CITY OF SAN DIEGO
PRIORITY DEVELOPMENT PROJECT
STORM WATER QUALITY MANAGEMENT PLAN
For:

Carroll Canyon Mixed Use Project
Entitlement

PTS#: 240716

Parcel 1 Parcel Map 4337
9850 Carroll Canyon Road
San Diego, CA 92177

Prepared By:

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January 2016

Updated August 2016

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ENGINEER'S CERTIFICATION

STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)
Carroll Canyon Mixed Use Project

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and 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 the requirements of the BMP Design Manual, which is based on the requirements of SDRWQCB Order NO. R9-2013-0001 (MS4 Permit).

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. I certify that this SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design BMPs proposed to minimize the potentially negative impacts of this projects land development activities on water quality. I understand and acknowledge that the plan check review of this SWQMP by the City Engineer is confined to a review and does not relieve me as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

Gregory W. Lang

Signature

68075 / 06-30-17

RCE No./Expiration Date

Gregory W. Lang, P.E.

Print Name

Pasco Laret Suiter & Associates , Inc.

Company

08/30/16

Date

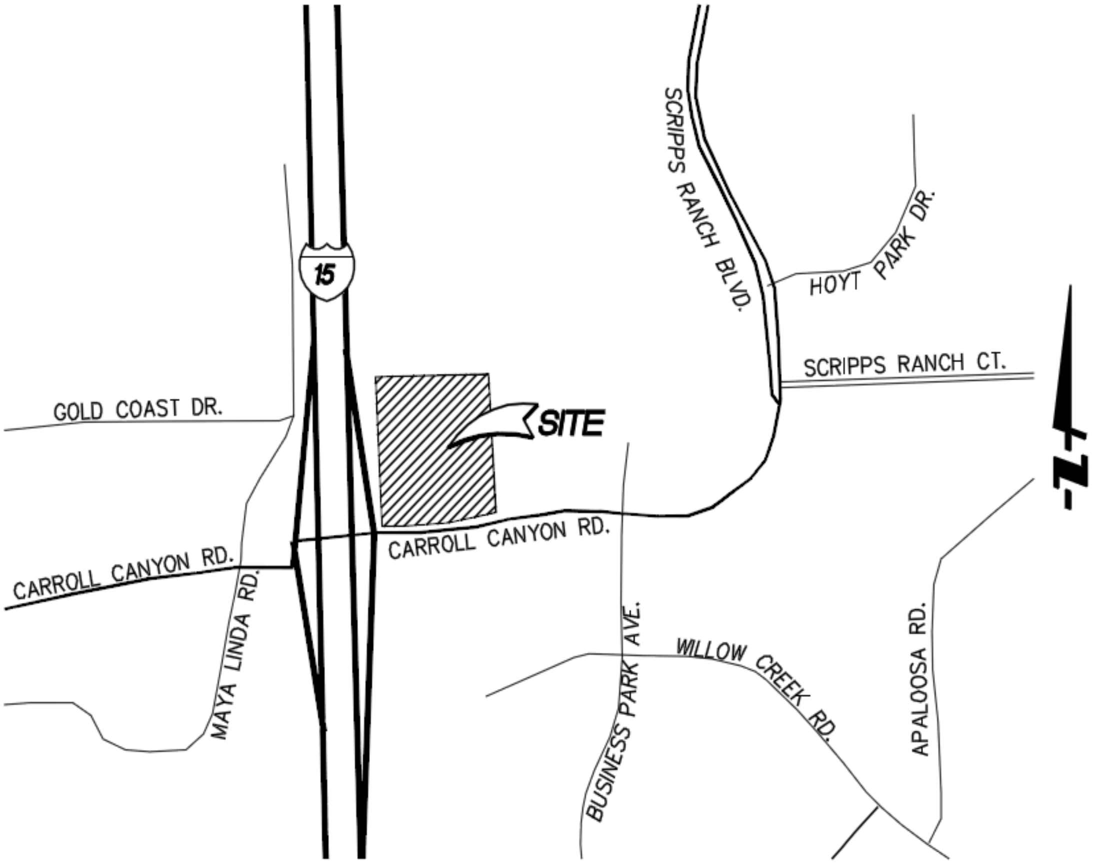
SUBMITTAL RECORD

STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)
CARROLL CANYON MIXED USE PROJECT

Submittal Number	Date	Project Status	Changes
1	02/15/2015	Entitlements	Initial Submittal 2007 WQTR Format
2	10/13/15	Entitlements	2013 SWQMP Format
3	1/21/16	Entitlements	Infiltration Rate
4	6/10/16	Entitlements	Address City Cycle Issues dated 4/25/16
5	08/30/16	Entitlements	Address City Cycle Issues dated 07/13/16

PROJECT VICINITY MAP

Project Name: Carroll Canyon Mixed Use Project
Permit Application Number: PTS 240716



<u>Figure 1 Vicinity Map</u>

Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)	Section 1.0

Project Identification

Project Name: Carroll Canyon Mixed Use Project

Permit Application Number: PTS 240716

Date: August 30, 2016

Determination of Requirements

The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.

Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop".
Refer to BMP Design Manual sections and/or separate forms referenced in each step below.

Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual for guidance.	☒ Yes	Go to Step 2.
	☐ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.

