 AM 9:50 AM	30.00	7.20	7.20	0.00	0.000	#DIV/0!
9:50 AM 10:20 AM	30.00	7.20	6.60	-0.60	-0.068	-50.000
10:20 AM 10:50 AM	30.00	6.60	6.60	0.00	0.000	#DIV/0!
10:50 AM 11:20 AM	30.00	6.60	6.60	0.00	0.000	#DIV/0!
11:20 AM 11:50 AM	30.00	6.60	6.84	0.24	0.027	125.000
11:50 AM 12:20 PM	30.00	6.84	6.96	0.12	0.014	250.000
12:20 PM 12:50 PM	30.00	6.96	7.20	0.24	0.027	125.000
12:50 PM 1:20 PM	30.00	6.84	7.44	0.60	0.069	50.000
1:20 PM 1:50 PM	30.00	6.36	6.72	0.36	0.041	83.333
1:50 PM 2:20 PM	30.00	5.88	6.12	0.24	0.027	125.000
2:20 PM 2:50 PM	30.00	6.12	6.24	0.12	0.013	250.000
2:50 PM 3:20 PM	30.00	6.00	6.12	0.12	0.013	250.000



* Based on Prochet Method

Percolation Test Data

P-1

Project Number: 12453.001

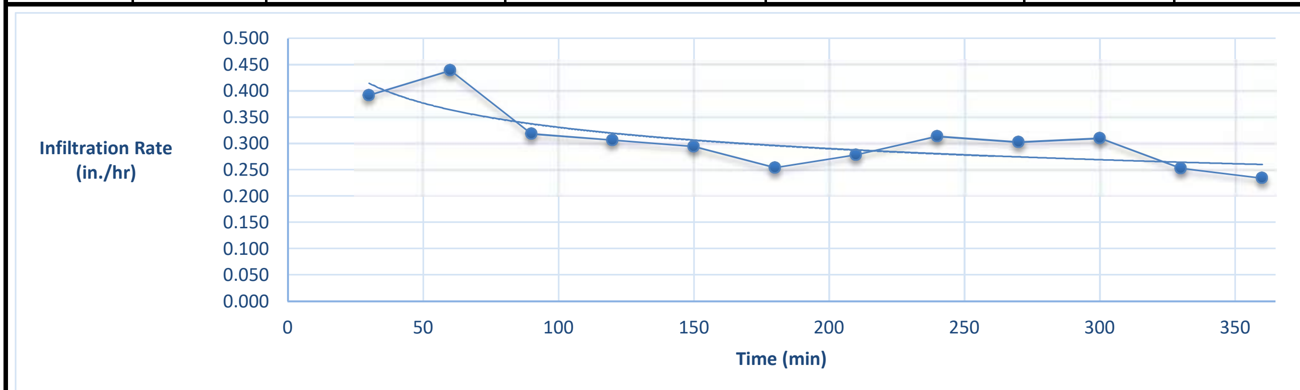
Project Name: *Murrieta Hot Springs Rd. Improvements*

Date: Oct-19

Leighton

Test Hole Number:	P-2	Project	MHS Rd. Improvements
Date Excavated:	10/1/2019	Project Number	12453.001
Tested by:	EMH	Date Tested	10.3.19
Soil Unit:	Afu/Qps	Depth of Test Hole (in.)	60
USCS Soil Type:	Silty SAND	Diameter (in.)	8

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:03 AM 9:33 AM	30.00	24.72	28.20	3.48	0.392	8.621
9:33 AM 10:03 AM	30.00	21.60	25.80	4.20	0.439	7.143
10:03 AM 10:33 AM	30.00	22.80	25.80	3.00	0.318	10.000
10:33 AM 11:03 AM	30.00	22.92	25.80	2.88	0.306	10.417
11:03 AM 11:33 AM	30.00	23.04	25.80	2.76	0.294	10.870
11:33 AM 12:03 PM	30.00	22.92	25.32	2.40	0.253	12.500
12:03 PM 12:33 PM	30.00	22.68	25.32	2.64	0.278	11.364
12:33 PM 1:03 PM	30.00	22.20	25.20	3.00	0.313	10.000
1:03 PM 1:33 PM	30.00	22.44	25.32	2.88	0.302	10.417
1:33 PM 2:03 PM	30.00	23.40	26.28	2.88	0.310	10.417
2:03 PM 2:33 PM	30.00	22.80	25.20	2.40	0.253	12.500
2:33 PM 3:03 PM	30.00	24.00	26.16	2.16	0.234	13.889



* Based on Prochet Method

Percolation Test Data

P-2

Project Number: 12453.001

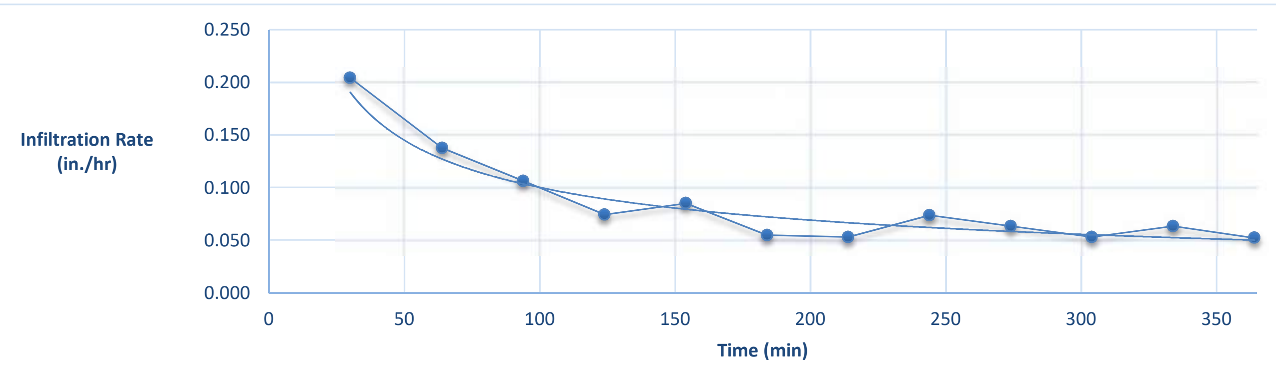
Project Name: *Murrieta Hot Springs Rd. Improvements*

Date: Oct-19

Leighton

Test Hole Number:	P-3	Project	MHS Rd. Improvements	
Date Excavated:	10/1/2019	Project Number	12453.001	
Tested by:	EMH	Date Tested	10.3.19	
Soil Unit:	Afu/Qps	Depth of Test Hole (in.)	60	
USCS Soil Type:	Silty Clayey SAND	Diameter (in.)	8	

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
8:51 AM 9:21 AM	30.00	16.20	18.48	2.28	0.204	13.158
9:25 AM 9:55 AM	30.00	15.84	17.40	1.56	0.138	19.231
9:55 AM 10:25 AM	30.00	16.20	17.40	1.20	0.106	25.000
10:25 AM 10:55 AM	30.00	16.20	17.04	0.84	0.074	35.714
10:55 AM 11:25 AM	30.00	16.32	17.28	0.96	0.085	31.250
11:25 AM 11:55 AM	30.00	16.20	16.82	0.62	0.055	48.387
11:55 AM 12:25 PM	30.00	16.20	16.80	0.60	0.053	50.000
12:25 PM 12:55 PM	30.00	15.96	16.80	0.84	0.074	35.714
12:55 PM 1:25 PM	30.00	16.08	16.80	0.72	0.063	41.667
1:25 PM 1:55 PM	30.00	16.20	16.80	0.60	0.053	50.000
1:55 PM 2:25 PM	30.00	16.08	16.80	0.72	0.063	41.667
2:25 PM 2:55 PM	30.00	15.60	16.20	0.60	0.052	50.000



* Based on Prochet Method

Percolation Test Data

P-3

Project Number: 12453.001

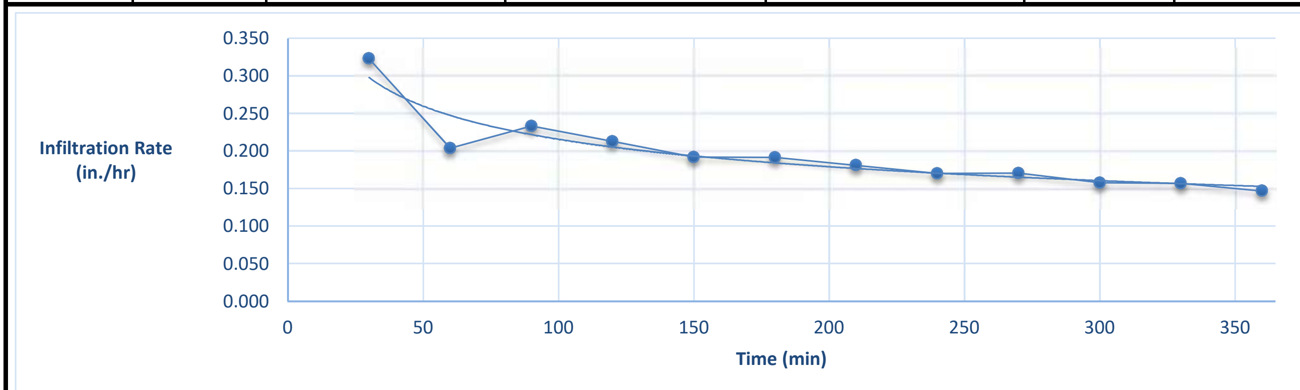
Project Name: *Murrieta Hot Springs Rd. Improvements*

Date: Oct-19

Leighton

Test Hole Number:	P-4	Project	MHS Rd. Improvements
Date Excavated:	10/1/2019	Project Number	12453.001
Tested by:	EMH	Date Tested	10.3.19
Soil Unit:	Qps	Depth of Test Hole (in.)	60
USCS Soil Type:	Silty SAND	Diameter (in.)	8

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:00 AM 9:30 AM	30.00	15.60	19.20	3.60	0.323	8.333
9:30 AM 10:00 AM	30.00	16.08	18.36	2.28	0.204	13.158
10:00 AM 10:30 AM	30.00	15.36	18.00	2.64	0.233	11.364
10:30 AM 11:00 AM	30.00	15.60	18.00	2.40	0.212	12.500
11:00 AM 11:30 AM	30.00	15.84	18.00	2.16	0.192	13.889
11:30 AM 12:00 PM	30.00	15.72	17.88	2.16	0.191	13.889
12:00 PM 12:30 PM	30.00	15.84	17.88	2.04	0.181	14.706
12:30 PM 1:00 PM	30.00	15.84	17.76	1.92	0.170	15.625
1:00 PM 1:30 PM	30.00	15.96	17.88	1.92	0.170	15.625
1:30 PM 2:00 PM	30.00	15.36	17.16	1.80	0.157	16.667
2:00 PM 2:30 PM	30.00	15.12	16.92	1.80	0.157	16.667
2:30 PM 3:00 PM	30.00	15.36	17.04	1.68	0.147	17.857



* Based on Prochet Method

Percolation Test Data

P-4

Project Number: 12453.001

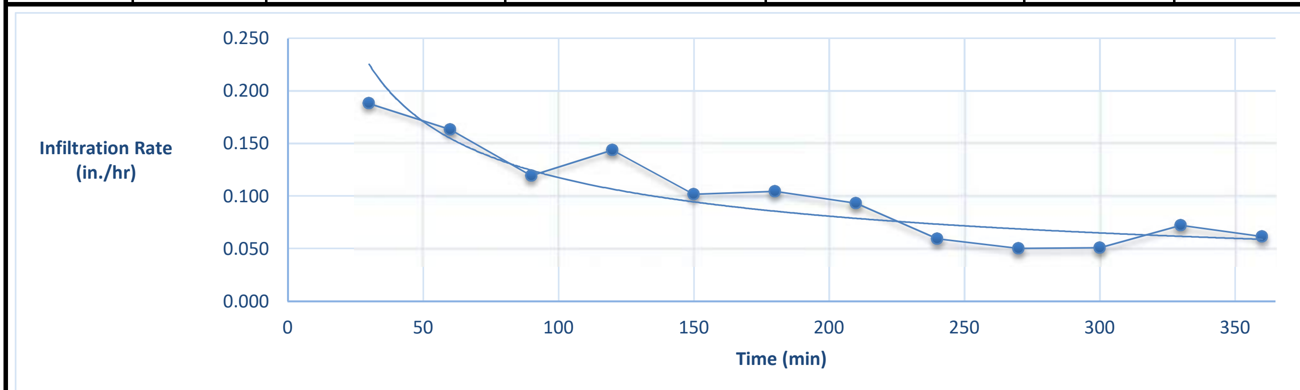
Project Name: *Murrieta Hot Springs Rd. Improvements*

Date: Oct-19

Leighton

Test Hole Number:	P-5	Project	MHS Rd. Improvements
Date Excavated:	10/1/2019	Project Number	12453.001
Tested by:	MSB	Date Tested	10.4.19
Soil Unit:	Afu/Qps	Depth of Test Hole (in.)	60
USCS Soil Type:	Silty Clayey SAND	Diameter (in.)	8

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:30 AM 10:00 AM	30.00	9.72	12.12	2.40	0.188	12.500
10:00 AM 10:30 AM	30.00	10.92	12.96	2.04	0.163	14.706
10:30 AM 11:00 AM	30.00	12.96	14.40	1.44	0.119	20.833
11:00 AM 11:30 AM	30.00	14.40	16.08	1.68	0.144	17.857
11:30 AM 12:00 PM	30.00	14.16	15.36	1.20	0.102	25.000
12:00 PM 12:30 PM	30.00	15.36	16.56	1.20	0.104	25.000
12:30 PM 1:00 PM	30.00	15.00	16.08	1.08	0.093	27.778
1:00 PM 1:30 PM	30.00	13.08	13.80	0.72	0.059	41.667
1:30 PM 2:00 PM	30.00	13.80	14.40	0.60	0.050	50.000
2:00 PM 2:30 PM	30.00	14.40	15.00	0.60	0.051	50.000
2:30 PM 3:00 PM	30.00	15.00	15.84	0.84	0.072	35.714
3:00 PM 3:30 PM	30.00	14.64	15.36	0.72	0.061	41.667

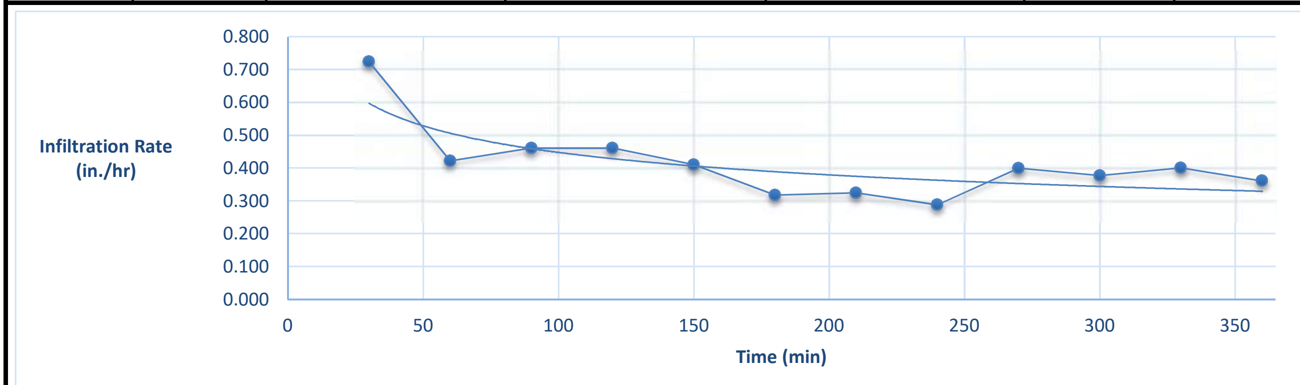


* Based on Prochet Method

Percolation Test Data	Project Number: 12453.001	
P-5	Project Name: Murrieta Hot Springs Rd. Improvements	Leighton
	Date: Oct-19	

Test Hole Number:	P-6	Project	MHS Rd. Improvements
Date Excavated:	10/1/2019	Project Number	12453.001
Tested by:	MSB	Date Tested	10.4.19
Soil Unit:	Afu/Qps	Depth of Test Hole (in.)	60
USCS Soil Type:	Silty SAND	Diameter (in.)	8

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:34 AM 10:04 AM	30.00	18.60	25.80	7.20	0.724	4.167
10:04 AM 10:34 AM	30.00	22.44	26.40	3.96	0.422	7.576
10:34 AM 11:04 AM	30.00	23.40	27.60	4.20	0.460	7.143
11:04 AM 11:34 AM	30.00	23.40	27.60	4.20	0.460	7.143
11:34 AM 12:04 PM	30.00	25.08	28.68	3.60	0.410	8.333
12:04 PM 12:34 PM	30.00	25.80	28.56	2.76	0.317	10.870
12:34 PM 1:04 PM	30.00	24.96	27.84	2.88	0.324	10.417
1:04 PM 1:34 PM	30.00	24.00	26.64	2.64	0.288	11.364
1:34 PM 2:04 PM	30.00	26.64	30.00	3.36	0.399	8.929
2:04 PM 2:34 PM	30.00	30.00	32.88	2.88	0.377	10.417
2:34 PM 3:04 PM	30.00	30.48	33.48	3.00	0.400	10.000
3:04 PM 3:34 PM	30.00	30.00	32.76	2.76	0.361	10.870



* Based on Prochet Method

Percolation Test Data

P-6

Project Number: 12453.001

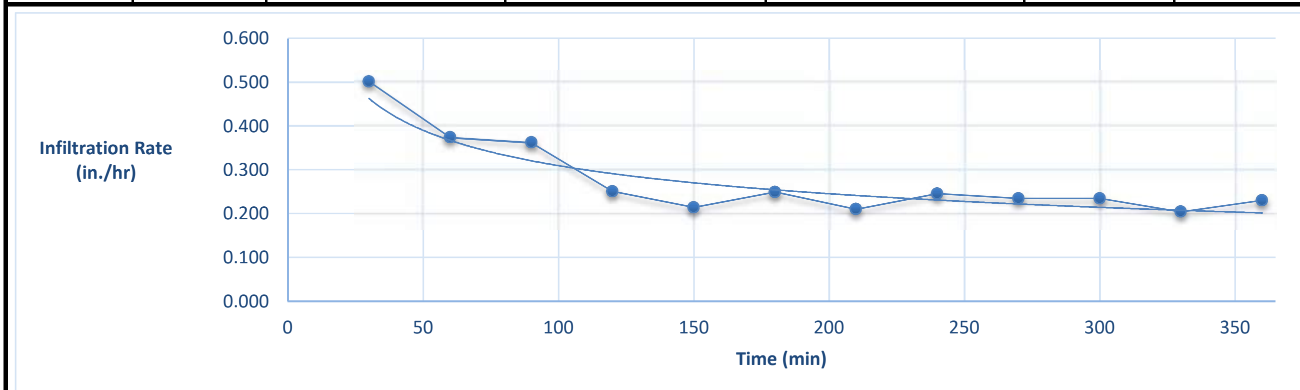
Project Name: *Murrieta Hot Springs Rd. Improvements*

Date: Oct-19

Leighton

Test Hole Number:	P-7	Project	MHS Rd. Improvements	
Date Excavated:	10/1/2019	Project Number	12453.001	
Tested by:	MSB	Date Tested	10.4.19	
Soil Unit:	Afu/Qps	Depth of Test Hole (in.)	60	
USCS Soil Type:	Slightly Silty SAND	Diameter (in.)	8	

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:37 AM 10:07 AM	30.00	16.20	21.60	5.40	0.501	5.556
10:07 AM 10:37 AM	30.00	18.96	22.80	3.84	0.374	7.813
10:37 AM 11:07 AM	30.00	20.40	24.00	3.60	0.362	8.333
11:07 AM 11:37 AM	30.00	22.44	24.84	2.40	0.250	12.500
11:37 AM 12:07 PM	30.00	22.80	24.84	2.04	0.214	14.706
12:07 PM 12:37 PM	30.00	22.20	24.60	2.40	0.249	12.500
12:37 PM 1:07 PM	30.00	22.08	24.12	2.04	0.210	14.706
1:07 PM 1:37 PM	30.00	21.60	24.00	2.40	0.245	12.500
1:37 PM 2:07 PM	30.00	24.00	26.16	2.16	0.234	13.889
2:07 PM 2:37 PM	30.00	26.16	28.20	2.04	0.234	14.706
2:37 PM 3:07 PM	30.00	28.20	29.88	1.68	0.204	17.857
3:07 PM 3:37 PM	30.00	27.60	29.52	1.92	0.230	15.625



* Based on Prochet Method

Percolation Test Data

P-7

Project Number: 12453.001

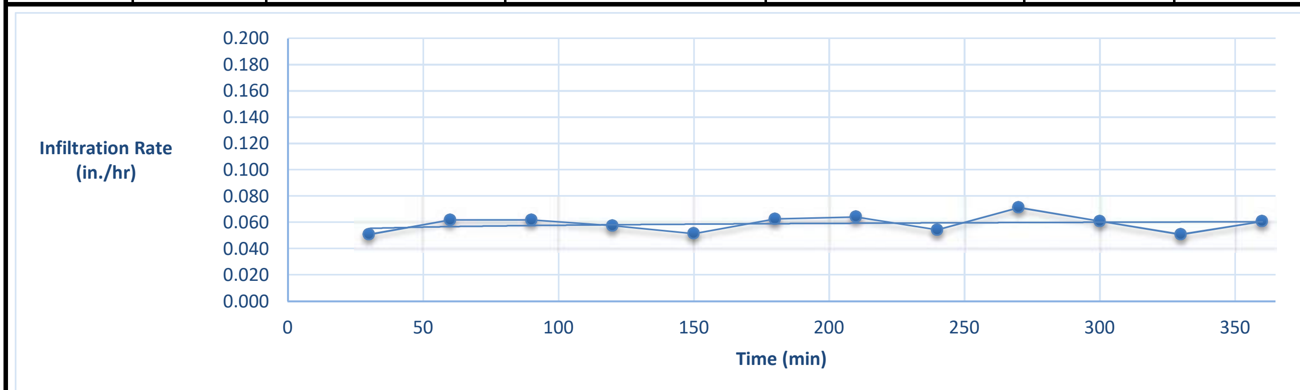
Project Name: *Murrieta Hot Springs Rd. Improvements*

Date: Oct-19

Leighton

Test Hole Number:	P-8	Project	MHS Rd. Improvements
Date Excavated:	10/1/2019	Project Number	12453.001
Tested by:	MSB	Date Tested	10.4.19
Soil Unit:	Qps	Depth of Test Hole (in.)	60
USCS Soil Type:	Silty Clayey SAND	Diameter (in.)	8

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:47 AM 10:17 AM	30.00	14.40	15.00	0.60	0.051	50.000
10:17 AM 10:47 AM	30.00	15.00	15.72	0.72	0.062	41.667
10:47 AM 11:17 AM	30.00	15.00	15.72	0.72	0.062	41.667
11:17 AM 11:47 AM	30.00	15.72	16.38	0.66	0.057	45.455
11:47 AM 12:17 PM	30.00	15.00	15.60	0.60	0.051	50.000
12:17 PM 12:47 PM	30.00	15.60	16.32	0.72	0.063	41.667
12:47 PM 1:17 PM	30.00	16.68	17.40	0.72	0.064	41.667
1:17 PM 1:47 PM	30.00	17.40	18.00	0.60	0.054	50.000
1:47 PM 2:17 PM	30.00	14.40	15.24	0.84	0.071	35.714
2:17 PM 2:47 PM	30.00	14.28	15.00	0.72	0.061	41.667
2:47 PM 3:17 PM	30.00	14.40	15.00	0.60	0.051	50.000
3:17 PM 3:47 PM	30.00	14.16	14.88	0.72	0.061	41.667



* Based on Prochet Method

Percolation Test Data

P-8

Project Number: 12453.001

Project Name: *Murrieta Hot Springs Rd. Improvements*

Date: Oct-19

Leighton

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D 6913

Leighton

Project Name:	Murrieta Hot Springs Rd Improvements	Tested By:	MRV	Date:	10/09/19
Project No.:	12453.001	Checked By:	MRV	Date:	10/10/19
Boring No.:	P-2	Depth (feet):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Silty Sand (SM), Brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	K	Wt. of Air-Dry Soil + Cont. (g)	627.2
Wt. of Air-Dried Soil + Cont.(g)	627.2	Wt. of Dry Soil + Cont. (g)	616.9
Wt. of Container (g)	159.0	Wt. of Container No.______ (g)	159.0
Dry Wt. of Soil (g)	457.9	Moisture Content (%)	2.2

After Wet Sieve	Container No.	K
	Wt. of Dry Soil + Container (g)	487.0
	Wt. of Container (g)	159.0
	Dry Wt. of Soil Retained on # 200 Sieve (g)	328.0

U. S. Sieve Size (in.)	U. S. Sieve Size (mm.)	Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000		100.0
1/2"	12.500		100.0
3/8"	9.500	0.0	100.0
#4	4.750	8.7	98.1
#8	2.360	32.8	92.8
#16	1.180	80.0	82.5
#30	0.600	136.7	70.1
#50	0.300	209.2	54.3
#100	0.150	277.5	39.4
#200	0.075	325.2	29.0
PAN			

GRAVEL: **2 %**

SAND: **69 %**

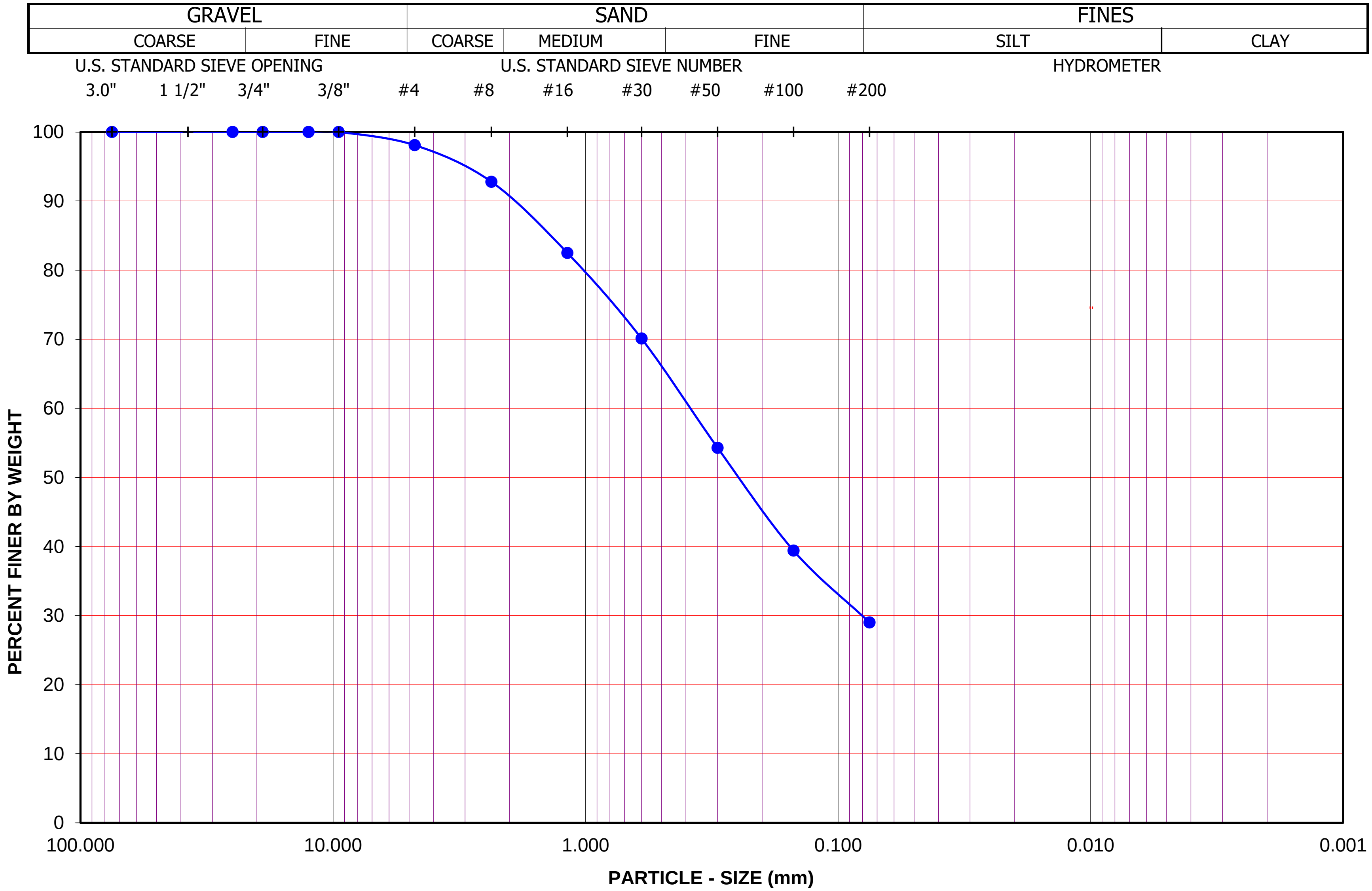
FINES: **29 %**

GROUP SYMBOL: **SM**

$Cu = D60/D10 =$ N/A

$Cc = (D30)^2/(D60*D10) =$ N/A

Remarks:



Project Name: Murrieta Hot Springs Rd Improvements

Project No.: 12453.001

Boring No.: P-2 Sample No.: B-1

Depth (feet): 0 - 5.0 Soil Type : SM

Soil Identification: Silty Sand (SM), Brown.

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

GR:SA:FI : (%) 2 : 69 : 29

Oct-19

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D 6913

Leighton

Project Name:	Murrieta Hot Springs Rd Improvements	Tested By:	MRV	Date:	10/09/19
Project No.:	12453.001	Checked By:	MRV	Date:	10/10/19
Boring No.:	P-3	Depth (feet):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Clayey Sand (SC), Brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	R	Wt. of Air-Dry Soil + Cont. (g)	666.8
Wt. of Air-Dried Soil + Cont.(g)	666.8	Wt. of Dry Soil + Cont. (g)	600.9
Wt. of Container (g)	158.2	Wt. of Container No._____ (g)	158.2
Dry Wt. of Soil (g)	442.7	Moisture Content (%)	14.9

After Wet Sieve	Container No.	R
	Wt. of Dry Soil + Container (g)	494.3
	Wt. of Container (g)	158.2
	Dry Wt. of Soil Retained on # 200 Sieve (g)	336.1

U. S. Sieve Size (in.)	U. S. Sieve Size (mm.)	Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000	0.0	100.0
1/2"	12.500	21.8	95.1
3/8"	9.500	27.6	93.8
#4	4.750	34.9	92.1
#8	2.360	64.5	85.4
#16	1.180	116.6	73.7
#30	0.600	177.4	59.9
#50	0.300	243.9	44.9
#100	0.150	296.9	32.9
#200	0.075	325.2	26.5
PAN			

GRAVEL: **8 %**

SAND: **65 %**

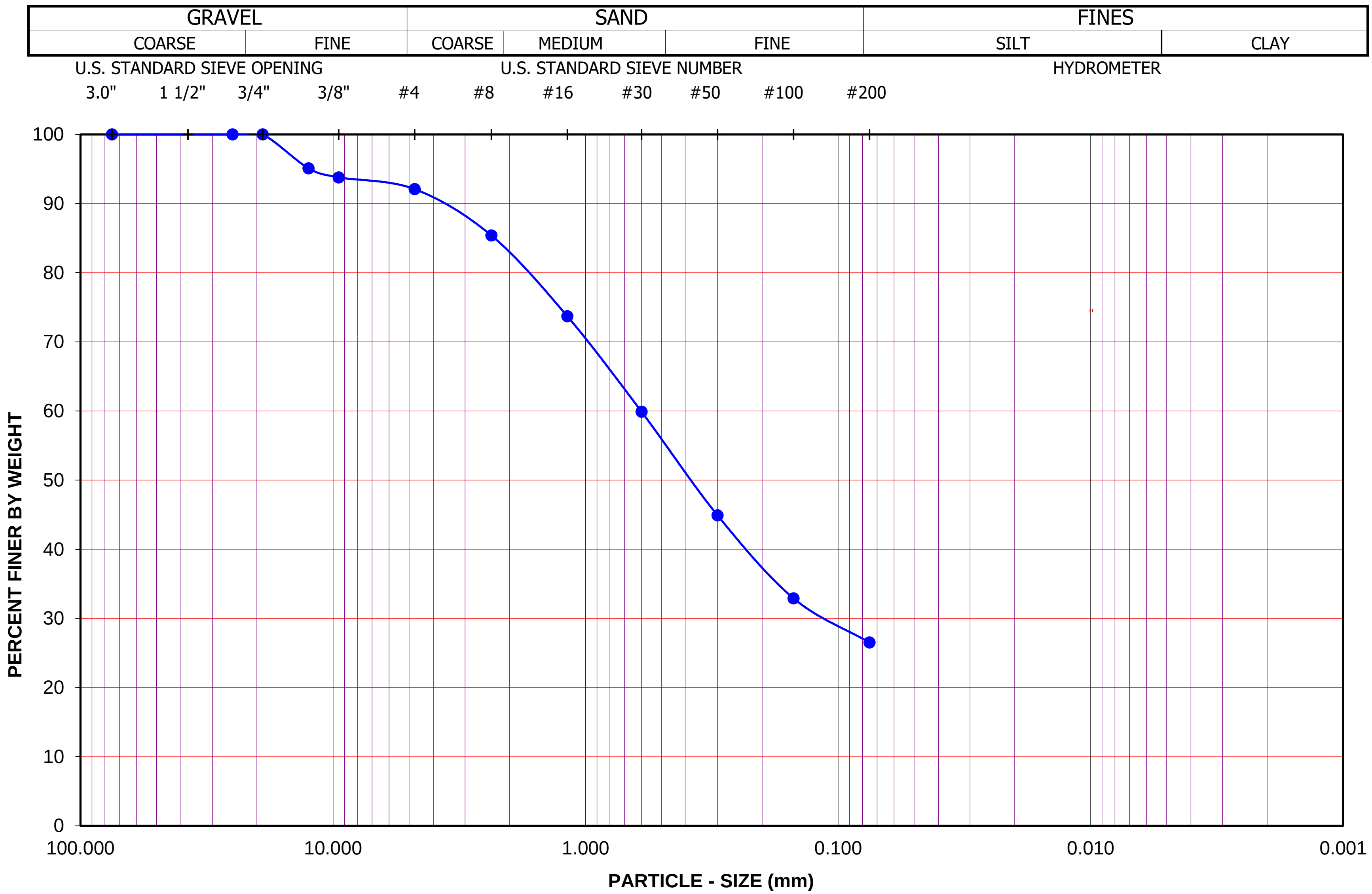
FINES: **27 %**

GROUP SYMBOL: **SC**

Cu = D60/D10 = N/A

Cc = (D30)²/(D60*D10) = N/A

Remarks:



Project Name: Murrieta Hot Springs Rd Improvements

Project No.: 12453.001

Boring No.: P-3

Sample No.: B-1

Depth (feet): 0 - 5.0

Soil Type : SC

Soil Identification: Clayey Sand (SC), Brown.

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

GR:SA:FI : (%) 8 : 65 : 27

Oct-19

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS
ASTM D 6913

Leighton

Project Name:	Murrieta Hot Springs Rd Improvements	Tested By:	MRV	Date:	10/09/19
Project No.:	12453.001	Checked By:	MRV	Date:	10/10/19
Boring No.:	P-6	Depth (feet):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Silty Sand (SM), Brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	RH	Wt. of Air-Dry Soil + Cont. (g)	649.7
Wt. of Air-Dried Soil + Cont.(g)	649.7	Wt. of Dry Soil + Cont. (g)	642.6
Wt. of Container (g)	199.9	Wt. of Container No.______ (g)	199.9
Dry Wt. of Soil (g)	442.7	Moisture Content (%)	1.6

After Wet Sieve	Container No.	RH
	Wt. of Dry Soil + Container (g)	560.0
	Wt. of Container (g)	199.9
	Dry Wt. of Soil Retained on # 200 Sieve (g)	360.1

U. S. Sieve Size		Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
(in.)	(mm.)		
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000	0.0	100.0
1/2"	12.500	9.0	98.0
3/8"	9.500	23.9	94.6
#4	4.750	41.3	90.7
#8	2.360	67.1	84.8
#16	1.180	120.3	72.8
#30	0.600	181.2	59.1
#50	0.300	250.0	43.5
#100	0.150	312.0	29.5
#200	0.075	355.4	19.7
PAN			

GRAVEL: **9 %**

SAND: **71 %**

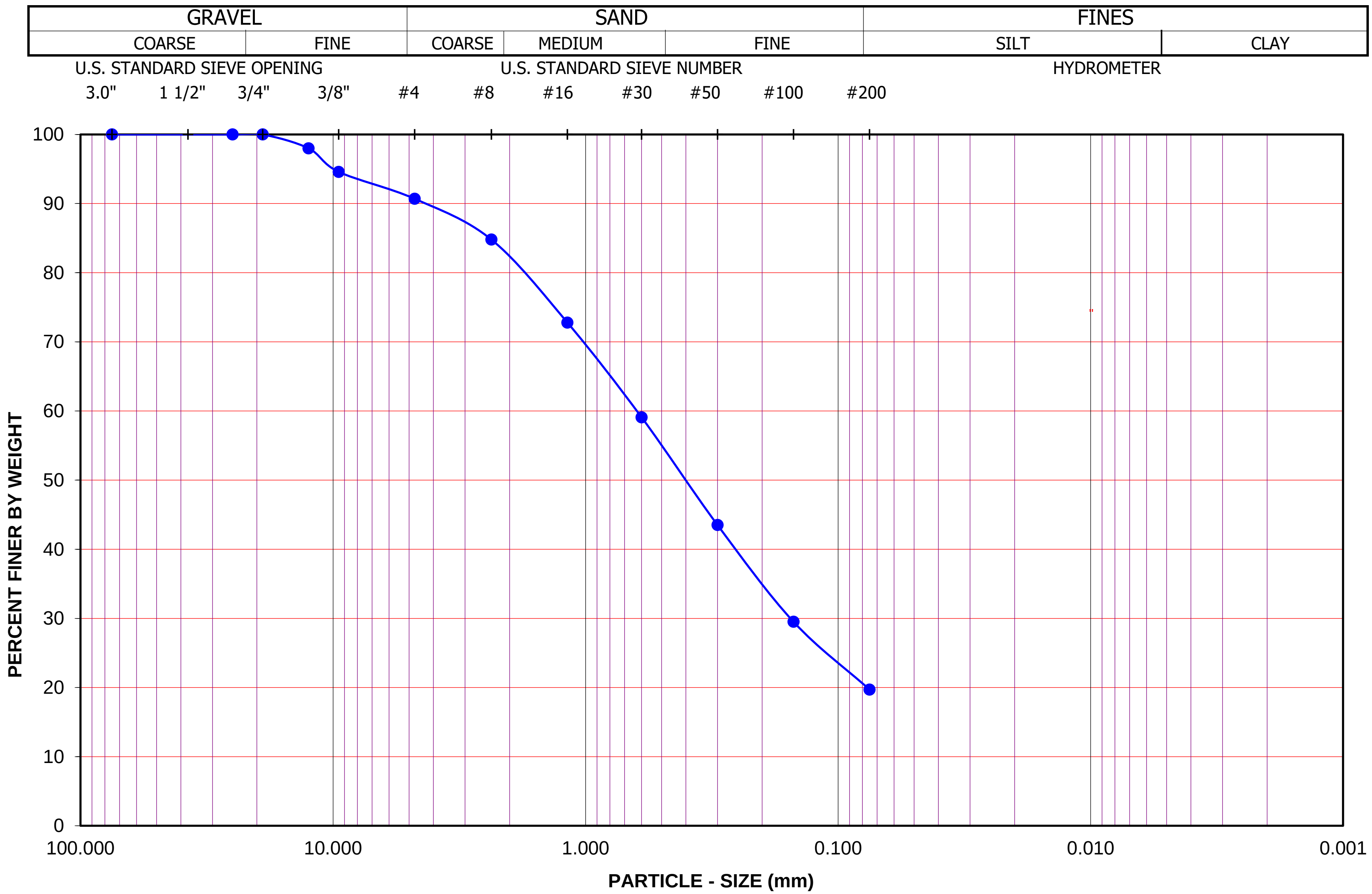
FINES: **20 %**

GROUP SYMBOL: **SM**

Cu = D60/D10 = N/A

Cc = (D30)²/(D60*D10) = N/A

Remarks:



Project Name: Murrieta Hot Springs Rd Improvements

Project No.: 12453.001

Boring No.: P-6 Sample No.: B-1

Depth (feet): 0 - 5.0 Soil Type : SM

Soil Identification: Silty Sand (SM), Brown.

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

GR:SA:FI : (%) 9 : 71 : 20

Oct-19

Sieve; P-6, B-1 (10-04-19)

Leighton

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D 6913

Project Name:	Murrieta Hot Springs Rd Improvements	Tested By:	MRV	Date:	10/09/19
Project No.:	12453.001	Checked By:	MRV	Date:	10/10/19
Boring No.:	P-7	Depth (feet):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Silty Sand (SM), Brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	DE	Wt. of Air-Dry Soil + Cont. (g)	854.9
Wt. of Air-Dried Soil + Cont.(g)	854.9	Wt. of Dry Soil + Cont. (g)	844.4
Wt. of Container (g)	408.9	Wt. of Container No.______ (g)	408.9
Dry Wt. of Soil (g)	435.5	Moisture Content (%)	2.4

After Wet Sieve	Container No.	DE
	Wt. of Dry Soil + Container (g)	693.0
	Wt. of Container (g)	408.9
	Dry Wt. of Soil Retained on # 200 Sieve (g)	284.1

U. S. Sieve Size (in.)	U. S. Sieve Size (mm.)	Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000		100.0
1/2"	12.500		100.0
3/8"	9.500		100.0
#4	4.750	0.0	100.0
#8	2.360	7.9	98.2
#16	1.180	30.2	93.1
#30	0.600	70.7	83.8
#50	0.300	144.7	66.8
#100	0.150	224.5	48.5
#200	0.075	281.0	35.5
PAN			

GRAVEL: **0 %**

SAND: **64 %**

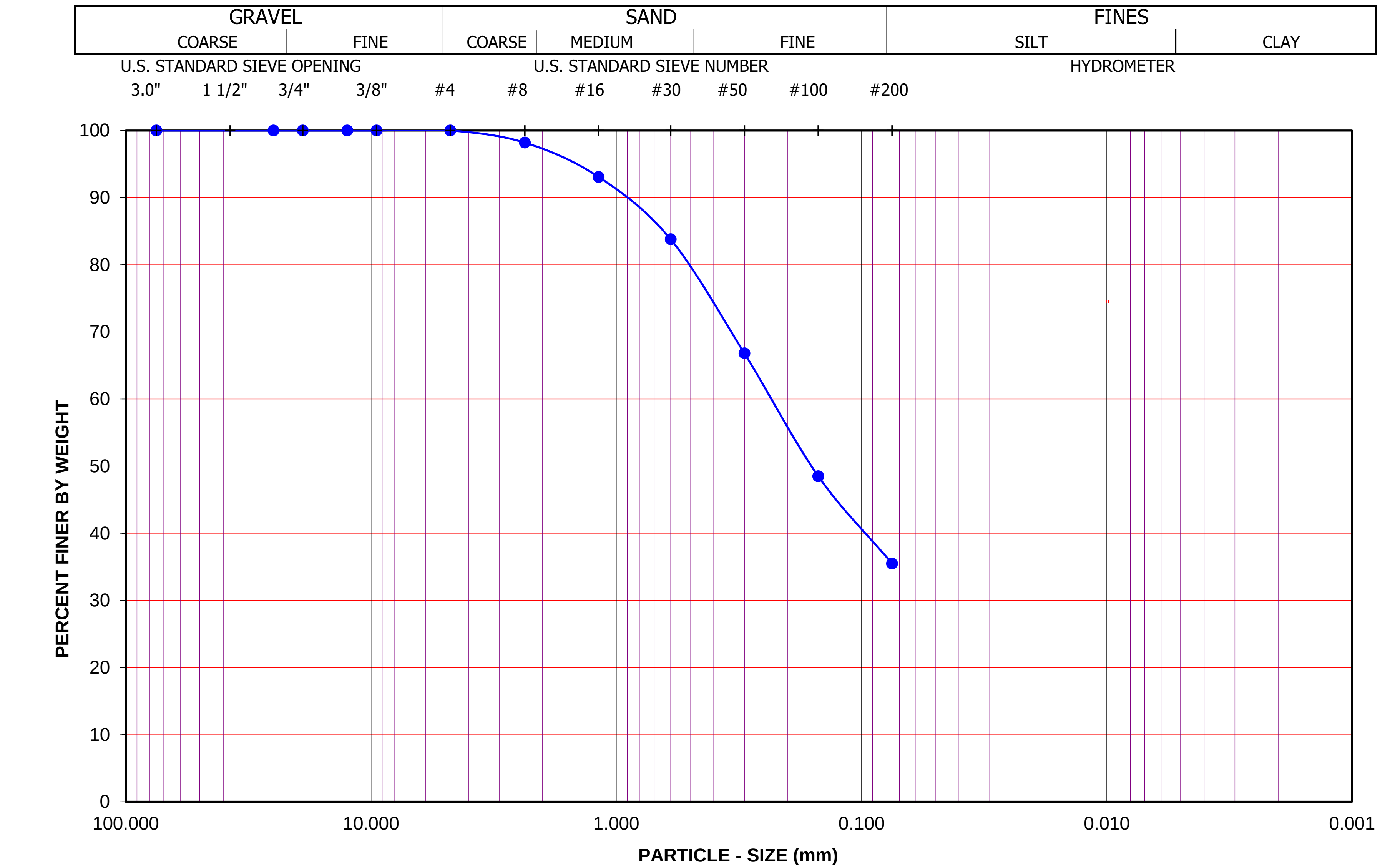
FINES: **36 %**

GROUP SYMBOL: **SM**

Cu = D60/D10 = N/A

Cc = $(D30)^2/(D60*D10)$ = N/A

Remarks:



Project Name: Murrieta Hot Springs Rd Improvements

Project No.: 12453.001

Boring No.: P-7 Sample No.: B-1

Depth (feet): 0 - 5.0 Soil Type : SM

Soil Identification: Silty Sand (SM), Brown.

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

GR:SA:FI : (%) 0 : 64 : 36

Oct-19

Sieve; P-7, B-1 (10-04-19)

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS
ASTM D 6913

Leighton

Project Name:	Murrieta Hot Springs Rd Improvements	Tested By:	MRV	Date:	10/09/19
Project No.:	12453.001	Checked By:	MRV	Date:	10/10/19
Boring No.:	P-8	Depth (feet):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Silty Sand (SM), Brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	EX	Wt. of Air-Dry Soil + Cont. (g)	804.3
Wt. of Air-Dried Soil + Cont.(g)	804.3	Wt. of Dry Soil + Cont. (g)	774.0
Wt. of Container (g)	309.6	Wt. of Container No.______ (g)	309.6
Dry Wt. of Soil (g)	464.4	Moisture Content (%)	6.5

After Wet Sieve	Container No.	EX
	Wt. of Dry Soil + Container (g)	704.2
	Wt. of Container (g)	309.6
	Dry Wt. of Soil Retained on # 200 Sieve (g)	394.6

U. S. Sieve Size (in.)	U. S. Sieve Size (mm.)	Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000	0.0	100.0
1/2"	12.500	9.4	98.0
3/8"	9.500	11.6	97.5
#4	4.750	21.6	95.3
#8	2.360	70.1	84.9
#16	1.180	160.0	65.5
#30	0.600	241.4	48.0
#50	0.300	314.9	32.2
#100	0.150	366.5	21.1
#200	0.075	392.5	15.5
PAN			

GRAVEL: **5 %**

SAND: **79 %**

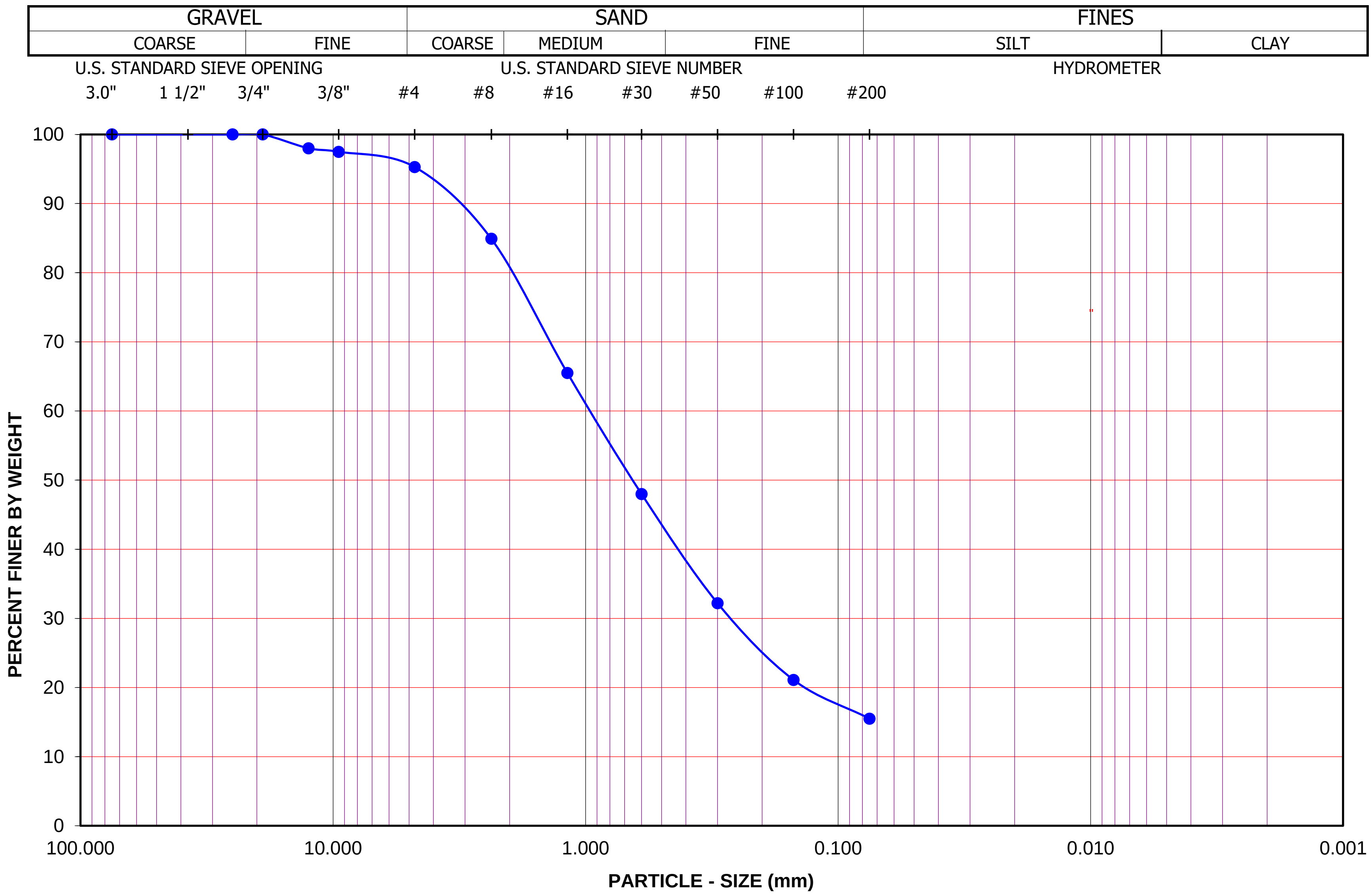
FINES: **16 %**

GROUP SYMBOL: **SM**

Cu = D60/D10 = N/A

Cc = (D30)²/(D60*D10) = N/A

Remarks:



Project Name: Murrieta Hot Springs Rd Improvements

Project No.: 12453.001

Boring No.: P-8 Sample No.: B-1

Depth (feet): 0 - 5.0 Soil Type : SM

Soil Identification: Silty Sand (SM), Brown.

GR:SA:FI : (%) 5 : 79 : 16

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Oct-19

Sieve; P-8, B-1 (10-04-19)

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Examples of material to provide in Appendix 4 may include but are not limited to the following:

- Environmental Site Assessments conducted for the project,
- Other information on Past Site Use that impacts the feasibility of LID BMP implementation on the site.

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections D of this Template.

Appendix 5: LID Feasibility Supplemental Information

Information that supports or supplements the determination of LID technical feasibility documented in Section D

Examples of material to provide in Appendix 5 may include but are not limited to the following:

- Technical feasibility criteria for DMAs
- Site specific analysis of technical infeasibility of all LID BMPs (if Alternative Compliance is needed)
- Documentation of Approval criteria for Proprietary Biofiltration BMPs

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections D of this Template.

Appendix 6: LID BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation to supplement Section D

Examples of material to provide in Appendix 6 may include but are not limited to the following:

- DCV calculations,
- LID BMP sizing calculations from Exhibit C of the SMR WQMP
- Design details/drawings from manufacturers for proprietary BMPs

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 3.4 of the SMR WQMP and Sections D.4 of this Template.

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	SB&O Inc.	Date	5/11/2020
Designed by	BCK	County/City Case No	
Company Project Number/Name	68282.60 - Murrieta Hot Springs Road Widening		
Drainage Area Number/Name	DMA NW		

Enter the Area Tributary to this Feature A_T = 2.107 acres

85^{th} Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township	
Range	
Section	

Enter the 85^{th} Percentile, 24-hour Rainfall Depth D_{85} = 0.74

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.87

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.69

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.51 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (\text{in-ac/ac}) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 3,901 ft^3

Notes:

Biofiltration with No Infiltration Facility - Design Procedure	BMP ID	Legend:	Required Entries
	NW BNI		Calculated Cells

Company Name: SB&O, Inc. Date: 5.11.2020

Designed by: BCK County/City Case No.:

Design Volume

Enter the area tributary to this feature	A_T=	2.107	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	3,901	ft^3
Estimated footprint of BMP, $Area_{BMP}$ (available space or 3% imp. area)	$Area_{BMP}$=	1,777	ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water quality ponding elevation of the basin. The underlying gravel layer for drain pipes should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Biofiltration with No Infiltration Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum)	d_P =	12.0	inches
Depth of Engineered Soil Media (24" to 36"; 18" if vertically constrained)	d_S =	30.0	inches
Design Media Filtration Rate (2.5 in/hr)	I_{design} =	2.5	in/hr
Allowable Routing Period, $T_{routing}$ (5 hrs)	$T_{routing}$ =	5.0	hr
Effective Biofiltration Depth, d_{E_bio} d_{E_bio} (ft) = (d_P + (0.3 x d_S) + (I_{design} * $T_{routing}$)) (ft)	d_{E_bio} =	2.8	ft
Effective Static Depth, $d_{E\_bio\_static}$ $d_{E\_bio\_static}$ = (d_P + (0.3 * d_S)) (ft)	$d_{E\_bio\_static}$ =	1.8	ft
$V_{biofiltered} = d_{E\_bio} * Area_{BMP}$	$V_{biofiltered}$ =	4960.8	ft^3
$V_{biofiltered\_static} = d_{E\_bio\_static} * Area_{BMP}$	$V_{biofiltered\_static}$ =	3109.8	ft^3

Sizing Option 1 Result

Criteria 1: $V_{biofiltered\ (with\ routing)} \geq$ 150% of V_{BMP} Results: **FAIL**

Sizing Option 2 Result

Criteria 2: $V_{biofiltered\_static} \geq 0.75 \times V_{BMP}$ Results: PASS

Note

If neither of these criteria are met increase the footprint and rerun calculations. This calculation is inherently iterative.

Biofiltration with No Retention Facility Properties

Side Slopes in Partial Retention with Biofiltration Facility	z =		:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		2	%
Check Dam Spacing		0	feet
Describe Vegetation:			

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries | Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	SB&O Inc.	Date	5/11/2020
Designed by	BCK	County/City Case No	
Company Project Number/Name	68282.60 - Murrieta Hot Springs Road Widening		
Drainage Area Number/Name	DMA SW		

Enter the Area Tributary to this Feature $A_T =$ 1.588 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township	
Range	
Section	

Enter the 85th Percentile, 24-hour Rainfall Depth $D_{85} =$ 0.74

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction $I_f =$ 0.85

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ $C =$ 0.66

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ $V_u =$ 0.49 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

$V_{BMP} =$ 2,825 ft^3

Notes:

Biofiltration with No Infiltration Facility - Design Procedure	BMP ID	Legend:	Required Entries	
	SW BNI		Calculated Cells	

Company Name: SB&O, Inc. Date: 5/11/2020

Designed by: BCK County/City Case No.:

Design Volume

Enter the area tributary to this feature	A_T=	1.588	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	2,825	ft^3
Estimated footprint of BMP, $Area_{BMP}$ (available space or 3% imp. area)	$Area_{BMP}$=	1,309	ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water quality ponding elevation of the basin. The underlying gravel layer for drain pipes should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Biofiltration with No Infiltration Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum)	d_P =	12.0	inches
Depth of Engineered Soil Media (24" to 36"; 18" if vertically constrained)	d_S =	30.0	inches
Design Media Filtration Rate (2.5 in/hr)	I_{design} =	2.5	in/hr
Allowable Routing Period, $T_{routing}$ (5 hrs)	$T_{routing}$ =	5.0	hr
Effective Biofiltration Depth, d_{E_bio} d_{E_bio} (ft) = (d_P + (0.3 x d_S) + (I_{design} * $T_{routing}$)) (ft)	d_{E_bio} =	2.8	ft
Effective Static Depth, $d_{E\_bio\_static}$ $d_{E\_bio\_static}$ = (d_P + (0.3 * d_S)) (ft)	$d_{E\_bio\_static}$ =	1.8	ft
$V_{biofiltered} = d_{E\_bio} * Area_{BMP}$	$V_{biofiltered}$ =	3654.3	ft^3
$V_{biofiltered\_static} = d_{E\_bio\_static} * Area_{BMP}$	$V_{biofiltered\_static}$ =	2290.8	ft^3

Sizing Option 1 Result

Criteria 1: $V_{biofiltered\ (with\ routing)} \geq 150\%$ of V_{BMP} Results: **FAIL**

Sizing Option 2 Result

Criteria 2: $V_{biofiltered\_static} \geq 0.75 \times V_{BMP}$ Results: PASS

Note

If neither of these criteria are met increase the footprint and rerun calculations. This calculation is inherently iterative.

Biofiltration with No Retention Facility Properties

Side Slopes in Partial Retention with Biofiltration Facility	z =	:1
Diameter of Underdrain	6	inches
Longitudinal Slope of Site (3% maximum)	2	%
Check Dam Spacing	0	feet
Describe Vegetation:		

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	SB&O Inc.	Date	5/11/2020
Designed by	BCK	County/City Case No	
Company Project Number/Name	68282.60 - Murrieta Hot Springs Road Widening		
Drainage Area Number/Name	DMA NE		

Enter the Area Tributary to this Feature $A_T =$ 0.68 acres

85^{th} Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township

Range

Section

Enter the 85^{th} Percentile, 24-hour Rainfall Depth $D_{85} =$ 0.74

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction $I_f =$ 0.86

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ $C =$ 0.67

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ $V_u =$ 0.50 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

$V_{BMP} =$ 1,234 ft^3

Notes:

Biofiltration with No Infiltration Facility - Design Procedure	BMP ID	Legend:	Required Entries
	NE BNI		Calculated Cells

Company Name: SB&O, Inc. Date: 5/11/2020

Designed by: BCK County/City Case No.:

Design Volume

Enter the area tributary to this feature	A_T=	0.68	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	1,234	ft^3
Estimated footprint of BMP, $Area_{BMP}$ (available space or 3% imp. area)	$Area_{BMP}$=	578	ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water quality ponding elevation of the basin. The underlying gravel layer for drain pipes should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Biofiltration with No Infiltration Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum)	d_P =	12.0	inches
Depth of Engineered Soil Media (24" to 36"; 18" if vertically constrained)	d_S =	30.0	inches
Design Media Filtration Rate (2.5 in/hr)	I_{design} =	2.5	in/hr
Allowable Routing Period, $T_{routing}$ (5 hrs)	$T_{routing}$ =	5.0	hr
Effective Biofiltration Depth, d_{E_bio} d_{E_bio} (ft) = $(d_P + (0.3 \times d_S) + (I_{design} * T_{routing}))$ (ft)	d_{E_bio} =	2.8	ft
Effective Static Depth, $d_{E\_bio\_static}$ $d_{E\_bio\_static} = (d_P + (0.3 * d_S))$ (ft)	$d_{E\_bio\_static}$ =	1.8	ft
$V_{biofiltered} = d_{E\_bio} * Area_{BMP}$	$V_{biofiltered}$ =	1613.6	ft^3
$V_{biofiltered\_static} = d_{E\_bio\_static} * Area_{BMP}$	$V_{biofiltered\_static}$ =	1011.5	ft^3

Sizing Option 1 Result

Criteria 1: $V_{biofiltered\ (with\ routing)} \geq 150\%$ of V_{BMP} Results: **FAIL**

Sizing Option 2 Result

Criteria 2: $V_{biofiltered\_static} \geq 0.75 \times V_{BMP}$ Results: **PASS**

Note

If neither of these criteria are met increase the footprint and rerun calculations. This calculation is inherently iterative.

Biofiltration with No Retention Facility Properties

Side Slopes in Partial Retention with Biofiltration Facility	z =		:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		2	%
Check Dam Spacing		0	feet
Describe Vegetation:			

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend:	Required Entries
	Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	SB&O Inc.	Date	5/11/2020
Designed by	BCK	County/City Case No	
Company Project Number/Name	68282.60 - Murrieta Hot Springs Road Widening		
Drainage Area Number/Name	DMA SE		

Enter the Area Tributary to this Feature $A_T =$ 0.844 acres

85^{th} Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township	
Range	
Section	

Enter the 85^{th} Percentile, 24-hour Rainfall Depth $D_{85} =$ 0.74

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction $I_f =$ 0.65

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ $C =$ 0.45

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ $V_u =$ 0.33 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

$V_{BMP} =$ 1,011 ft^3

Notes:

Biofiltration with No Infiltration Facility - Design Procedure	BMP ID	Legend:	Required Entries
	SE BNI		Calculated Cells

Company Name:	SB&O, Inc.	Date:	5/11/2020
Designed by:	BCK	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	0.844	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	1,011	ft^3
Estimated footprint of BMP, $Area_{BMP}$ (available space or 3% imp. area)	$Area_{BMP}$=	605	ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water quality ponding elevation of the basin. The underlying gravel layer for drain pipes should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Biofiltration with No Infiltration Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum)	d_P =	12.0	inches
Depth of Engineered Soil Media (24" to 36"; 18" if vertically constrained)	d_S =	30.0	inches
Design Media Filtration Rate (2.5 in/hr)	I_{design} =	2.5	in/hr
Allowable Routing Period, $T_{routing}$ (5 hrs)	$T_{routing}$ =	5.0	hr
Effective Biofiltration Depth, d_{E_bio} d_{E_bio} (ft) = (d_P + (0.3 x d_S) + (I_{design} * $T_{routing}$)) (ft)	d_{E_bio} =	2.8	ft
Effective Static Depth, $d_{E\_bio\_static}$ $d_{E\_bio\_static}$ = (d_P + (0.3 * d_S)) (ft)	$d_{E\_bio\_static}$ =	1.8	ft
$V_{biofiltered} = d_{E\_bio} * Area_{BMP}$	$V_{biofiltered}$ =	1689.0	ft^3
$V_{biofiltered\_static} = d_{E\_bio\_static} * Area_{BMP}$	$V_{biofiltered\_static}$ =	1058.8	ft^3

Sizing Option 1 Result

Criteria 1:	$V_{biofiltered\ (with\ routing)} \geq$ 150% of V_{BMP}	Results:	PASS

Sizing Option 2 Result

Criteria 2:	$V_{biofiltered\_static} \geq 0.75 \times V_{BMP}$	Results:	PASS

Note

If neither of these criteria are met increase the footprint and rerun calculations. This calculation is inherently iterative.

Biofiltration with No Retention Facility Properties

Side Slopes in Partial Retention with Biofiltration Facility	z =		:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		2	%
Check Dam Spacing		0	feet

Describe Vegetation:

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries; Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	SB&O Inc.	Date	5/11/2020
Designed by	BCK	County/City Case No	
Company Project Number/Name	68282.60 - Murrieta Hot Springs Road Widening		
Drainage Area Number/Name	DMA SE2		

Enter the Area Tributary to this Feature A_T = 0.417 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township	
Range	
Section	

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.74

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.60

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.41

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.30 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (\text{in-ac/ac}) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 454 ft^3

Notes:

Biofiltration with No Infiltration Facility - Design Procedure	BMP ID	Legend:	Required Entries	
	SE2 BNI		Calculated Cells	

Company Name:	SB&O, Inc	Date:	5.7.2020
Designed by:	BCK	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	0.417	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	454	ft^3
Estimated footprint of BMP, $Area_{BMP}$ (available space or 3% imp. area)	$Area_{BMP}$=	292	ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water quality ponding elevation of the basin. The underlying gravel layer for drain pipes should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Biofiltration with No Infiltration Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum)	d_P =	12.0	inches
Depth of Engineered Soil Media (24" to 36"; 18" if vertically constrained)	d_S =	30.0	inches
Design Media Filtration Rate (2.5 in/hr)	I_{design} =	2.5	in/hr
Allowable Routing Period, $T_{routing}$ (5 hrs)	$T_{routing}$ =	5.0	hr

Effective Biofiltration Depth, d_{E_bio}

d_{E_bio} (ft) = (d_P + (0.3 x d_S) + (I_{design} * $T_{routing}$)) (ft)	d_{E_bio} =	2.8	ft

Effective Static Depth, $d_{E\_bio\_static}$

$d_{E\_bio\_static}$ = (d_P + (0.3 * d_S)) (ft)	$d_{E\_bio\_static}$ =	1.8	ft
$V_{biofiltered} = d_{E\_bio} * Area_{BMP}$	$V_{biofiltered}$ =	815.2	ft^3
$V_{biofiltered\_static} = d_{E\_bio\_static} * Area_{BMP}$	$V_{biofiltered\_static}$ =	511.0	ft^3

Sizing Option 1 Result

Criteria 1:	$V_{biofiltered\ (with\ routing)} \geq$ 150% of V_{BMP}	Results:	PASS

Sizing Option 2 Result

Criteria 2:	$V_{biofiltered\_static} \geq 0.75 \times V_{BMP}$	Results:	PASS

Note

If neither of these criteria are met increase the footprint and rerun calculations. This calculation is inherently iterative.

Biofiltration with No Retention Facility Properties

Side Slopes in Partial Retention with Biofiltration Facility	z =		:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		2	%
Check Dam Spacing		0	feet
Describe Vegetation:			

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	SB&O Inc.	Date	10/23/2019
Designed by	BCK	County/City Case No	
Company Project Number/Name	68282.60 - Murrieta Hot Springs Road Widening		
Drainage Area Number/Name	DMA SE3		

Enter the Area Tributary to this Feature $A_T =$ 0.371 acres

85^{th} Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township

Range

Section

Enter the 85^{th} Percentile, 24-hour Rainfall Depth $D_{85} =$ 0.74

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction $I_f =$ 0.80

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ $C =$ 0.60

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ $V_u =$ 0.44 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

$V_{BMP} =$ 593 ft^3

Notes:

Biofiltration with No Infiltration Facility - Design Procedure	BMP ID	Legend:	Required Entries	
	SE3 BNI		Calculated Cells	

Company Name: SB&O, Inc. Date: 5/11/2020

Designed by: BCK County/City Case No.:

Design Volume

Enter the area tributary to this feature A_T= 0.371 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 593 ft^3

Estimated footprint of BMP, $Area_{BMP}$ (available space or 3% imp. area) $Area_{BMP}$= 314 ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water quality ponding elevation of the basin. The underlying gravel layer for drain pipes should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Biofiltration with No Infiltration Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum) d_P = 12.0 inches

Depth of Engineered Soil Media (24" to 36"; 18" if vertically constrained) d_S = 30.0 inches

Design Media Filtration Rate (2.5 in/hr) I_{design} = 2.5 in/hr

Allowable Routing Period, $T_{routing}$ (5 hrs) $T_{routing}$ = 5.0 hr

Effective Biofiltration Depth, d_{E_bio}

d_{E_bio} (ft) = $(d_P + (0.3 \times d_S) + (I_{design} * T_{routing}))$ (ft) d_{E_bio} = 2.8 ft

Effective Static Depth, $d_{E\_bio\_static}$

$d_{E\_bio\_static} = (d_P + (0.3 * d_S))$ (ft) $d_{E\_bio\_static}$ = 1.8 ft

$V_{biofiltered} = d_{E\_bio} * Area_{BMP}$ $V_{biofiltered}$ = 876.6 ft^3

$V_{biofiltered\_static} = d_{E\_bio\_static} * Area_{BMP}$ $V_{biofiltered\_static}$ = 549.5 ft^3

Sizing Option 1 Result

Criteria 1: $V_{biofiltered\ (with\ routing)} \geq 150\%$ of V_{BMP} Results: **FAIL**

Sizing Option 2 Result

Criteria 2: $V_{biofiltered\_static} \geq 0.75 \times V_{BMP}$ Results: PASS

Note

If neither of these criteria are met increase the footprint and rerun calculations. This calculation is inherently iterative.

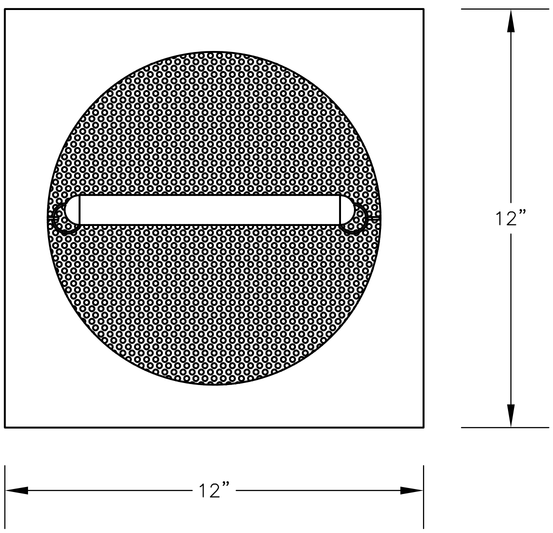
Biofiltration with No Retention Facility Properties

Side Slopes in Partial Retention with Biofiltration Facility	z =	:1
Diameter of Underdrain	6	inches
Longitudinal Slope of Site (3% maximum)	2	%
Check Dam Spacing	0	feet
Describe Vegetation:		

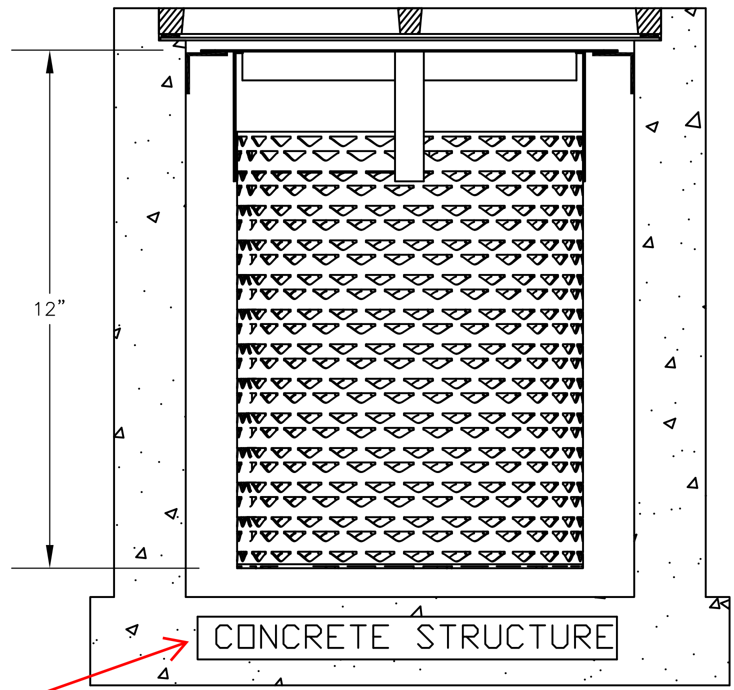
Notes:

BIO CLEAN FULL CAPTURE FILTER

FOR USE IN GRATE INLETS

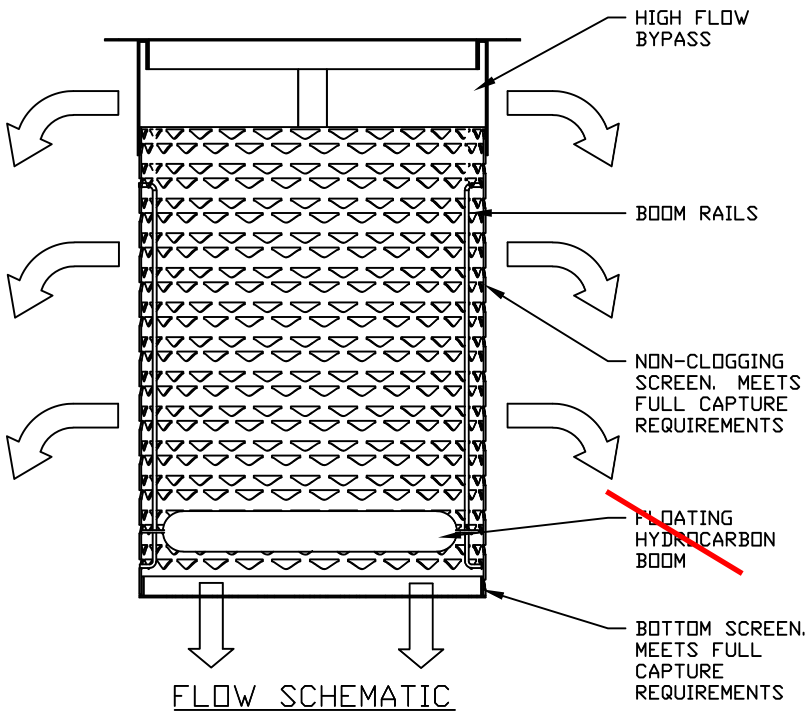


TOP VIEW



Brooks Box
(see attached)

Hand maintenance: lift/remove brooks box 12x12" grate, lift screen, empty, replace screen and replace grate.



FLOW SCHEMATIC

NOTES:

1. ALL HARDWARE, FLANGE, FRAME, SCREENS SHALL BE STAINLESS STEEL
2. HYDROCARBON BOOM SHALL BE 2" DIAMETER AND CONNECTED, MECHANICALLY TO THE FILTER FRAME WITH RAILS ALLOWING IT TO FLOAT ON THE WATER SURFACE REGARDLESS OF HEIGHT.
3. SEE PERFORMANCE REPORTS IN MANUFACTURER'S SPECIFICATIONS.
4. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE – CONTACT BIO CLEAN FOR MORE INFORMATION.
5. BASED ON 37% OPEN AREA.
6. CONSIDERS A SAFETY FACTOR OF 2.0.
7. CONSIDERS A LOCAL DEPRESSION PONDING DEPTH OF 6 INCHES.
8. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
9. CONCRETE STRUCTURE SOLD SEPARATELY.

MODEL #	TREATMENT FLOW (CFS)	BYPASS FLOW (CFS)	SOLIDS STORAGE CAPACITY (CF)
BIO-GRATE-FULL 12-12-12	1.55	1.55	0.27

DRAWING: BIO CLEAN GRATE INLET FILTER DETAILS

TYPICAL MODEL DETAIL

WARRANTY: 8 YEAR MANUFACTURERS

MEETS FULL CAPTURE REQUIREMENTS

BIO CLEAN ENVIRONMENTAL SERVICES, INC.
398 VIA EL CENTRO, OCEANSIDE CA 92058
PHONE: 760-433-7640 FAX: 760-433-3176

DATE: 10/12/17	SCALE: SF = 15	PROJECT:	
DRAFTER: M.C.P.	UNITS = INCHES	REVISIONS:	DATE:
		REVISIONS:	DATE:
		REVISIONS:	DATE:
		REVISIONS:	DATE:

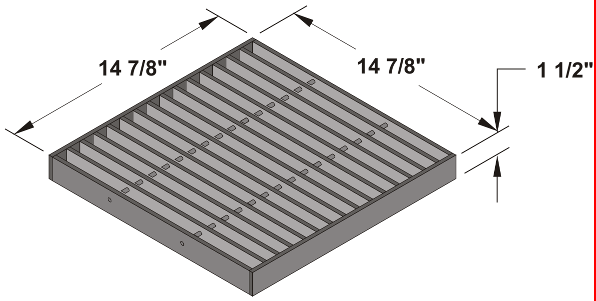
Bio Clean
A Forterra Company

1212 CAST IRON GRATE

PARKWAY ONLY 28 lbs.

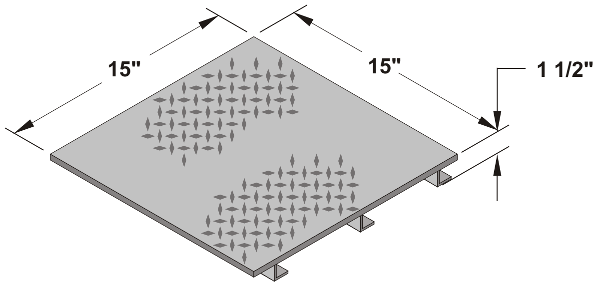
1212 STEEL GRATES

PARKWAY 16 lbs.
TRAFFIC 18 lbs.

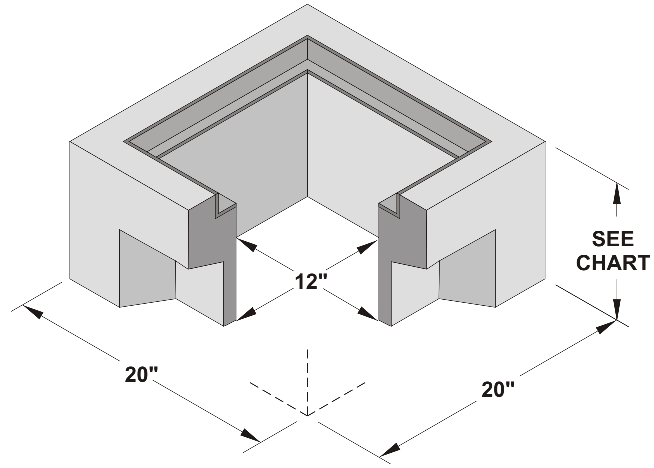


1212 STEEL COVER

PARKWAY 22 lbs.
TRAFFIC 25 lbs.



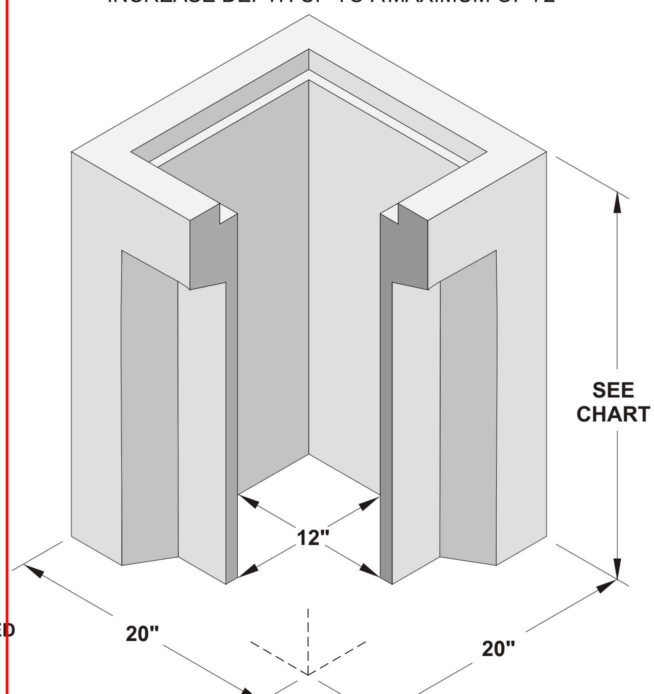
1212 TOP SECTION (*WITH GALVANIZED FRAME*)



7-01

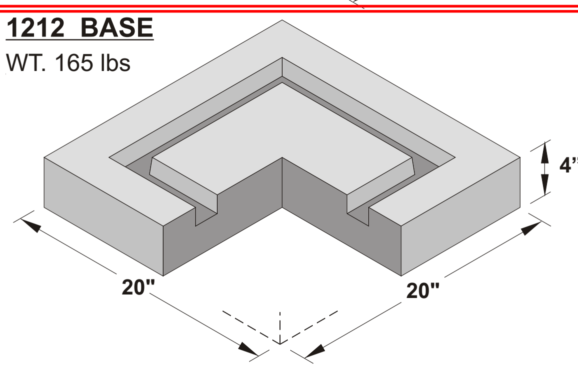
1212 LOWER SECTION (*NO FRAME*)

NOTE: USE 12", 18", 24", 28" LOWERS TO INCREASE DEPTH UP TO A MAXIMUM OF 72"



1212 BASE

WT. 165 lbs



NOTES:

1. GRATES AND COVERS AVAILABLE PAINTED BLACK OR GALVANIZED
2. "ADA" GRATES AVAILABLE IN PARKWAY & TRAFFIC
3. "HEEL PROOF" GRATES AVAILABLE IN PARKWAY & TRAFFIC
4. A TOP SECTION WITH FRAME MUST BE USED IF BOLT DOWN REQUIRED

TOP SECTION	HT.	LBS	KNOCK-OUT
1212 T6	6"	170	NONE
1212 T12	12"	275	(4) 5" x 10"
1212 T18	18"	270	(4) 8" x 12"
1212 T24	24"	430	(4) 8" x 15"
1212 T28	28"	380	(4) 8" x 22"

EXTENSION SECTION	HT.	LBS	KNOCK-OUT
1212 E6	6"	170	NONE

LOWER SECTION	HT.	LBS	KNOCK-OUT
1212 L12	12"	275	(4) 5" x 10"
1212 L18	18"	270	(4) 8" x 12"
1212 L24	24"	430	(4) 8" x 15"
1212 L28	28"	380	(4) 8" x 22"

12" x 12"
CATCH BASIN

BROOKS PRODUCTS

ORG. DWG. DATE	REV. DWG. DATE
04-20-95	05-18-00

1212 CB

Channel Report

2' Wide 3" Deep Curb Opening Chnl Capacity at S of 0.0800 is 4.7 cfs

Rectangular

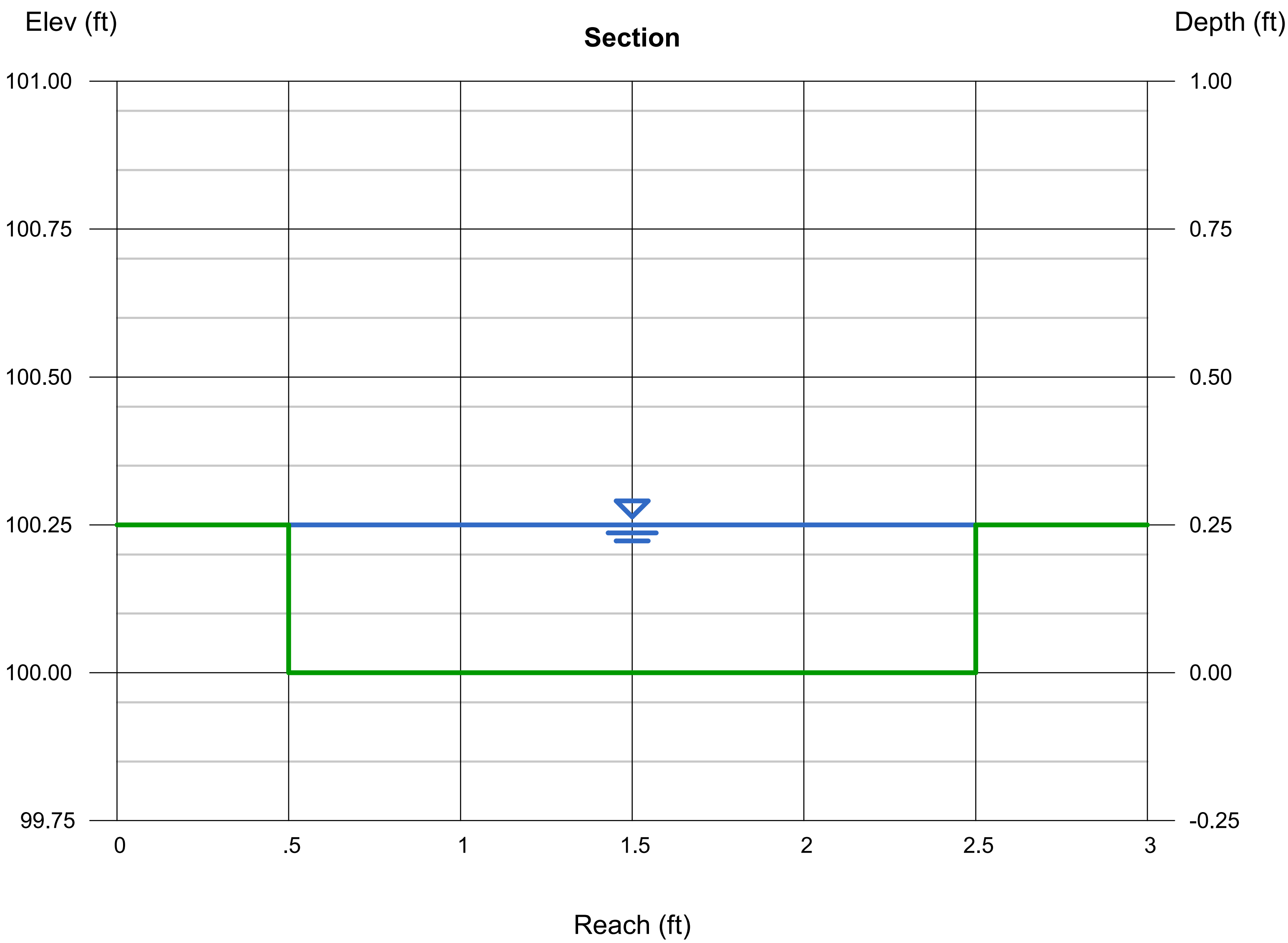
Bottom Width (ft)	= 2.00
Total Depth (ft)	= 0.25
Invert Elev (ft)	= 100.00
Slope (%)	= 8.00
N-Value	= 0.015

Calculations

Compute by:	Known Depth
Known Depth (ft)	= 0.25

Highlighted

Depth (ft)	= 0.25
Q (cfs)	= 4.789
Area (sqft)	= 0.50
Velocity (ft/s)	= 9.58
Wetted Perim (ft)	= 2.50
Crit Depth, Yc (ft)	= 0.25
Top Width (ft)	= 2.00
EGL (ft)	= 1.68



Appendix 7: Hydromodification

Supporting Detail Relating to compliance with the Hydromodification Performance Standards

Examples of material to provide in Appendix 7 may include but are not limited to the following:

- Hydromodification Exemption Exhibit,
- Potential Critical Coarse Sediment Yield Area Mapping
- Hydromodification BMP sizing calculations,
- **B. Cho, v. 4,** report files,
- Site-Specific Critical Coarse Sediment Analysis,
- Design details/drawings from manufacturers for proprietary BMPs

This information should support the hydromodification exemption (if applicable) and hydrologic control BMP and Sediment Supply BMP sections of this Template. Refer to Section 2.4 and 3.6 of the SMR WQMP and Sections E of this Template.

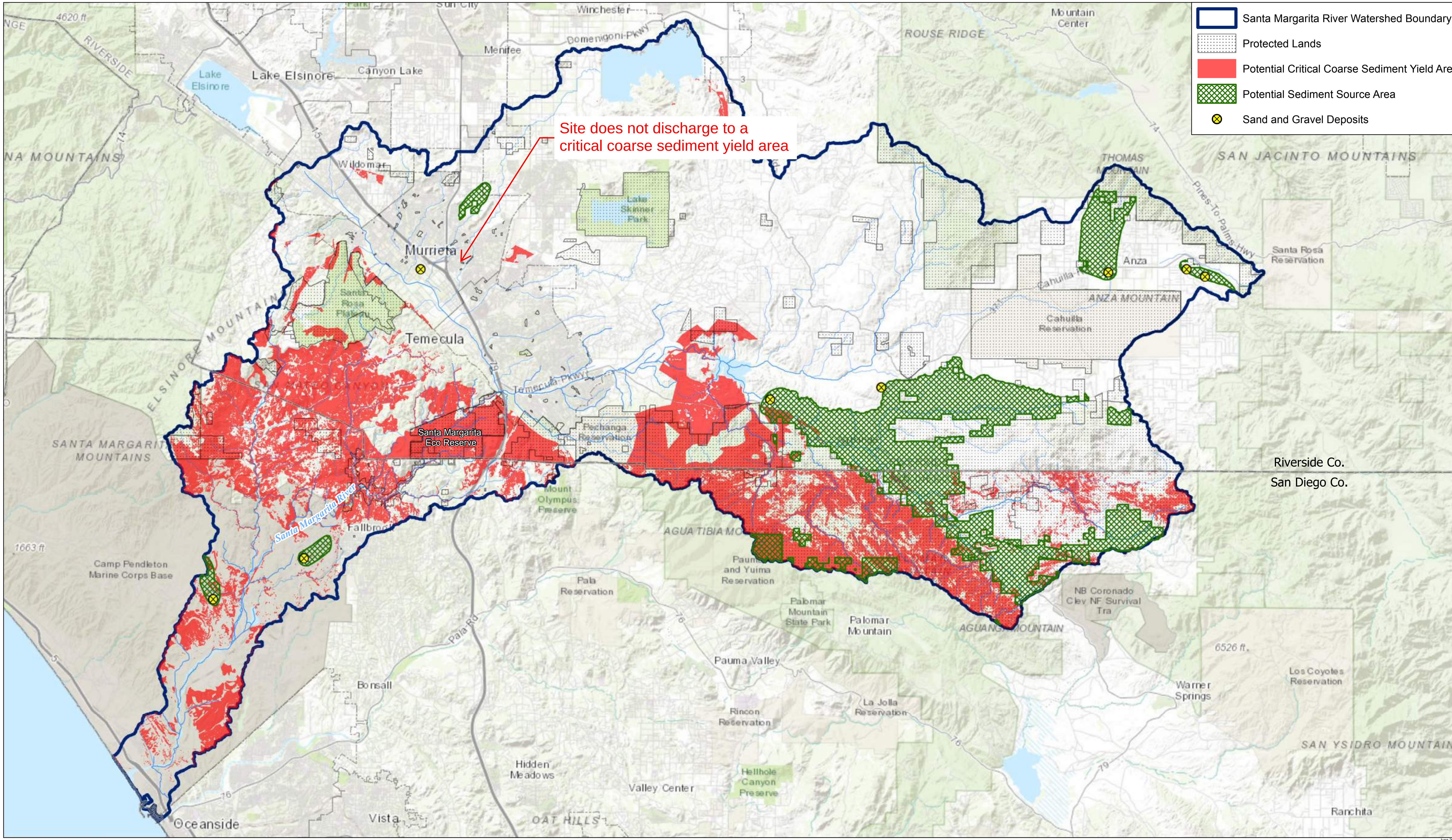


Exhibit G-1

SANTA MARGARITA RIVER WATERSHED

POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS AND POTENTIAL SEDIMENT SOURCE AREAS

It is expressly agreed and understood by the USER of this Excel Spreadsheet file (file) released hereby (whether released in digital or hard copy form) that Riverside County (County) makes no representation as to its accuracy. Further, it is the intent of the parties hereto that the USER shall review and verify calculations, analyze results, and/or independently determine the accuracy thereof prior to placing any reliance whatsoever on the information. Further, the USER shall hold the County, together with the officers, agents and employees of each, free and harmless from any liability whatsoever, including wrongful death, based or asserted upon any act or omission of the District or County, their officers, agents, employees or subcontractors, relating to or in any way connected with the unauthorized use of these files or information; and USER agrees to protect and defend, including all attorney fees and other expenses, each of the foregoing bodies and persons in any legal action based or asserted upon any such acts or omissions. USER also agrees not to sell, reproduce or release these files to others for any purpose whatsoever, except those incidental uses for which the files were acquired, verified and combined with USER'S own work product. Reasonable effort was made to fully comply with the San Diego MS4 Permit requirements using the methods found in the Riverside County Hydrology Manual. If the user finds an error in any way, please contact the County so that the error can be corrected. Any direct tampering of the equations in this spreadsheet would be considered extremely inappropriate, and potentially fraudulent.

Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):	MHS Rd Widening	Rain Gauge	Temecula Valley
Latitude (decimal format):	33.555045	BMP Type (per WQMP):	Biofiltration with No Infiltration
Longitude (decimal format):	-117.147997	BMP Number (Sequential):	NW

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	2.107	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.52
LONGEST WATERCOURSE (FT) - 1,000' max[1]	1000	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	0.88
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1000	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.56
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	989.6	CLOSEST IMPERVIOUS PERCENTAGE (%)	75% Mobile Home Park
EXISTING IMPERVIOUS PERCENTAGE (%)	75		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
1	1.0535 Ac.	Barren	- Cover	84.1		15.9		63	**80**	91
22	1.0535 Ac.	Urban Landscaping	Good Cover	84.1		15.9		21	**38**	58
								0	**0**	0
	2.11 Ac.					**Weighted Average RI Numbers =**		**42.0**	**59.0**	**74.5**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = **1.539** cfs	Ex. 10% of the 2-year Flowrate[1] = **0.205** cfs
(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]	
Ex. 10-year Flowrate (Attach Study) = cfs	Ex. 2-year Flowrate (Attach Study) = cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	2.107	Go to "BMP Design" tab to design your BMP, then check results below. Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.
LONGEST WATERCOURSE (FT)	1000	
DIFFERENCE IN ELEV (FT) - along watercourse	10.4	
PROPOSED IMPERVIOUS PERCENTAGE (%)	87	

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	2.107 Ac.	Urban Landscaping	Good Cover	84.1		15.9		21	**38**	58
								0	**0**	0
								0	**0**	0
	2.11 Ac.					**Weighted Average RI Numbers =**		**21.0**	**38.0**	**58.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
Hydromod Ponded depth	**1.70 feet**	Requirement		Proposed			
Hydromod Drain Time (unclogged)	**297.13 hours**						
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---

Responsible-in-charge: ____________________ Date: __________

Signature: ____________________ Spreadsheet Developed by: Benjie Cho, P.E.

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BMP Design

Fill in blue shaded areas

BMP Geometry & Detention Calculations

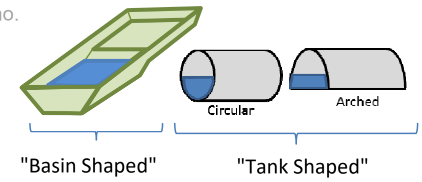
0.1 feet, Stage Intervals

Larger intervals may incr. the Q at the bottom stg.

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Is the BMP a Tank shape? 2 — 1 for yes; 2 for no.



Basin Shaped BMP (Bottom Stage 1st)

Bottom Stage H= 1.2' SS= 0 :1

Top Area		Bottom Area		
Width	5.5	Width	5.5	FT
Length	323	Length	323	FT
area =	1776.5	area =	1777	

Top Stage H= 0.5' SS= 2 :1

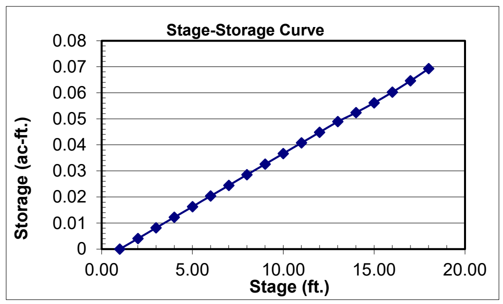
Top Area		Bottom Area		
Width	6.5	Width	4.5	FT
Length	323	Length	321	FT
area =	2099.5	area =	1445	

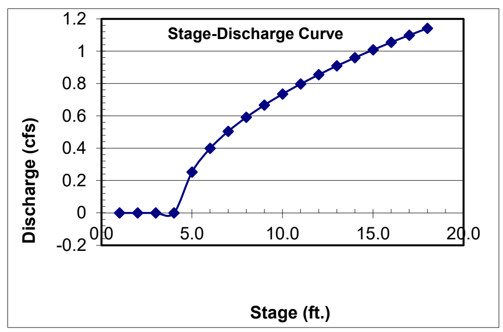
Prop. Top Stg. Vol. =	881	FT3
Prop Bottom Stg Vol =	2,132	FT3
Total Prop. Volume[1] =	3,013	FT3
Max HydroMod Volume =	3,012	FT3
Total Acreage[2] =	2,100	FT2
BMP % of Site =	2.29%	
Max HydroMod Depth[3] =	1.70	FT

[1]Does not include forebay, or low flow trench

[2]Does not account for freeboard or access roads

[3]Does not consider Increased Runoff





Stage-Storage-Discharge*

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.004	178	0.00
0.20	0.008	355	0.00
0.30	0.012	533	0.00
0.40	0.016	711	0.25
0.50	0.020	888	0.40
0.60	0.024	1066	0.50
0.70	0.029	1244	0.59
0.80	0.033	1421	0.67
0.90	0.037	1599	0.74
1.00	0.041	1777	0.80
1.10	0.045	1954	0.86
1.20	0.049	2132	0.91
1.30	0.052	2283	0.96
1.40	0.056	2447	1.01
1.50	0.060	2624	1.05
1.60	0.065	2814	1.10
1.70	0.069	3017	1.14
	0.069	3,017	

MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	0.00	0			
0.0833	6.00	1			
			1.70	2.6	1

Hydromod Depth = 1.70 FT

+ 1' Freeboard = 2.70 FT

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	5.5	FT
Length	323	FT

Top Stage		
Width	15.3	FT
Length	331.8:1	FT

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Add Infiltration

Enter information from actual infiltration tests

Yes	**Consider Infiltration (Yes or No)?**
0.1	Infiltration rate (in/hr) [3]
4	Factor of Safety (3 or greater) [3]
360	mins, Max. Time represented by tests

0.0041	ft3/sec, Infiltration (over entire bottom)
0.0010	ft3/sec, Infiltration / Factor of Safety

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

[3]Per the RC LID Manual, Appendix A.

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Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

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Development Project Number(s):	MHS Rd Widening	Rain Gauge	Temecula Valley
Latitude (decimal format):	33.555045	BMP Type (per WQMP):	Biofiltration with No Infiltration
Longitude (decimal format):	-117.147997	BMP Number (Sequential):	SW

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	1.588	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.52
LONGEST WATERCOURSE (FT) - 1,000' max[1]	1000	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	0.88
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1000	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.56
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	989.6	CLOSEST IMPERVIOUS PERCENTAGE (%)	75% Mobile Home Park
EXISTING IMPERVIOUS PERCENTAGE (%)	76		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
1	0.794 Ac.	Barren	- Cover	100				60	78	90
22	0.794 Ac.	Urban Landscaping	Good Cover	100				16	32	52
								0	0	0
	1.59 Ac.						Weighted Average RI Numbers =	38.0	55.0	71.0

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = 1.153 cfs	Ex. 10% of the 2-year Flowrate[1] = 0.153 cfs
(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]	
Ex. 10-year Flowrate (Attach Study) = cfs	Ex. 2-year Flowrate (Attach Study) = cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	1.588	Go to "BMP Design" tab to design your BMP, then check results below. Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.
LONGEST WATERCOURSE (FT)	1000	
DIFFERENCE IN ELEV (FT) - along watercourse	10.4	
PROPOSED IMPERVIOUS PERCENTAGE (%)	85	

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	1.588 Ac.	Urban Landscaping	Good Cover	100				16	32	52
								0	0	0
								0	0	0
	1.59 Ac.						Weighted Average RI Numbers =	16.0	32.0	52.0

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
Hydromod Ponded depth	1.70 feet	Requirement		Proposed			
Hydromod Drain Time (unclogged)	294.73 hours						
Is the HydroMod BMP properly sized?	Yes, this is acceptable	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	Yes, this is acceptable	---	---	---	---	Issue @ Stage =	---
Mitigated Duration < 110% of Pre-Dev?*	Yes, this is acceptable	---	---	---	---	Issue @ Stage =	---

Responsible-in-charge: ____________ Date: ____________

Signature: ____________

Spreadsheet Developed by: Benjie Cho, P.E.

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BMP Design

Fill in blue shaded areas

BMP Geometry & Detention Calculations

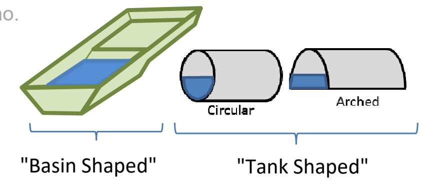
0.1 feet, Stage Intervals

Larger intervals may incr. the Q at the bottom stg.

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Is the BMP a Tank shape? 2 1 for yes; 2 for no.



Basin Shaped BMP (Bottom Stage 1st)

Bottom Stage H= 1.2' SS= 0 :1

Top Area		Bottom Area		
Width	5.5	Width	5.5	FT
Length	238	Length	238	FT
area =	1309	area =	1309	

Top Stage H= 0.5' SS= 2 :1

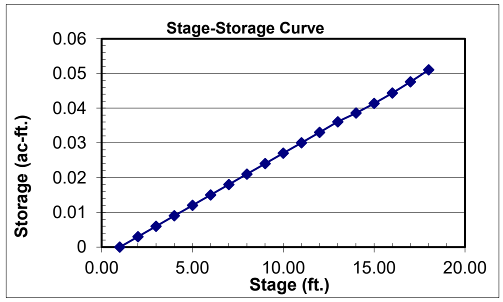
Top Area		Bottom Area		
Width	6.5	Width	4.5	FT
Length	238	Length	236	FT
area =	1547	area =	1062	

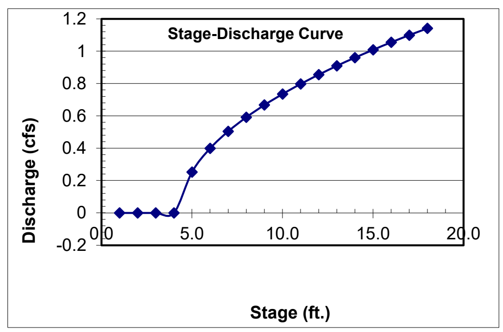
Prop. Top Stg. Vol. =	648	FT3
Prop Bottom Stg Vol =	1,571	FT3
Total Prop. Volume[1] =	2,219	FT3
Max HydroMod Volume =	2,219	FT3
Total Acreage[2] =	1,547	FT2
BMP % of Site =	2.24%	
Max HydroMod Depth[3] =	1.70	FT

[1]Does not include forebay, or low flow trench

[2]Does not account for freeboard or access roads

[3]Does not consider Increased Runoff





Stage-Storage-Discharge*

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.003	131	0.00
0.20	0.006	262	0.00
0.30	0.009	393	0.00
0.40	0.012	524	0.25
0.50	0.015	655	0.40
0.60	0.018	785	0.50
0.70	0.021	916	0.59
0.80	0.024	1047	0.67
0.90	0.027	1178	0.74
1.00	0.030	1309	0.80
1.10	0.033	1440	0.86
1.20	0.036	1571	0.91
1.30	0.039	1682	0.96
1.40	0.041	1802	1.01
1.50	0.044	1933	1.05
1.60	0.048	2073	1.10
1.70	0.051	2223	1.14
	0.051	2,223	

MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	0.00	0			
0.083	6.00	1			
			1.70	2.6	1

Hydromod Depth = 1.70 FT

+ 1' Freeboard = 2.70 FT

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	5.5	FT
Length	238	FT

Top Stage		
Width	15.3	FT
Length	246.8:1	FT

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Add Infiltration

Enter information from actual infiltration tests

Yes	**Consider Infiltration (Yes or No)?**
0.1	Infiltration rate (in/hr) [3]
4	Factor of Safety (3 or greater) [3]
360	mins, Max. Time represented by tests

0.0030	ft3/sec, Infiltration (over entire bottom)
0.0008	ft3/sec, Infiltration / Factor of Safety

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

[3]Per the RC LID Manual, Appendix A.

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Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):	MHS Rd Widening	Rain Gauge	Temecula Valley
Latitude (decimal format):	33.555045	BMP Type (per WQMP):	Biofiltration with No Infiltration
Longitude (decimal format):	-117.147997	BMP Number (Sequential):	NE

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	0.68	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.52
LONGEST WATERCOURSE (FT) - 1,000' max[1]	1000	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	0.88
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1000	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.56
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	991.4	CLOSEST IMPERVIOUS PERCENTAGE (%)	75% Mobile Home Park
EXISTING IMPERVIOUS PERCENTAGE (%)	77		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
1	0.34 Ac.	Barren	- Cover	77.2		22.8		64	**81**	92
22	0.34 Ac.	Urban Landscaping	Good Cover	77.2		22.8		22	**40**	60
								0	**0**	0
	0.68 Ac.						**Weighted Average RI Numbers =**	**43.0**	**60.5**	**76.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = **0.501** cfs	Ex. 10% of the 2-year Flowrate[1] = **0.065** cfs

(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]

Ex. 10-year Flowrate (Attach Study) = cfs	Ex. 2-year Flowrate (Attach Study) = cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	0.68	Go to "BMP Design" tab to design your BMP, then check results below. Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.
LONGEST WATERCOURSE (FT)	1000	
DIFFERENCE IN ELEV (FT) - along watercourse	8.6	
PROPOSED IMPERVIOUS PERCENTAGE (%)	86	

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	0.68 Ac.	Urban Landscaping	Good Cover	77.2		22.8		22	**40**	60
								0	**0**	0
								0	**0**	0
	0.68 Ac.						**Weighted Average RI Numbers =**	**22.0**	**40.0**	**60.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
Hydromod Ponded depth	**1.70 feet**	Requirement		Proposed			
Hydromod Drain Time (unclogged)	**150.58 hours**						
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---

Responsible-in-charge: Date:

Signature:

Spreadsheet Developed by: Benjie Cho, P.E.

It is expressly agreed and understood by the USER of this Excel Spreadsheet file (file) released hereby (whether released in digital or hard copy form) that Riverside County (County) makes no representation as to its accuracy. Further, it is the intent of the parties hereto that the USER shall review and verify calculations, analyze results, and/or independently determine the accuracy thereof prior to placing any reliance whatsoever on the information. Further, the USER shall hold the County, together with the officers, agents and employees of each, free and harmless from any liability whatsoever, including wrongful death, based or asserted upon any act or omission of the District or County, their officers, agents, employees or subcontractors, relating to or in any way connected with the unauthorized use of these files or information; and USER agrees to protect and defend, including all attorney fees and other expenses, each of the foregoing bodies and persons in any legal action based or asserted upon any such acts or omissions. USER also agrees not to sell, reproduce or release these files to others for any purpose whatsoever, except those incidental uses for which the files were acquired, verified and combined with USER'S own work product. Reasonable effort was made to fully comply with the San Diego MS4 Permit requirements using the methods found in the Riverside County Hydrology Manual. If the user finds an error in any way, please contact the County so that the error can be corrected. Any direct tampering of the equations in this spreadsheet would be considered extremely inappropriate, and potentially fraudulent.

BMP Design

Fill in **blue** shaded areas

BMP Geometry & Detention Calculations

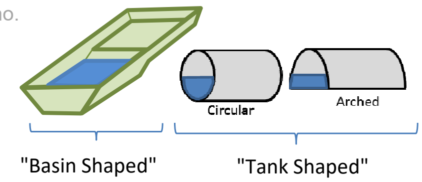
0.1 feet, Stage Intervals

Larger intervals may incr. the Q at the bottom stg.

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Is the BMP a Tank shape? **2** 1 for yes; 2 for no.



Basin Shaped BMP (Bottom Stage 1st)

Bottom Stage H= **1.2'** SS= **0** :1

Top Area		Bottom Area		
Width	5.5	Width	5.5	FT
Length	105	Length	105	FT
area =	577.5	area =	577.5	

Top Stage H= **0.5'** SS= **2** :1

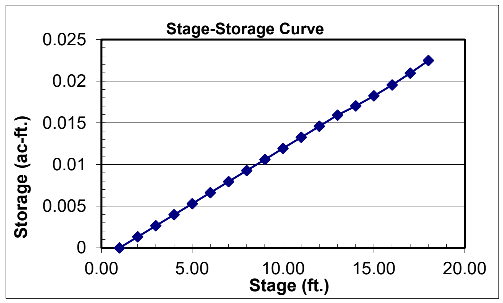
Top Area		Bottom Area		
Width	6.5	Width	4.5	FT
Length	105	Length	103	FT
area =	682.5	area =	463.5	

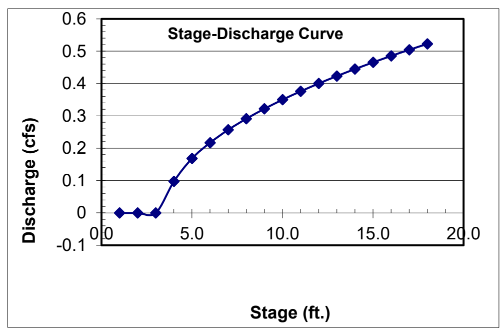
Prop. Top Stg. Vol. =	285	FT3
Prop Bottom Stg Vol =	693	FT3
Total Prop. Volume[1] =	978	FT3
Max HydroMod Volume =	970	FT3
Total Acreage[2] =	683	FT2
BMP % of Site =	2.30%	
Max HydroMod Depth[3] =	1.70	FT

[1]Does not include forebay, or low flow trench

[2]Does not account for freeboard or access roads

[3]Does not consider Increased Runoff





Stage-Storage-Discharge*

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.001	58	0.00
0.20	0.003	116	0.00
0.30	0.004	173	0.10
0.40	0.005	231	0.17
0.50	0.007	289	0.22
0.60	0.008	347	0.26
0.70	0.009	404	0.29
0.80	0.011	462	0.32
0.90	0.012	520	0.35
1.00	0.013	578	0.38
1.10	0.015	635	0.40
1.20	0.016	693	0.42
1.30	0.017	741	0.44
1.40	0.018	794	0.47
1.50	0.020	852	0.49
1.60	0.021	913	0.50
1.70	0.022	979	0.52
	0.022	979	

MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	0.00	0			
0.083	4.00	1			
			1.70	2.6	1

Hydromod Depth =	1.70 FT	
+ 1' Freeboard =	2.70 FT	

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	5.5	FT
Length	105	FT

Top Stage		
Width	15.3	FT
Length	113.8:1	FT

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Add Infiltration

Enter information from actual infiltration tests

Yes	**Consider Infiltration (Yes or No)?**	
0.1	Infiltration rate (in/hr) [3]	0.0013 ft3/sec, Infiltration (over entire bottom)
4	Factor of Safety (3 or greater) [3]	0.0003 ft3/sec, Infiltration / Factor of Safety
360	mins, Max. Time represented by tests	

[3]Per the RC LID Manual, Appendix A.

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

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Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):	MHS Rd Widening	Rain Gauge	Temecula Valley
Latitude (decimal format):	33.555045	BMP Type (per WQMP):	Biofiltration with No Infiltration
Longitude (decimal format):	-117.147997	BMP Number (Sequential):	SE

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	0.844	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.52
LONGEST WATERCOURSE (FT) - 1,000' max[1]	686	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	0.88
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1140.5	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.56
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	1132.5	CLOSEST IMPERVIOUS PERCENTAGE (%)	65% Condominiums
EXISTING IMPERVIOUS PERCENTAGE (%)	68		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
1	0.422 Ac.	Barren	- Cover	100				60	**78**	90
22	0.422 Ac.	Urban Landscaping	Good Cover	100				16	**32**	52
								0	**0**	0
	0.84 Ac.						**Weighted Average RI Numbers =**	**38.0**	**55.0**	**71.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = **0.602** cfs	Ex. 10% of the 2-year Flowrate[1] = **0.093** cfs

(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]

Ex. 10-year Flowrate (Attach Study) = cfs	Ex. 2-year Flowrate (Attach Study) = cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	0.844	Go to "BMP Design" tab to design your BMP, then check results below.
LONGEST WATERCOURSE (FT)	686	Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.
DIFFERENCE IN ELEV (FT) - along watercourse	8	
PROPOSED IMPERVIOUS PERCENTAGE (%)	65	

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	0.844 Ac.	Urban Landscaping	Good Cover	100				16	**32**	52
								0	**0**	0
								0	**0**	0
	0.84 Ac.						**Weighted Average RI Numbers =**	**16.0**	**32.0**	**52.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record: Requirement		Proposed		See below for the Height in the Basin (Stage) that is causing a non-compliant result	
Hydromod Ponded depth	**1.70 feet**						
Hydromod Drain Time (unclogged)	**150.89 hours**						
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---

Responsible-in-charge:

Date:

Signature:

Spreadsheet Developed by: Benjie Cho, P.E.

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BMP Design

Fill in blue shaded areas

BMP Geometry & Detention Calculations

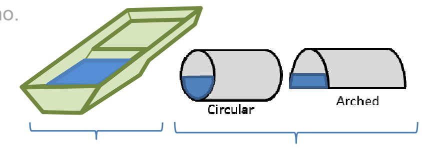
0.1	feet, Stage Intervals

Larger intervals may incr. the Q at the bottom stg.

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Is the BMP a Tank shape? 2 1 for yes; 2 for no.



"Basin Shaped" "Tank Shaped"

Basin Shaped BMP (Bottom Stage 1st)

Bottom Stage H= 1.2' SS= 0 :1

Top Area		Bottom Area		
Width	5.5	Width	5.5	FT
Length	110	Length	110	FT
area =	605	area =	605	

Top Stage H= 0.5' SS= 2 :1

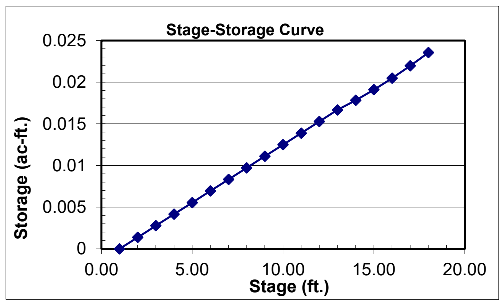
Top Area		Bottom Area		
Width	6.5	Width	4.5	FT
Length	110	Length	108	FT
area =	715	area =	486	

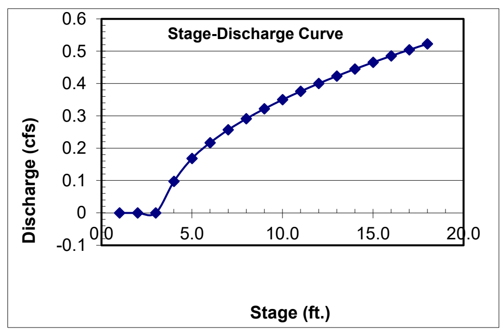
Prop. Top Stg. Vol. =	298	FT3
Prop Bottom Stg Vol =	726	FT3
Total Prop. Volume[1] =	1,024	FT3
Max HydroMod Volume =	1,024	FT3
Total Acreage[2] =	715	FT2
BMP % of Site =	1.94%	
Max HydroMod Depth[3] =	1.70	FT

[1]Does not include forebay, or low flow trench

[2]Does not account for freeboard or access roads

[3]Does not consider Increased Runoff





Stage-Storage-Discharge*

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.001	61	0.00
0.20	0.003	121	0.00
0.30	0.004	182	0.10
0.40	0.006	242	0.17
0.50	0.007	303	0.22
0.60	0.008	363	0.26
0.70	0.010	424	0.29
0.80	0.011	484	0.32
0.90	0.013	545	0.35
1.00	0.014	605	0.38
1.10	0.015	666	0.40
1.20	0.017	726	0.42
1.30	0.018	777	0.44
1.40	0.019	832	0.47
1.50	0.020	892	0.49
1.60	0.022	957	0.50
1.70	0.024	1026	0.52
	0.024	1,026	

MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	0.00	0			
0.083	4.00	1			
			1.70	2.6	1

Hydromod Depth =	1.70 FT
+ 1' Freeboard =	2.70 FT

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	5.5	FT
Length	110	FT

Top Stage		
Width	15.3	FT
Length	118.8:1	FT

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Add Infiltration

Enter information from actual infiltration tests

Yes	**Consider Infiltration (Yes or No)?**
0.1	Infiltration rate (in/hr) [3]
4	Factor of Safety (3 or greater) [3]
360	mins, Max. Time represented by tests

0.0014	ft3/sec, Infiltration (over entire bottom)
0.0004	ft3/sec, Infiltration / Factor of Safety

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

[3]Per the RC LID Manual, Appendix A.

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Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):	MHS Rd Widening	Rain Gauge	Temecula Valley
Latitude (decimal format):	33.555045	BMP Type (per WQMP):	Biofiltration with No Infiltration
Longitude (decimal format):	-117.147997	BMP Number (Sequential):	SE2

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	0.417	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.52
LONGEST WATERCOURSE (FT) - 1,000' max[1]	386	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	0.88
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1132.5	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.56
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	1130.5	CLOSEST IMPERVIOUS PERCENTAGE (%)	80% Apartment
EXISTING IMPERVIOUS PERCENTAGE (%)	78		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
1	0.2085 Ac.	Barren	- Cover	100				60	78	90
22	0.2085 Ac.	Urban Landscaping	Good Cover	100				16	32	52
								0	0	0
	0.42 Ac.				Weighted Average RI Numbers =			38.0	55.0	71.0

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = **0.308** cfs	Ex. 10% of the 2-year Flowrate[1] = **0.048** cfs
(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]	
Ex. 10-year Flowrate (Attach Study) = cfs	Ex. 2-year Flowrate (Attach Study) = cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	0.417	Go to "BMP Design" tab to design your BMP, then check results below. Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.
LONGEST WATERCOURSE (FT)	386	
DIFFERENCE IN ELEV (FT) - along watercourse	2	
PROPOSED IMPERVIOUS PERCENTAGE (%)	60	

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	0.417 Ac.	Urban Landscaping	Good Cover	100				16	32	52
								0	0	0
								0	0	0
	0.42 Ac.				Weighted Average RI Numbers =			16.0	32.0	52.0

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
Hydromod Ponded depth	**1.70 feet**	Requirement		Proposed			
Hydromod Drain Time (unclogged)	**60.93 hours**						
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---

Responsible-in-charge: ____________________ Date: __________

Signature: ____________________

Spreadsheet Developed by: Benjie Cho, P.E.

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BMP Design

Fill in **blue** shaded areas

BMP Geometry & Detention Calculations

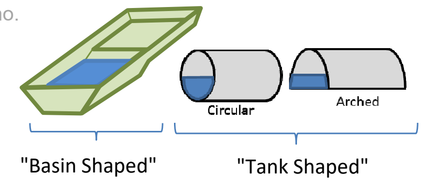
0.1 **feet, Stage Intervals**

Larger intervals may incr. the Q at the bottom stg.

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Is the BMP a Tank shape? 2 1 for yes; 2 for no.



Basin Shaped BMP (Bottom Stage 1st)

Bottom Stage H= 1.2' SS= 0 :1

Top Area		Bottom Area		
Width	5.5	Width	5.5	FT
Length	53	Length	53	FT
area =	291.5	area =	291.5	

Top Stage H= 0.5' SS= 2 :1

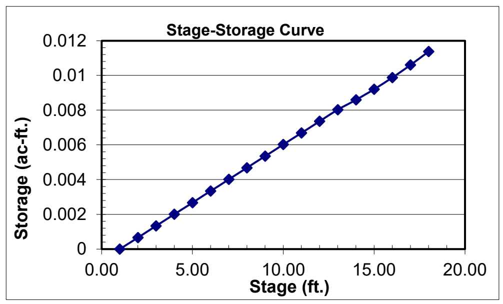
Top Area		Bottom Area		
Width	6.5	Width	4.5	FT
Length	54	Length	52	FT
area =	351	area =	234	

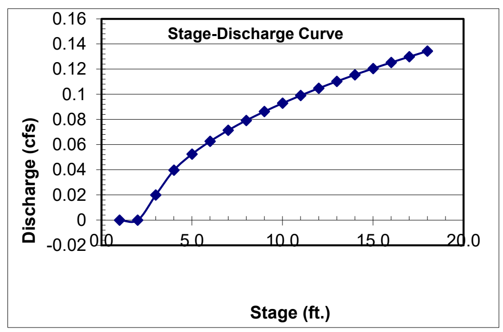
Prop. Top Stg. Vol. =	145	FT3
Prop Bottom Stg Vol =	350	FT3
Total Prop. Volume[1] =	495	FT3
Max HydroMod Volume =	486	FT3
Total Acreage[2] =	351	FT2
BMP % of Site =	1.93%	
Max HydroMod Depth[3] =	1.70	FT

[1]Does not include forebay, or low flow trench

[2]Does not account for freeboard or access roads

[3]Does not consider Increased Runoff





Stage-Storage-Discharge*

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.001	29	0.00
0.20	0.001	58	0.02
0.30	0.002	87	0.04
0.40	0.003	117	0.05
0.50	0.003	146	0.06
0.60	0.004	175	0.07
0.70	0.005	204	0.08
0.80	0.005	233	0.09
0.90	0.006	262	0.09
1.00	0.007	292	0.10
1.10	0.007	321	0.10
1.20	0.008	350	0.11
1.30	0.009	374	0.12
1.40	0.009	401	0.12
1.50	0.010	430	0.13
1.60	0.011	462	0.13
1.70	0.011	496	0.13
	0.011	496	

MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	0.00	0			
0.083	2.00	1			
			1.70	2.6	1

Hydromod Depth = 1.70 FT

\+ 1' Freeboard = 2.70 FT

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	5.5	FT
Length	53	FT

Top Stage		
Width	15.3	FT
Length	62.8:1	FT

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Add Infiltration

Enter information from actual infiltration tests

Yes	**Consider Infiltration (Yes or No)?**
0.1	Infiltration rate (in/hr) [3]
4	Factor of Safety (3 or greater) [3]
360	mins, Max. Time represented by tests

0.0007	ft3/sec, Infiltration (over entire bottom)
0.0002	ft3/sec, Infiltration / Factor of Safety

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

[3]Per the RC LID Manual, Appendix A.

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Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):	MHS Rd Widening	Rain Gauge	Temecula Valley
Latitude (decimal format):	33.555045	BMP Type (per WQMP):	Biofiltration with No Infiltration
Longitude (decimal format):	-117.147997	BMP Number (Sequential):	SE3

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	0.371	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.52
LONGEST WATERCOURSE (FT) - 1,000' max[1]	734	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	0.88
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1130.5	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.56
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	1125.8	CLOSEST IMPERVIOUS PERCENTAGE (%)	90% Commercial
EXISTING IMPERVIOUS PERCENTAGE (%)	92		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
1	0.1855 Ac.	Barren	- Cover	51.9		48.1		68	**84**	93
22	0.1855 Ac.	Urban Landscaping	Good Cover	51.9		48.1		31	**50**	70
								0	**0**	0
	0.37 Ac.						**Weighted Average RI Numbers =**	**49.5**	**67.0**	**81.5**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = **0.288** cfs	Ex. 10% of the 2-year Flowrate[1] = **0.043** cfs
(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]	
Ex. 10-year Flowrate (Attach Study) = cfs	Ex. 2-year Flowrate (Attach Study) = cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	0.371	Go to "BMP Design" tab to design your BMP, then check results below. Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.
LONGEST WATERCOURSE (FT)	734	
DIFFERENCE IN ELEV (FT) - along watercourse	4.7	
PROPOSED IMPERVIOUS PERCENTAGE (%)	80	

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	0.371 Ac.	Urban Landscaping	Good Cover	51.9		48.1		31	**50**	70
								0	**0**	0
								0	**0**	0
	0.37 Ac.						**Weighted Average RI Numbers =**	**31.0**	**50.0**	**70.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
Hydromod Ponded depth	**1.70 feet**	Requirement		Proposed			
Hydromod Drain Time (unclogged)	**150.02 hours**						
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---

Responsible-in-charge: ____________________ Date: __________

Signature: ____________________

Spreadsheet Developed by: Benjie Cho, P.E.

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BMP Design

Fill in **blue** shaded areas

BMP Geometry & Detention Calculations

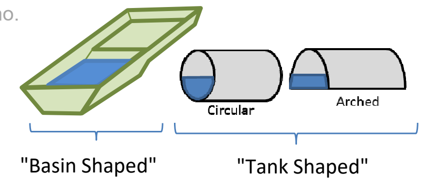
0.1	feet, Stage Intervals

Larger intervals may incr. the Q at the bottom stg.

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Is the BMP a Tank shape? **2** 1 for yes; 2 for no.



Basin Shaped BMP (Bottom Stage 1st)

Bottom Stage H= 1.2' SS= 0 :1

Top Area		Bottom Area		
Width	5.5	Width	5.5	FT
Length	57	Length	57	FT
area =	313.5	area =	313.5	

Top Stage H= 0.5' SS= 2 :1

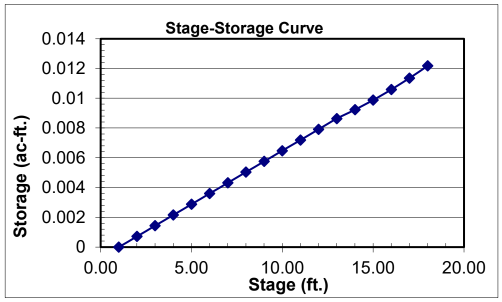
Top Area		Bottom Area		
Width	6.5	Width	4.5	FT
Length	57	Length	55	FT
area =	370.5	area =	247.5	

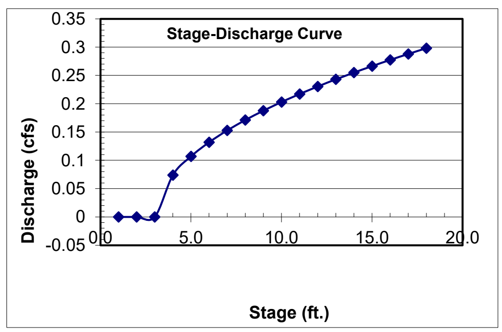
Prop. Top Stg. Vol. =	153	FT3
Prop Bottom Stg Vol =	376	FT3
Total Prop. Volume[1] =	530	FT3
Max HydroMod Volume =	525	FT3
Total Acreage[2] =	371	FT2
BMP % of Site =	2.29%	
Max HydroMod Depth[3] =	1.70	FT

[1] Does not include forebay, or low flow trench

[2] Does not account for freeboard or access roads

[3] Does not consider Increased Runoff





Stage-Storage-Discharge*

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.001	31	0.00
0.20	0.001	63	0.00
0.30	0.002	94	0.07
0.40	0.003	125	0.11
0.50	0.004	157	0.13
0.60	0.004	188	0.15
0.70	0.005	219	0.17
0.80	0.006	251	0.19
0.90	0.006	282	0.20
1.00	0.007	314	0.22
1.10	0.008	345	0.23
1.20	0.009	376	0.24
1.30	0.009	402	0.26
1.40	0.010	430	0.27
1.50	0.011	461	0.28
1.60	0.011	495	0.29
1.70	0.012	530	0.30
	0.012	530	

MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	0.00	0			
0.083	3.00	1			
			1.70	2.6	1

Hydromod Depth =	1.70 FT
+ 1' Freeboard =	2.70 FT

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	5.5	FT
Length	57	FT

Top Stage		
Width	15.3	FT
Length	65.8:1	FT

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Add Infiltration

Enter information from actual infiltration tests

Yes	**Consider Infiltration (Yes or No)?**
0.1	Infiltration rate (in/hr) [3]
4	Factor of Safety (3 or greater) [3]
360	mins, Max. Time represented by tests

0.0007	ft3/sec, Infiltration (over entire bottom)
0.0002	ft3/sec, Infiltration / Factor of Safety

[3] Per the RC LID Manual, Appendix A.

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Include a copy of the completed Pollutant Sources/Source Control Checklist used to document Source Control BMPs in Section H of this Template.

Appendix 8

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section **H** of the 20**18** SMR WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table H.1 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ A. **On-site storm drain inlets**	❑ **Locations of inlets.**	❑ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	❑ **Maintain and periodically repaint or replace inlet markings.** ❑ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ❑ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ❑ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
❑ B. **Interior floor drains and elevator shaft sump pumps**		❑ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	❑ **Inspect and maintain drains to prevent blockages and overflow.**
❑ C. **Interior parking garages**		❑ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	❑ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ D1. Need for future indoor & structural pest control		❑ Note building design features that discourage entry of pests.	❑ Provide Integrated Pest Management information to owners, lessees, and operators.
☑ D2. Landscape/ Outdoor Pesticide Use	❑ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ❑ Show self-retaining landscape areas, if any. ☑ Show stormwater treatment and hydrograph modification management BMPs.	State that final landscape plans will accomplish all of the following. ❑ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ☑ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ☑ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ☑ Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☑ Maintain landscaping using minimum or no pesticides. ☑ See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at: http://www.rcwatershed.org/about/materials-library/#1450469138395-bb76dd39-d810 ☑ Provide IPM information to new owners, lessees and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at:** http://www.rcwatershed.org/about/materials-library/#1450469201433-f5f358c9-6008
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at** http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9 **Provide this brochure to new site owners, lessees, and operators.**
❑ G. **Refuse areas**	❑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ❑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	❑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ❑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	❑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at** www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at: **http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9**
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	❑ **Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. Vehicle and Equipment Cleaning	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9 ❑ Car dealerships and similar may rinse cars with water only.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** **Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations; "Outdoor Cleaning Activities;" and "Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants. Brochures can be found at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ N. **Fire Sprinkler Test Water**		❑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	❑ **See the note in Fact Sheet SC-41, “Building and Grounds Maintenance,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ❑ **Boiler drain lines** ❑ **Condensate drain lines** ❑ **Rooftop equipment** ❑ **Drainage sumps** ❑ **Roofing, gutters, and trim.** ❑ **Other sources**		❑ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ❑ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ❑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ❑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ❑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** ❑ **Include controls for other sources as specified by local reviewer.**	

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ P. **Plazas, sidewalks, and parking lots.**			☐ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Include the completed Operation and Maintenance Plan in this Appendix along with additional documentation of Finance and Maintenance Recording Mechanisms for the site. Refer to Sections 3.10 and 5 of the SMR WQMP and Section J of this Template.

Maintenance for the 6 Biofiltration with No Infiltration trenches shall include:

- **Vegetation maintenance:**
  Fertilizer, pesticide and herbicide use should be avoided as much as possible as they contribute to water pollution. Appropriate native plant selections and Integrated Pest Management (IPM) methods should be used where possible.
- **Trash maintenance to minimize clogging and improve aesthetics:**
  1. **Remove accumulations of trash from trench vegetation and at downstream end of each trench from around raised concrete outlet structure and grate.**
  2. **Remove outlet structure top grate; remove and empty steel trash capture basket and replace basket and top grate.**
- **Biofiltration trench bottom surface maintenance:**
  Monthly inspect trenches for irrigation issues, failed vegetation on bottom and side slopes, erosion, clogging, standing water, algae, etc. Observe, inspect, and maintain as follows:
    - **A. Specific area(s) of over-grown vegetation and/or excessive moisture (stagnant/standing water/algae) could indicate an irrigation leak. Repair irrigation as needed.**
    - **B. Dead vegetation indicates no irrigation. Repair irrigation and replace BSM and plantings per project WQMP and Landscape Plans as needed.**
    - **C. Visible rills, exposed plant roots, side slopes steeper than 2H:1V indicate erosion of trench biofiltration soil media (BSM). Regrade/ replace BSM and plantings per project WQMP and Landscape Plans as needed.**
    - **D. Accumulations of sediments located immediately around the 6” raised concrete outlet grate structure (at the downstream end of each trench) indicate erosion of BSM. Verify 6” vertical open air between top of the raised concrete outlet structure and bottom of trench. Regrade/replace BSM and plantings per project WQMP and Landscape Plans as needed.**
    - **E. The vertical height difference between the bottom of trench and top of curb should be 12 inches at all points in trench. If less than 12 inches, regrade/replace BSM and plantings per project WQMP and Landscape Plans as needed.**

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

Examples of material to provide in Appendix 10 may include but are not limited to the following:

- BMP Fact Sheets for proposed BMPs form Exhibit C: LID BMP Design Handbook of the SMR WQMP,
- Source control information and training material for site owners and operators,
- O&M training material,
- Other educational/training material related to site drainage and BMPs.

3.5 Biofiltration with Partial Infiltration

Type of BMP	LID – Biofiltration with Partial Infiltration
Priority Level	Priority 2 – Biofiltration
Treatment Mechanisms	Infiltration, Evapotranspiration, Evaporation, Biofiltration
Infiltration Rate Range	0.1 to 0.8 in/hr factored design infiltration rate
Maximum Drainage Area	This BMP is intended to be integrated into a project's landscaped area in a distributed manner. Typically, contributing drainage areas to Bioretention Facilities range from less than 1 acre to a maximum of around 5 acres. For facilities treating larger drainage basins see Fact Sheet 3.7 for additional guidance on design of larger scale facilities.

Description

Biofiltration with Partial Infiltration Facilities are shallow, vegetated basins underlain by an engineered soil media designed to retain a portion of the design capture volume, V_{BMP}, and provide biofiltration treatment for the portion not retained. Biofiltration with Partial Infiltration Facilities function similarly to bioretention facilities but always include a gravel storage layer and perforated underdrain where the gravel layer forms a sump below the discharge elevation of the underdrains. Healthy plant and biological activity in the root zone maintain and renew the macro-pore space in the soil media and maximize plant uptake of pollutants and runoff. This can extend the time until the BMP clogs and allows more of the soil column to function as both a sponge (retaining water) and an effective biofilter. In all cases, the bottom of a Biofiltration with Partial Infiltration Facility is unlined (for lined version, see Fact Sheet 3.6). When the infiltration rate and sump storage capacity for infiltration is exceeded, fully biofiltered flows are discharged via underdrains. In this way, these facilities are designed to maximize incidental volume reduction. Flows exceeding the design flowrate must discharge to a downstream conveyance system.

Biofiltration with Partial Infiltration Facilities can be effective in removing targeted pollutants from stormwater runoff. **Low-nutrient soil media (see Fact Sheet 3.8) is critical** to provide treatment and avoid leaching of nutrients.

Proprietary biofiltration devices may be categorized as Biofiltration with Partial Infiltration Facilities when they are combined with supplemental retention BMPs. Refer to the Biofiltration Fact Sheet for information regarding proprietary biofiltration BMPs. In order to use these BMPs as Biofiltration with Partial Retention, the applicant must provide evidence (calculations, narrative, etc.) to demonstrate that supplemental retention is provided to accompany proprietary biofiltration BMPs and is equivalent to the volume retention that would be provided by a Biofiltration with Partial Infiltration Facility. This does not refer to detention storage upstream of proprietary BMPs to reduce discharge rates through the BMPs.

Siting Considerations

These facilities work best when they are designed in a relatively level area. Biofiltration with Partial Infiltration Facilities can be used in smaller landscaped spaces on the site, such as:

- ✓ Parking islands
- ✓ Medians
- ✓ Site entrances

Identification of opportunities for siting bioretention facilities should begin with the initial layout of the site. Landscaped areas on the site (such as may otherwise be required through minimum landscaping ordinances), can often be designed as Biofiltration with Partial Infiltration Facilities. This can be accomplished by:

- *Depressing* landscaped areas below adjacent impervious surfaces, rather than elevating those areas,
- Grading the site to direct runoff from impervious surfaces *into* the Biofiltration with Partial Infiltration Facility, rather than away from the landscaping, and
- Sizing and designing the depressed landscaped area as a Biofiltration with Partial Infiltration Facility as described in this Fact Sheet.

Design of Biofiltration with Partial Infiltration Facilities should also consider, and mitigate or avoid, potential impacts related to sediment clogging. For example, facilities should not be used downstream of naturally high sediment producing areas (steep vegetated slopes or natural offsite areas) without including additional pretreatment mechanisms.

Setbacks

There are no default setbacks for use in feasibility screening for Biofiltration with Partial Infiltration BMPs. In general, incidental infiltration poses minor risks. However, if there are geotechnical or groundwater concerns documented in the project's geotechnical report and Project-Specific WQMP, these may preclude any level of infiltration.

Pretreatment

Pretreatment mechanisms are not always required for Biofiltration with Partial Infiltration Facilities; however, they can extend the life and decrease the frequency of required maintenance of a BMP by reducing the amount of sediment loading to the facility.

Pretreatment is strongly encouraged where the BMP will receive runoff from high traffic parking lots or roads, mixed land uses (with some erodible areas), or other land uses likely to generate elevated sediment.

For BMPs receiving overland flow, pretreatment may be provided using forebays with a volume equivalent to at least 10 percent (preferably 20 percent) of V_{BMP}. A forebay is effectively the first cell in the bioretention system, separated from the remaining area by a berm or cross plate. Forebays are designed to maximize sedimentation and will require more frequent, but more spatially-focused maintenance. This portion of the system can be concrete lined to facilitate simpler maintenance.

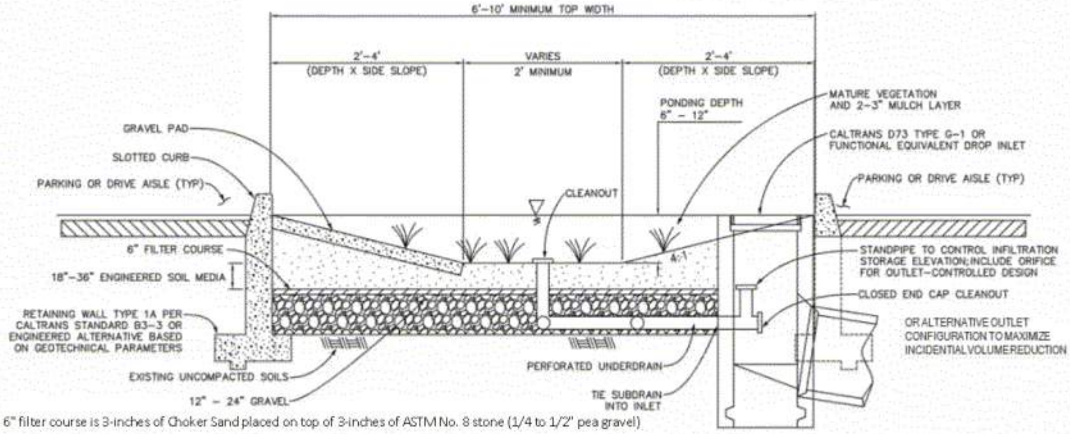
For BMPs with piped inlets, a forebay or sedimentation manhole may be applicable. In these systems, it is also necessary to consider energy dissipation near the inlet pipe, such as via a gravel pad and berm system or concrete splash block, to avoid erosion of the bioretention media bed.

If the BMP will receive runoff primarily from roofs, low-traffic impervious surface, or similar low sediment generating surfaces, then pre-treatment is not necessary, but energy dissipation should still be considered, particularly if there is a piped inflow such as a downspout.

Design and Sizing Criteria

This section summarizes the recommended design parameters for Biofiltration with Partial Infiltration Facilities. Use of the recommended parameters will help provide the expected treatment and long-term performance of the BMP. Deviations from the recommended parameters may be warranted and approved by the local jurisdiction based on site specific considerations. The recommended cross section necessary for a Biofiltration with Partial Infiltration Facility includes:

- Vegetated area
- 6” minimum, 12” maximum, surface ponding, measured from the top of the mulch layer (for designs with deeper depths, consult Fact Sheet 3.7)
- 2 to 3” mulch layer
- 24” recommended minimum depth of engineered soil media (36” preferred; 18” allowed in vertically-constrained conditions at the discretion of the local jurisdiction)
- 6” filter course layer
- 18” gravel storage layer (up to 30” if desired)
- 6” minimum diameter perforated underdrain (refer to Appendix B)



6" filter course is 3-inches of Choker Sand placed on top of 3-inches of ASTM No. 8 stone (1/4 to 1/2' pea gravel)

Figure 1: Standard Section for a Biofiltration with Partial Infiltration Facility

An upturned underdrain outlet, with the discharging section set to an elevation equal to the top of the filter course layer is the preferred configuration to maximize incidental volume reduction. However, if site-specific conditions require, the elevation of the upturned elbow may be reduced or omitted at the discretion of the local jurisdiction.

Pore space in the soil and gravel layer can be credited as storage volume. However, several considerations must be noted:

- Ponding depth above the soil surface (6 to 12 inches) is important to assure that design flows do not bypass the BMP when runoff exceeds the soil's absorption rate.
- In cases where the Bioretention Facility contains engineered soil media deeper than 36 inches, the pore space within the engineered soil media can only be counted to the 36-inch depth.
- A maximum of 30 percent pore space can be used for the soil media whereas a maximum of 40 percent pore space can be used for the gravel and filter course layers.
- Additional depth below the storage layer (via gravel) may be used to increase retention storage, under the following conditions:
  - The total system infiltrates the stored water in less than 72 hours
  - The depth below the media does not exceed the amount of water that can be filtered through the media during a typical DCV storm duration (5 hours, unless otherwise documented).

Outlet Controlled Approach

Biofiltration with Partial Infiltration Facilities may include the use of engineered soil media with a higher design filtration rate (up to 50 inches per hour) when combined with a flow restricting outlet control on the facility's perforated underdrain. This configuration can provide greater protection against clogging because the underdrain outlet controls the rate at which stormwater is filtered through the media, rather than the media itself. The underdrain outlet controls are designed to provide a flowrate equivalent to the typical design media filtration rate of 2.5 to 5 inches per hour.

Design Adaptations

Biofiltration with Partial Infiltration facilities can be designed to meet both pollutant control and hydromodification control performance standards. Combined facilities typically include increased storage (surface and/or subsurface) and flow control devices (i.e. outlet orifices and/or weirs). Outlets elevations for extra surface ponding must be set above the V_{BMP} ponding level such that there is no discharge of untreated water for the V_{BMP}, and the facilities must satisfy both the pollutant control and hydromodification control performance standards. For systems with ponding depth greater than 12 inches, also refer to Fact Sheet 3.7.

Subsurface storage greater than the minimum 18-inch gravel storage layer may be provided. Additional subsurface storage may allow designers to provide a smaller footprint BMP, reduce the subsurface depth of the BMP, or allow for additional volume retention. Refer to the Subsurface Storage section for additional information and criteria.

Engineered Soil Media Requirements and Aggregate Specifications

Refer to Fact Sheet 3.8 for engineered soil media requirements and specifications and aggregate specifications serving as filter course and underdrain stone in Biofiltration BMPs. ***Low-nutrient soil media design described in Fact Sheet 3.8 is critical to provide treatment and avoid leaching of nutrients.***

Subsurface Storage Requirements

Subsurface storage may be provided in the form of additional gravel thickness. For pollutant control, the depth of extra storage should not exceed 12 inches effective depth of water to ensure that the pores can be filled before surface overflow would be expected (5-hour typical storm x 2.5 in/hr = 12 inches = 30 inches of gravel).

The filter course layer shall be specifically designed to prevent migration of the engineered soil media into the storage layer. The filter course specifications are provided in Fact Sheet 3.8. Inclusion of a filter course layer is mandatory unless filter fabric is allowed per manufacturer's recommendation and is acceptable to the local jurisdiction.

Vegetation Requirements

Vegetative cover is important to minimize erosion and ensure that treatment occurs in the Biofiltration with Partial Infiltration Facility. The area should be designed for at least 70 percent mature coverage throughout the facility. To prevent the BMP from being used as walkways, Bioretention Facilities shall be planted with densely planted shrubs and grasses. Grasses shall be shall be compatible with periodic inundation, preferably ones that do not need to be mowed. The application of fertilizers and pesticides should be minimal. To maintain oxygen levels for the vegetation and promote biodegradation, it is important that vegetation not be completely submerged for any extended period of time. Vegetation should be selected to withstand the anticipated drawdown time and ponding depths.

A 2 to 3-inch layer of standard shredded aged hardwood mulch should be placed as the top layer inside the Biofiltration with Partial Infiltration Facility. The 6 to 12-inch ponding depth shown in Figure 1 above should be measured from the top surface of the mulch layer. Rounded stone mulch may be considered provided that it does not compact the underlying soils. A sacrificial layer of fine sand could be considered between the bioretention soil and stone mulch.

Curb Cuts and Energy Dissipation

If the Biofiltration with Partial Infiltration Facility is sited to receive runoff from adjacent impervious areas, 1-foot-wide (minimum) curb cuts should be placed approximately every 10 feet around the perimeter of the Bioretention Facility. Figure 3 shows a curb cut in a Biofiltration with Partial Infiltration Facility. Curb cut flow lines must be at or above the V_{BMP} water surface ponding level. Additionally, vertical curb cuts may be a tripping hazard. Where feasible, curb cuts should be tapered from the bottom to top of curb as shown below. When tapered cuts are used, the minimum bottom cut width remains 1 foot.

Figure 2: Example Curb Cut

To reduce erosion, a gravel or riprap pad shall be placed at each inlet point to the Biofiltration with Partial Infiltration Facility. The pad inside the Biofiltration with Partial Infiltration Facility should be flush with the finished surface at the curb cut and extend to the bottom of the slope. The size of gravel or riprap should be selected to withstand the expected peak flows into the basin.

In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet. See Figure 4.

When runoff is routed to the facility via a pipe, gutter, ditch or other conveyance structure, the conveyance should outlet to the forebay portion of the BMP and include appropriate energy dissipation devices to prevent erosion and scoring of the forebay (i.e. limit outlet velocities to 2 feet per second).

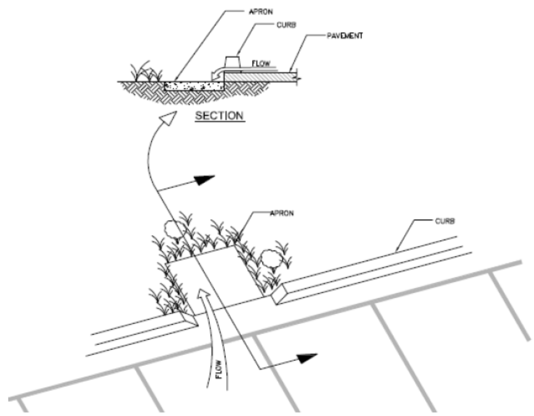


Figure 3: Apron located in a Biofiltration with Partial Retention Facility

Terracing the Facility

It is recommended that Biofiltration with Partial Infiltration Facilities be level. In the event the facility site slopes and lacks proper design, water would fill the lowest point of the BMP and then discharge from the basin without being treated. To ensure that the water will be held within the Biofiltration with Partial Infiltration Facility on sloped sites, the BMP must be terraced with nonporous check dams to provide the required storage and treatment capacity. The terraced version of this BMP shall be used on non-flat sites with no more than a 3 percent slope. The surcharge depth cannot exceed 0.5 feet, and side slopes shall not exceed 3:1. Table 1 below shows the spacing of the check dams, and slopes shall be rounded up (i.e., 2.5 percent slope shall use 10' spacing for check dams).

Table 1: Check Dam Spacing

6" Check Dam Spacing	
Slope	Spacing
1%	25'
2%	15'
3%	10'

Roof Runoff

Roof downspouts may be directed towards Biofiltration with Partial Infiltration Facilities. However, the downspouts must discharge onto a concrete splash block or other appropriate energy dissipation device to protect the Biofiltration with Partial Infiltration Facility from erosion.

Retaining Walls

When Bioretention facilities are located adjacent to structures, walkways, roadways, parking lots, etc., it is recommended that Retaining Wall Type 1A, per Caltrans Standard B3-3 or equivalent, be constructed around the entire perimeter of the Biofiltration with Partial Infiltration Facility. This practice will protect the sides of the Biofiltration with Partial Infiltration

Facility from collapsing during construction and maintenance or from high service loads adjacent to the BMP. Where such service loads would not exist adjacent to the BMP, an engineered alternative may be used if signed by a licensed civil engineer.

Side Slope Requirements

Biofiltration with Partial Infiltration Facilities Requiring Side Slopes
The design should assure that the Biofiltration with Partial Infiltration Facility does not present a tripping hazard. Biofiltration with Partial Infiltration Facilities proposed near pedestrian areas, such as areas parallel to parking spaces or along a walkway, should have a gentle slope to the bottom of the facility. Side slopes inside of a Biofiltration with Partial Infiltration Facility should generally be 4:1 unless steeper is approved by the local jurisdiction. A typical cross section for the Bioretention Facility is shown in Figure 1.

Biofiltration with Partial Infiltration Facilities Not Requiring Side Slopes
Where cars park perpendicular to the Biofiltration with Partial Infiltration Facility, side slopes are not required. A 12-inch maximum drop may be used for vertical walls, and the Biofiltration with Partial Infiltration Facility should be planted with shrubs to prevent pedestrian access. In this case, a curb is not placed around the Biofiltration with Partial Infiltration Facility, but wheel stops shall be used to prevent vehicles from entering the Biofiltration with Partial Infiltration Facility, as shown in Figure 5.

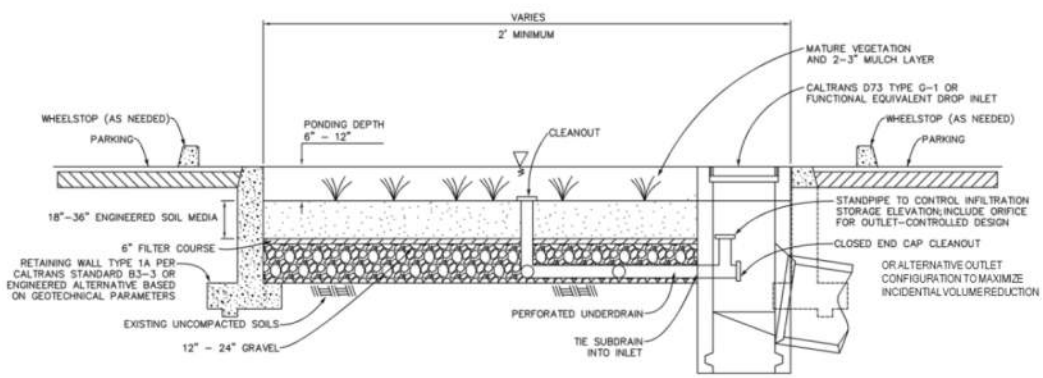


Figure 4: Biofiltration with Partial Infiltration Facility Cross Section without Side Slopes

Overflow

An overflow route is needed in the Biofiltration with Partial Infiltration Facility design to bypass stored runoff from storm events larger than V_{BMP} or in the event of facility or subdrain clogging. Overflow systems must connect to an acceptable discharge point, such as a downstream conveyance system as shown in Figure 1 and Figure 5. The inlet to the overflow structure shall be elevated inside the Biofiltration with Partial Infiltration Facility to be flush with the ponding surface for the design capture volume (V_{BMP}) as shown in Figure 5. This will allow the design capture volume to be fully treated by the Biofiltration with Partial Infiltration Facility, and for larger events to safely be conveyed to downstream systems. The overflow inlet shall **not** be located in the entrance of a Biofiltration with Partial Infiltration Facility, as shown in Figure 6.

Figure 5: Incorrect Placement of an Overflow Inlet

Underdrain Gravel and Pipes

An underdrain gravel layer and perforated pipes shall be provided in accordance with Appendix B – Underdrains. The underdrain shall be elevated at least 3" from the bottom of the gravel storage layer and be designed with an upturned elbow with an elevation equal to the top height of the filter course. This configuration will maximize retention and provides the most flexibility for BMP retrofitting. Inclusion of an upturned elbow is recommended but site-specific adaptations of this design are permitted at the discretion of the local jurisdiction.

Inspection and Maintenance Schedule

Inspection and maintenance of Biofiltration with Partial Retention Facilities is required to provide long term performance of these systems. Table 2 below provides a summary of the typical maintenance activities that may be applicable. Project specific activities and schedules may vary and are required to be included as part of the applicant's O&M Plan, At a minimum the Biofiltration with Partial Infiltration Facility area shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Biofiltration with Partial Infiltration Facility should be minimized.

Table 2: Maintenance Summary

Activity

• Maintain vegetation as needed. Use of fertilizers, pesticides and herbicides should be strenuously avoided to ensure they do not contribute to water pollution. If appropriate native plant selections and other IPM methods are used, such products should not be needed. If such projects are used,
  ○ Products shall be applied in accordance with their labeling, especially in relation to application to water, and in areas subjected to flooding.
  ○ Fertilizers should not be applied within 15 days before, after, or during the rainy season.
• Remove debris and litter from the entire basin to minimize clogging and improve aesthetics.
• Check for obvious problems and repair as needed. Address odor, insects, and overgrowth issues associated with stagnant or standing water in the basin bottom. There should be no long-term ponding water.
• Check for erosion and sediment laden areas in the basin. Repair as needed. Clean forebay if needed.
• Revegetate side slopes where needed.
• Inspect areas for ponding
• Inspect for erosion and clogging, repair as needed.
• Inspection of hydraulic and structural facilities. Examine the inlet for blockage, the embankment and spillway integrity, as well as damage to any structural element.
• Check for erosion, slumping and overgrowth. Repair as needed.
• Check basin depth for sediment build up and reduced total capacity. Scrape bottom as needed and remove sediment. Restore to original cross-section and infiltration rate. Replant basin vegetation.
• Verify the basin bottom is allowing acceptable infiltration. Scarify the surface using a rake, etc., to restore infiltration, working to avoid damage to plants if possible.
• No water should be present 72 hours after an event. No long term standing water should be present at all. No algae formation should be visible. Correct problem as needed.

Biofiltration with Partial Infiltration Facility Sizing and Design Procedure

Biofiltration with Partial Infiltration Facilities provide treatment through two mechanisms, bioretention and biofiltration. The combined sizing procedure is presented below:

1) Enter the area tributary, A_T, to the Biofiltration with Partial Infiltration Facility.

2) Enter the required Design Capture Volume, V_{BMP} determined from Section 2.1 of this Handbook.

3) Enter the estimated footprint for the BMP (use available space or default of 3% of contributing impervious surface area). **This is the effective footprint of the BMP.** It is measured at the mid ponding depth of the BMP. For example, if the BMP has a ponding depth of 12 inches, then the effective footprint is the wetted surface area when the BMP is holding 6 inches of ponded water. The engineered soil media and stone reservoir should have at least this footprint below the BMP. For systems with vertical walls, the effective area is the same as the total area.

4) Estimate the portion of the V_{BMP} retained by the BMP.

$$V_{Retained} = 18\,inches\ \times \left(0.4\frac{in}{in}porosity\right) \times\ Area_{BMP} \times\ \frac{1\,ft}{12\,inches}$$

If deeper depth of gravel storage is used, then revise this calculation accordingly.

5) Estimate the portion of V_{BMP} not reliably retained by the BMP

$$V_{Not\ Reliably\ Retained} = V_{BMP} - V_{Retained}$$

6) Enter the depth of surface ponding layer, d_P. The minimum depth of surface ponding layer can be 6" so that the runoff is uniformly spread throughout the basin. The maximum depth can be 12". Higher depths may be allowed for facilities designed per the criteria in Fact Sheet 3.7.

7) Enter the depth of the engineered soil media, d_S. The recommended minimum depth is 24". A depth of 36" is preferred to provide an enhanced root zone. Engineered soil media deeper than 36" will only get credit for the pore space in the first 36".

8) Enter the design media filtration rate of the media (I_{design}) of 2.5 in/hr to be used for sizing. Actual installed filtration rate may be higher.

9) Enter the allowable routing period ($T_{routing}$) of 5 hours. Routing period is estimated based on 15^{th} percentile storm duration for storms similar to 85^{th} percentile rainfall depth at the Temecula gage.

10) Calculate the effective biofiltration depth, d_{E_bio}, within the Biofiltration with Partial Infiltration Facility. The effective depth of biofiltration is calculated as:

$$d_{E\_bio}\,(ft) = (d_P + (0.3 \times d_S) + (I_{design} \times T_{routing}))\,(ft)$$

Where:

I_{design} = the media filtration rate (or effective filtration rate if an outlet control is included)

The retention storage has already been accounted, so the effective biofiltration storage should only include the storage above the discharge elevation of the underdrain. The maximum allowable pore space of the soil media is 30%. This calculation accounts for water biofiltered filtered during the event.

11) Calculate the effective *static* biofiltration depth, $d_{E\_bio\_static}$, within the Biofiltration with Partial Infiltration Facility. The effective depth of biofiltration storage is calculated as:

$$d_{E\_bio\_static}\,(ft) = (d_P + (0.3 \times d_S)\,(ft)$$

This is similar to the effective biofiltered depth, but does not include the depth infiltrated during the storm event.

12) Calculate the amount of $V_{biofiltered}$ and $V_{biofiltered\_static}$

$$V_{biofiltered} = d_{E\_bio\ (with\ routing)} \times A_{effective}$$

$$V_{biofiltered\_static} = d_{E\_bio\_static} \times A_{effective}$$

13) Compare the results of above to the required biofiltration volume. There are two options for demonstrating conformance:

a) $V_{biofiltered\ (with\ routing)} > 150\%$ of $V_{not\ reliably\ retained}$

OR

b) $V_{biofiltered\_static} > 0.75 \times V_{not\ reliably\ retained}$

14) If neither of these criteria are met, then return to Step 3, increase retention depth, increase footprint, or both, and rerun calculations. This calculation is inherently iterative.

15) Verify that side slopes are no steeper than 4:1 in the standard design, and are not required in the modified design. Demonstrate that the assumed effective area is provided at the mid ponding contour of the BMP.

16) Provide the diameter, minimum 6 inches, of the perforated underdrain used in the Biofiltration with Partial Infiltration Facility. See Appendix B for specific information regarding perforated pipes.

17) Provide the slope within the Biofiltration with Partial Infiltration Facility, if used. The maximum slope is 3 percent for a standard design.

18) Provide the check dam spacing, the Biofiltration with Partial Infiltration Facility is sloped.

19) Describe the vegetation used within the Biofiltration with Partial Infiltration Facility.

3.6 Biofiltration Facility (no infiltration/limited infiltration)

Type of BMP	LID – Biofiltration
Priority Level	Priority 2 – Biofiltration without infiltration
Treatment Mechanisms	Evapotranspiration, Evaporation, Biofiltration
Infiltration Rate Range	Less than 0.1 in/hr (factored) or other feasibility criteria limits any amount of infiltration
Maximum Drainage Area	This BMP is intended to be integrated into a project's landscaped area in a distributed manner. Typically, contributing drainage areas to Bioretention Facilities range from less than 1 acre to a maximum of around 5 acres. For facilities treating larger drainage basins see Fact Sheet 3.7 for additional guidance on design of larger scale facilities.

Description

Biofiltration Facilities are shallow, vegetated basins that filter water through vegetation and engineered soil media prior to discharge via underdrain or overflow to the downstream conveyance system. Healthy plant and biological activity in the root zone maintain and renew the macro-pore space in the soil media and maximize plant uptake of pollutants and runoff. This can extend the time until the BMP clogs and allows more of the soil column to function as both a sponge (retaining water) and an effective biofilter.

Biofiltration Facilities are similar to Biofiltration with Partial Infiltration Facilities except Biofiltration Facilities are generally lined and include a shallower gravel underdrain layer. **This fact sheet is condensed to include only the design aspects and criteria that are different when designing biofiltration compared to biofiltration with partial infiltration**. The user should refer to the Biofiltration with Partial Infiltration Fact Sheet (3.5) and apply the criteria in that fact sheets with the exception of the differences below.

Differences from Biofiltration with Partial Infiltration

Infiltration constraints do not apply. There are no setbacks or considerations related to infiltration feasibility. Infiltration does not occur in appreciable amounts in these facilities.

Underdrain placement and gravel depth is similar to biofiltration with partial infiltration, but for different purposes. These systems should still include a gravel layer of 12 to 18 inches below the underdrain discharge elevation wherever the system discharges to a nutrient-impaired water body. (This applies to all projects in Santa Margarita Watershed). This sump serves to promote nitrogen removal. This can be achieved with an upturned elbow on the outlet. Alternative outlet configurations are acceptable at the discretion of the local jurisdiction.

Planter box configuration is allowed. Biofiltration Facilities that do not include infiltration can also be placed above ground as planter boxes. Planter boxes must have a minimum width of 2 feet, a maximum surcharge depth of 12 inches. No side slopes are necessary. Planter boxes must be constructed so as to ensure that the top surface of the engineered soil media will remain level. This option may be constructed of concrete, brick, stone or other stable materials that will not warp or bend. Chemically treated wood or galvanized steel, which has the ability to contaminate stormwater, should not be used. Planter boxes must be lined with an impermeable liner on all sides, including the bottom. Other general criteria for design are the same as biofiltration with partial infiltration.

Figure 1: Planter Box

Use of proprietary devices as biofiltration BMPs may be allowed. Approved proprietary biofiltration devices may be classified as Biofiltration facilities . Proprietary biofiltration facilities are small footprint, manufactured devices that have been designed to provide biofiltration treatment through the use of high filtration rate media. Proprietary biofiltration BMPs can be considered equivalent to standard biofiltration facilities for the "no infiltration" feasibility condition. See Section 2.3.7 of the 2018 WQMP for approval requirements. Separate sizing methods, maintenance requirements, and design criteria may apply to proprietary biofiltration BMPs.

Sizing calculations are similar, but do not include the infiltration compartment. Because there is no volume retained via infiltration in these facilities, sizing methods differ.

Biofiltration Sizing and Design Procedure

Biofiltration Facilities provide treatment through biofiltration and do not provide appreciable retention (though a minor amount is possible via evapotranspiration). The sizing and design procedure is presented below:

1) Enter the area tributary, A_T, to the Bioretention Facility.

2) Enter the required Design Volume, V_{BMP} (also referred to as DCV) determined from Section 2.1 of this Handbook.

3) Enter the estimated footprint for the BMP (use available space or default of 3% of contributing impervious surface area). **This is the effective footprint of the BMP.** It is measured at the mid ponding depth of the BMP. For example, if the BMP has a ponding depth of 12 inches, then effective footprint is the wetted surface area when the BMP is holding 6 inches of ponded water. For systems with vertical walls, the effective area is the same as the total area.

4) Enter the depth of surface ponding layer, d_p. The minimum depth of surface ponding layer can be 6" so that the runoff is uniformly spread throughout the basin. The maximum depth can be 12".

5) Enter the depth of the engineered soil media, d_S. The recommended minimum depth is 24". A depth of 36" is preferred to provide an enhanced root zone. Engineered soil media deeper than 36" will only get credit for the pore space in the first 36".

6) Enter the design media filtration rate of the media (I_{design}) of 2.5 in/hr to be used for sizing. Actual installed filtration rate may be higher.

7) Enter the allowable routing period ($T_{routing}$) of 5 hours. Routing period is estimated based on the 15th percentile storm duration for storms similar to 85th percentile rainfall depth at the Temecula gage.

8) Calculate the effective biofiltration depth, d_{E_bio}. The effective depth of biofiltration is calculated as:

$$d_{E\_bio}\text{ (ft)} = (d_P + (0.3 \text{ x } d_S) + (I_{design} \text{ x } T_{routing}))\text{ (ft)}$$

The internal gravel storage is permanently saturated in this design and should not be considered in this calculation. The effective biofiltration storage should only include the storage above the discharge elevation of the underdrain. The maximum allowable pore space of the soil media is 30%. This calculation accounts for water biofiltered during the event.

9) Calculate the effective *static* biofiltration depth, $d_{E\_bio\_static}$, within the Biofiltration with Facility. The effective depth of biofiltration storage is calculated as:

$$d_{E\_bio\_static}\text{ (ft)} = (d_P + (0.3 \text{ x } d_S)\text{ (ft)}$$

This is similar to the effective biofiltration depth above, but does not include the depth infiltrated during the storm event.

10) Calculate the amount of $V_{biofiltered}$ and $V_{biofiltered\_static}$

$$V_{biofiltered} = d_{E\_bio\ (with\ routing)} \times A_{effective}$$

$$V_{biofiltered\_static} = d_{E\_bio\_static} \times A_{effective}$$

11) Compare the results of above to the required biofiltration volume. There are two options for demonstrating conformance:

a) $V_{biofiltered\ (with\ routing)} > 150\%$ of V_{BMP}

OR

b) $V_{biofiltered\_static} > 0.75 \times V_{BMP}$

Both calculations assume that no portion of the V_{BMP} is retained. This is slightly conservative as it does not account for soil soaking and drying. But soil pores are credited as biofiltration volume. This simplification has negligible effect.

12) If neither of these criteria are met, then return to Step 3, increase the footprint and rerun calculations. This calculation is inherently iterative.

13) Verify that side slopes are no steeper than 4:1 in the standard design, and are not required in the modified design. Demonstrate that the assumed effective area is provided at the mid ponding contour of the BMP.

14) Provide the diameter, minimum 6 inches, of the perforated underdrain used in the Biofiltration Facility. See Appendix B for specific information regarding perforated pipes.

15) Provide the slope within the Biofiltration with Partial Infiltration Facility, if used. The maximum slope is 3 percent for a standard design.

16) Provide the check dam spacing, the Biofiltration with Partial Infiltration Facility is sloped.

17) Describe the vegetation used within the Biofiltration Facility.

3.8 Bioretention/Biofiltration Soil Media and Drainage Aggregates

Type of BMP	For Use with Bioretention, Biofiltration with Partial Infiltration, and Biofiltration with No Infiltration
Treatment Mechanisms	Biofiltration
Other Names	Engineered Soil Media

Description

Bioretention Soil Media (BSM) is a formulated soil mixture that filters pollutants from stormwater, retains moisture, and supports healthy vegetation. It is used in LID BMPs including Bioretention, Biofiltration with Partial Infiltration, and Biofiltration with No Infiltration. BSM consists of **60-80% sand, up to 20% topsoil, and 20% of an organic amendment**, by volume.

BSM must support healthy plant growth and should provide filtering of runoff. When used in Biofiltration BMPs that discharge filtered runoff to surface waters, BSM should be specially formulated to enhance filtering of runoff, reduce the risk of pollutant leaching from BSM, and limit the potential for clogging.

All areas within the Santa Margarita Region (SMR) of Riverside County drain to the Santa Margarita River and Santa Margarita Estuary, both of which are listed as impaired for nutrients under the approved 2010 303(d) list. Accordingly, **all BSM should be formulated to reduce the potential for nutrient leaching, especially when used in flow-through Biofiltration BMPs.** Where a BMP may discharge to a waterbody that is impaired for other pollutants, BSM should be formulated to reduce leaching of those pollutants as well.

The applicability of BSM testing requirements and other provisions of this Fact Sheet depend on the type of BMP and BMP design guidelines as shown in Table 1.

Table 1. Applicability of BSM Specification and Testing Requirements.

Testing Element	**Bioretention (full infiltration)**	**Biofiltration (Partial and No Infiltration)**
General Criteria and Composition	X	X
Basic Testing of Mixed BSM	X	X
Hydraulic Evaluation of Mixed BSM		X
Chemical Suitability of Mixed BSM		X
Sand for BSM	X[1]	X[1]
Topsoil for BSM	X[1]	X[1]
Organic Amendments for BSM	X	X
Mulch for BSM	X	X

[1] – Elements of these specifications may be waived by the local jurisdiction if testing of mixed BSM is acceptable.

General Criteria and Composition

- **BSM should consist of 60-80% sand, up to 20% topsoil, and 20% of an organic amendment, by volume.** Both mixed BSM and BSM components are subject to specific testing requirements depending on BMP type and design elements (see Table 1). To meet applicable requirements, suggested BSM component fractions and types are presented in Table 2. These are suggestions only; **acceptance of BSM depends on BSM and BSM component testing results.**
- Alternative BSM components and proportions may be used if they meet all applicable testing requirements. Acceptance of any such alternative BSM is subject to approval from the local jurisdiction.
- BSM should support the growth of hardy drought-tolerant native vegetation, which is typically adapted to thrive in limited nutrient environments. Excessive levels of nutrients in BSM can increase the presence of weeds and other undesirable vegetation and can cause export of nutrients from BSM. Accordingly, **all BSM should be evaluated according to the "Basic Whole Mixture Testing Requirements"** section.
- Sand, topsoil, and organic amendment components of BSM, and mulch are subject to requirements contained in sections of this Fact Sheet titled "Sand for BSM", "Topsoil for BSM", "Organic Amendments for BSM", and "Mulch for BSM", respectively. Specifications for sand and top soil can be waived at the discretion of the local jurisdiction if whole mix texting shows acceptable properties.
- To reduce the potential for nutrient leaching from BSM, it should be formulated according to the following guidelines (Also presented in Table 2).
    - For Bioretention BMPs, nutrient-sensitive compost may be used as the organic amendment according to requirements in the "Organic Amendments" section of this Fact Sheet.
    - **For Biofiltration BMPs, mixed BSM must meet requirements in the "Chemical Suitability for Mixed BSM" section of this Fact Sheet.** To meet these requirements, it is suggested that compost not be used as an organic amendment due to its potential to leach nutrients, even when carefully sourced to reduce such leaching. Instead, coconut coir pith, peat moss, or other alternative organic amendments are recommended. For guidance on these and other alternative organic amendments see the "Alternative Organic Amendments" subsection of this Fact Sheet.
- BSM should be formulated to support the long-term design flow rate of a given BMP.
    - For Biofiltration BMPs, BSM plays a critical role in BMP hydraulic performance and should be formulated depending on whether underdrain outlet controls are used. **BSM for Biofiltration BMPs should be evaluated according to the "Hydraulic Evaluation of Mixed BSM" section of this Fact Sheet.** Meeting these requirements may require that the fines content of sand or top soil be limited (see Table 2). Some sources of top soil and sand may not provide adequate permeability.
- BSM should always be **blended before it is delivered to the site** using a mechanical mixing method (e.g. drum mixer) to ensure uniform mixing. Using a loader to mix materials on site is typically not adequate for uniform mixing and is discouraged. If sand or topsoil components are sourced from the Project site, mixing may be conducted using loaders.

- **Testing samples of the mixed BSM that is delivered to the site is highly recommended,** especially for larger BMPs. Prior testing from a material manufacturer may be acceptable in place of project-specific data if it is not more than 6 months old and represents the actual mix proportions and components in the BSM delivered to the site.
- Procurement, handling, and placement of BSM should adhere to guidelines in the "Construction Guidelines" section of this Fact Sheet.

Table 2. Recommended BSM mixture component proportions and types to meet applicable requirements.

Component Type	Bioretention	Biofiltration (Partial and No Infiltration)	
		Without outlet control	With outlet control
Sand Type	Washed	Washed	Washed
Sand Fraction, by volume	60%	60-80%	80%
Topsoil Type	Sandy Loam or Loamy Sand	Sandy Loam or Loamy Sand	NA
Topsoil Fraction, by volume	20%	Up to 20%	0%
Organic Type	Nutrient-sensitive compost	Coconut coir pith, peat, or low nutrient compost	Coconut coir pith, peat, or low nutrient compost
Organic Fraction, by volume	20%	20%	20%

Basic Testing for Mixed BSM

Basic whole mixture testing should be conducted for any BSM used in stormwater BMPs. This should ideally be completed for actual mixed BSM that is used in site BMPs, but may be from a representative sample analysis not more than 6 months old. Sample(s) should be submitted to an agronomic laboratory for analysis of all parameters listed in this section. Laboratory analytical reports must document that mixed BSM conforms to the following requirements:

- pH: 6.0 – 8.5
- Salinity: 0.5 to 3.0 mmho/cm as electrical conductivity.
- Sodium absorption ratio: < 6.0
- Chloride: < 800 ppm
- Cation Exchange Capacity (CEC): > 10 meq/100 g.
- Organic Matter: 2 to 5% on a dry weight basis.
- Carbon:Nitrogen Ratio: 12 to 40; preferably 15 to 40.
- Sieve Fractions: Should adhere to the sieve fractions presented in Table 3 based on particle size analysis by ASTM Method D422 or similar.

Table 3. Sieve analysis requirements for mixed BSM

Textural Class (ASTM D422)	Size Range	Mass Fraction
Gravel	Larger than 2 mm	0 to 25 percent of total sample
Clay	Smaller than 0.005 mm	0 to 5 percent of non-gravel fraction

Hydraulic Testing of Mixed BSM

BSM that is used in Biofiltration BMPs plays a critical role in controlling flow through BMPs. BSM that flows too quickly can result in short contact times and poor hydraulics for pollutant removal. BSM that flows too slowly can limit surface infiltration rates below design assumptions, resulting in bypass during storms smaller than the design storm.

Hydraulic Testing Requirements: Samples of mixed BSM used in Biofiltration BMPs should be submitted for laboratory analysis of hydraulic conductivity. BSM samples used in this analysis should preferably be sourced from the actual BSM batch that will be used in a given BMP but analytical results from a representative sample not more than 6 months old may also be accepted. Analysis of hydraulic conductivity may be conducted according to one of the following methods:

- Permeability of Granular Soils: ASTM D2434, or,
- Analysis of hydraulic conductivity by USDA Handbook 30 method 34b, or similar approved laboratory method.

Hydraulic conductivity must be within the limits presented in Table 4 for BSM acceptance.

Table 4. Hydraulic suitability requirements for BSM.

BMP Hydraulic Regime	Maximum K_{sat} (in/hr)	Minimum K_{sat} (in/hr)
Biofiltration with Unrestricted Outlet (media control)	8	24
Biofiltration with Restricted Outlet (outlet control)	20	80
Bioretention	NA – Hydraulic Testing Not Required	

Chemical Suitability for Mixed BSM

To reduce the potential for pollutant leaching to surface waters, a sample of BSM used in Biofiltration BMPs should be submitted for laboratory analysis for pollutant leaching potential. The BSM sample should be from the actual batch of BSM that is used in the BMP or from a representative sample not more than 6 months old. This analysis should be performed according to the "Saturated Media Extract" methods (USDA Agricultural Handbook No. 60), which is commonly performed by agronomic laboratories.

Pollutant leaching test results for BSM should comply with limits for nitrate, phosphorus, and copper:

- Nitrate: < 3 mg/L
- Phosphorus: < 1 mg/L
- Copper: < 0.025 mg/L

Testing may be performed after laboratory rinsing of media with up to 15 pore volumes of water. Alternative organic amendments, may be needed to meet these criteria. The above pollutant leaching criteria may be waived at the discretion of the local jurisdiction.

Mulch for BSM

Bioretention and Biofiltration planting areas should generally be covered with 2 to 3 inches of well-aged, double or triple shredded mulch at the time of construction. An additional 1 to 2 inches of mulch should be added annually. Mulch should be non-floating to avoid clogging overflow structures. Inorganic mulches, such as rock, may be used.

Sand for BSM

The requirements in this section may be waived at the discretion of the local jurisdiction if criteria are met for applicable whole mix testing.

Sand should meet requirements for ASTM C33 “fine aggregate concrete sand.” It may be sourced from commercial soil suppliers or from natural soil deposits (such as may be found on site). Sand should conform to the following requirements:

- Be free of any waste, wood, coatings (e.g. clay, stone dust, carbonate, etc.), or any other deleterious materials.
- Conform to the particle size distribution requirements for ATSM C33 “fine aggregate concrete sand” in Table 5 based on sieve size analysis by ASTM Method D422 or similar. This should be documented by laboratory analysis results for the actual sand that was used in the BSM, or a representative sample analysis not more than 6 months old.
- All aggregate passing the #200 sieve should be non-plastic.

Table 5. Sieve size fractions for ASTM C33 “fine aggregate concrete sand”.

Sieve Size (ASTM D422)	Sieve Size (mm)	Percent Passing (by weight)	
		Minimum	Maximum
3/8 inch	9.5	100	100
#4	4.8	95	100
#8	2.4	80	100
#16	1.2	50	85
#30	0.60	25	60
#50	0.42	5	30
#100	0.15	0	10
#200	0.08	0	5

Topsoil for BSM

Topsoil can be an important part of BSM and can improve pollutant filtering, nutrient retention, and water holding. Because of these benefits, it is generally recommended as a component of BSM for Bioretention BMPs. However, topsoil (especially the fine fraction) can limit flow of water through BSM, so it may not be suitable for BSM.

If topsoil is used as a component of BSM it should be a sandy loam or loamy sand that is free of hazardous materials. It may be sourced from regional soil suppliers or from the project site, providing that it meets all requirements in this Section. Decomposed granite and derivatives of decomposed granite are not considered to be topsoil. All topsoil should meet the following requirements as confirmed by laboratory analytical reports from samples used in the mixed BSM, or from a representative sample analysis not more than 6 months old:

- Texture: Sandy loam or loamy sand according to the US Department of Agriculture Textural Classification System.

Sieve Fractions: Should adhere to the sieve fractions presented in Table 6 based on particle size analysis by ASTM Method D422 or similar. *Sieve analysis may be waived at the discretion of the local jurisdiction if permeability criteria are met for applicable whole mix testing.*

Table 6. Sieve analysis requirements for topsoil used in BSM

Textural Class (ASTM D422)	Size Range	Mass Fraction
Gravel	Larger than 2 mm	0 to 25 percent of total sample
Clay	Smaller than 0.005 mm	0 to 15 percent of non-gravel fraction

Organic Amendments for BSM

Organic amendments are a critical component of BSM to help filter pollutants from runoff, retain moisture, and support healthy vegetation. However, organic amendments, especially compost, can be a source of nutrients and other pollutants that can impact receiving waters.

Nutrient leaching from organic amendments is a particular concern for BSM that is used in Biofiltration BMPs which can discharge directly to surface waters. Accordingly, BSM used in Biofiltrations BMPs must conform to requirements contained in the “Chemical Suitability of Mixed BSM” section of this Fact Sheet. Alternative Organic Amendments are recommended to comply with chemical suitability requirements.

Bioretention BMPs discharge treated water to groundwater, so they pose less risk from nutrient export from BSM.

All organic amendments should conform to the requirements in either “Compost for BSM” or “Alternative Organic Amendments for BSM”.

Compost for BSM

Compost should be a well-decomposed, stable, weed-free organic source derived from waste materials including yard debris, wood wastes, crop residues, or other organic materials. It should not be derived from biosolids. Compost should preferably be certified through the US Composting Council (USCC) Seal of Testing Assurance (STA) Program.

Compost should comply with the requirements in the list below. Given the stringent nature of these requirements, it is expected that not all composts will comply with the requirements. All requirements should be confirmed by laboratory analytical reports from samples of the compost used in the mixed BSM, or from a representative sample analysis not more than 6 months old.

- Feedstock: Compost feedstock should be specified. Compost should not be derived, in whole or in part, from biosolids.
- Source: Compost should be sourced from a facility that is permitted through CalRecycle. It should also preferably be sourced from a facility that is certified through the USCC STA program.
- Physical contaminants: Not to exceed 1% by dry weight.
- Organic Matter: 35% - 75% on a dry weight basis.
- pH: 6.0 – 8.5
- Salinity: < 10 mmho/cm as electrical conductivity
- Carbon:Nitrogen Ratio: 12:1 – 40:1. Ideal C:N ratio is greater than 15:1 to reduce the potential for nutrient leaching, especially when compost is intended to be used as the organic amendment of BSM in Biofiltration BMPs.
- Maturity/Stability: Shall conform to either:
    - Solvita Maturity Index: ≥ 5.5
    - CO_2 Evolution: < 2.5 mg CO_2-C per g compost organic matter per day or < 5 mg CO_2-C per g compost C per day, whichever unit is reported.
- Select pathogens: Shall pass US EPA Class A Standard, 40 CFR Section 503.32(a).
- Trace metals: Shall pass US EPA Class A Standard, 40 CFR Section 503.13.

Alternative Organic Amendments for BSM

Amendments used as a substitute for compost should provide comparable pollutant filtration, water holding, and support for vegetation. Coconut coir pith and peat are two alternative organic amendments that have been successfully used to replace compost in BSM. If either of these amendments is used, they should conform to the requirements under the headers below.

If other organic amendments are used a certified agronomist should certify that they would provide substantially equivalent pollutant filtration (i.e. nutrient retention and cation exchange capacity), water holding capacity, and would help to support healthy vegetation. Acceptance of any other organic amendment is subject to approval by the local jurisdiction.

<u>Coconut Coir Pith:</u>

If coconut coir pith is used as a component of BSM it should conform to the following requirements:

- Production Regime: Must be rinsed with freshwater to reduce potential salt water residues and screened to remove coarse fibers.
- Aging: Must be aged a minimum of 6 months.
- Salinity: < 2.0 mmho/cm as electrical conductivity.
- Total Carbon: > 35% on a dry weight basis.
- Total Nitrogen: < 1.5% on a dry weight basis.
- C:N Ratio: > 40.

Sphagnum Peat:
If sphagnum peat is used as a component of BSM is should conform to the following requirements:

- Salinity: < 3.0 mmho/cm as electrical conductivity.
- Total Carbon: > 35% on a dry weight basis.
- Total Nitrogen: < 1.5% on a dry weight basis.

Aggregate Materials for BSM Drainage Layers

Drainage of BSM requires the use of specific aggregate materials for filter course (aka choking layer) materials and for an underlying drainage and storage layer. Open graded ASTM No 57 stone (1/2” to 1-1/2” gravel) is used as the drain rock layer. ASTM No. 8 stone (1/4 to 1/2”pea gravel) is placed on top of this layer in a 3 inch lift. Choker sand is placed on top of the pea gravel in a 3-inch lift immediately below the BSM.

Rock and sand products used in BMP drainage should comply with size classifications in Table 7 and Table 8. All sand and stone products used in BSM drainage layers shall be clean and should preferably be washed.

Table 7. Particle size requirements for rock products.

Sieve Size	Percent Passing Sieves	
	AASHTO No. 57	ASTM No. 8
3 in	-	-
2.5 in	-	-
2 in	-	-
1.5 in	100	-
1 in	95 – 100	-
0.75 in	-	-
0.5 in	25 – 60	100
0.375 in	-	85 – 100
No. 4	10 max.	10 – 30
No. 8	5 max.	0 – 10
No. 16		0 – 5
No. 50		-

Table 8. Particle size requirements for choker sand

Sieve Size	Percent Passing Sieves
	Choker Sand - ASTM C33
0.375 in	100
No. 4	95 – 100
No. 8	80 – 100
No. 16	50 – 85
No. 30	25 – 60
No. 50	5 – 30
No. 100	0 – 10
No. 200	0 – 3

Delivery, Storage, and Handling

BSM and Aggregates should not be delivered or placed in frozen, wet, or muddy conditions. The Contractor should protect materials from absorbing excess water and form erosion at all times. The Contractor shall not store materials unprotected during large rainfall events (>0.25 inches). If water is introduced into material while it is stockpiled, the Contractor shall allow the material to drain to an acceptable level before it is placed.

BSM shall be thoroughly mixed prior to delivery using mechanical mixing methods such as a drum mixer. BSM shall be lightly compacted and placed in loose lifts approximately 12 inches thick to ensure reasonable settlements without excessive compaction. Compaction within the BSM area should not exceed 75 to 85% standard proctor within the designated depth of BSM. Machinery shall not be used in the BSM area to place BSM. A conveyor or spray system shall be used for placement in large facilities. Low ground pressure equipment may be authorized for large facilities at the discretion of the local jurisdiction.

Placement methods and BSM quantities shall account for approximately 10% volume loss due to compaction and settling. Planting methods and timing shall account for settling of media without exposing plant root systems.

The local jurisdiction may request up to three double ring infiltrometer tests (ASTM D3385) or approved alternative tests to confirm that placed materials meet applicable hydraulic suitability criteria. If the infiltration rate of placed material does not meet applicable criteria, the local jurisdiction may require replacement and/or decompaction of materials.

Quality Control and Acceptance

Acceptance of materials will be based on test results that are certified by the Contractor to be representative of the materials that are delivered to the site. Laboratory testing should ideally be conducted on stockpiled materials prior to delivery to the site. Testing results may be from previously sampled materials if they are not more than 6 months old and if the Contractor certifies that they are representative of the materials that are actually delivered to the site.

Section A	**Section B**	**Section C**	**Section D**	**Section E**
Section F	**Section G**	**Section H**	**Section I**	**Section J**
Section K				
Appendix 1 **WQ Maps**	**Appendix 2** **Construction Plans**	**Appendix 3** **Soils Info**	**Appendix 4** **Historical**	**Appendix 5** **LID Infeasibility**
Appendix 6 **BMP Design**	**Appendix 7** **Hydromod Ctrl**	**Appendix 8** **Source Control**	**Appendix 9** **O&M**	**Appendix 10** **Educational**

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