Discussion / justification if the project is not a "development project" (e.g., the project includes only interior remodels within an existing building):

Step	Answer	Progression
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual in its entirety for guidance, AND complete Storm Water Requirements Applicability Checklist.	☐ Standard Project	Stop. Standard Project requirements apply.
	☒ PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.
	☐ Exception to PDP definitions	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below.

Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:

See Draft Form 560

<table>
<tr><th colspan="3">Section 1.0 Page 2</th></tr>
<tr><th>Step</th><th>Answer</th><th>Progression</th></tr>
<tr><td>Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval?
See Section 1.10 of the BMP Design Manual for guidance.</td><td>☐ Yes</td><td>Consult the City Engineer to determine requirements.
Provide discussion and identify requirements below.
Go to Step 4.</td></tr>
<tr><td></td><td>☒ No</td><td>BMP Design Manual PDP requirements apply.
Go to Step 4.</td></tr>
<tr><td colspan="3">Discussion / justification of prior lawful approval, and identify requirements (<u>not required if prior lawful approval does not apply</u>):</td></tr>
<tr><td>Step 4. Do hydromodification control requirements apply?
See Section 1.6 of the BMP Design Manual for guidance.</td><td>☒ Yes</td><td>PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6).
Go to Step 5.</td></tr>
<tr><td></td><td>☐ No</td><td>Stop.
PDP structural BMPs required for pollutant control (Chapter 5) only.
Provide brief discussion of exemption to hydromodification control below.</td></tr>
<tr><td colspan="3">Discussion / justification if hydromodification control requirements do <u>not</u> apply:</td></tr>
<tr><td>Step 5. Does protection of critical coarse sediment yield areas apply?
See Section 6.2 of the BMP Design Manual for guidance.</td><td>☐ Yes</td><td>Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2).
Stop.</td></tr>
<tr><td></td><td>☒ No</td><td>Management measures not required for protection of critical coarse sediment yield areas.
Provide brief discussion below.
Stop.</td></tr>
<tr><td colspan="3">Discussion / justification if protection of critical coarse sediment yield areas does <u>not</u> apply:

According to mapping of the project site on the Potential Critical Coarse Sediment Yield Areas Exhibit for Regional San Diego County Watersheds dated September 8, 2014 the project is not located in an area designated as a potential critical coarse sediment yield area. (See Appendix 2b)</td></tr>
</table>

Project Summary Information	
Project Name	Carroll Canyon Mixed Use Project
Project Address	9850 Carroll Canyon Road San Diego, CA 92177
Assessor's Parcel Number (APN):	363-360-28
Permit Application Number	PTS 240716
Project Watershed	Select One: ☐ San Dieguito River ☒ Penasquitos ☐ Mission Bay ☐ San Diego River ☐ San Diego Bay ☐ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal paces (9XX.XX)	906.10 Miramar Reservoir Hydraulic Area
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	9.52 Acres (414,691 Square Feet)
Area to be disturbed by the project	9.0 Acres (392,040 Square Feet)
Project Proposed Impervious Area	6.54 Acres; (284,882 Square Feet)
Project Proposed Pervious Area	2.46 Acres (119,354 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition	146 % Increase

Description of Existing Site Condition and Drainage Patterns

Current Status of the Site (select all that apply):

☒ Existing development
☐ Previously graded but not built out
☐ Agricultural or other non-impervious use
☐ Vacant, undeveloped/natural

Description / Additional Information:

The site is fully developed with 2 large buildings and parking lots. Existing hydrology basins on the site include one basin draining to the northwest, one to the northeast and one to the southeast

Existing Land Cover Includes (select all that apply):

☒ Vegetative Cover
☒ Non-Vegetated Pervious Areas
☒ Impervious Areas

Description / Additional Information:

See current Status of Site above.

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

☐ NRCS Type A
☐ NRCS Type B
☐ NRCS Type C
☒ NRCS Type D

Approximate Depth to Groundwater (GW):

☐ GW Depth < 5 feet
☐ 5 feet < GW Depth < 10 feet
☐ 10 feet < GW Depth < 20 feet
☒ GW Depth > 100 feet*

*Additional Information: Groundwater Depth below 100 feet per the project Geotechnical Investigation by Geocon, Inc. (See Appendix 6)

Existing Natural Hydrologic Features (select all that apply):

☐ Watercourses
☐ Seeps
☐ Springs
☐ Wetlands
☒ None

Description / Additional Information:

No known watercourses, seeps, springs, or wetlands exist on the proposed disturbed area of the site.

Description of Existing Site Topography and Drainage:

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

1. Whether existing drainage conveyance is natural or urban;
2. If runoff from offsite is conveyed through the site? If yes, quantification of all offsite drainage areas, design flows, and locations where offsite flows enter the project site and summarize how such flows are conveyed through the site;
3. Provide details regarding existing project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, and natural and constructed channels;
4. Identify all discharge locations from the existing project along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Description / Additional Information:

Under existing conditions, the site was previously developed with two office buildings and associated parking, hardscape, and landscaping. A ridgeline divides the site into two distinct drainage basins. The majority of the project site, which has been designated as Basin A, drains northerly to a natural canyon via surface flow through two concrete ditches. This canyon then flows westerly to an existing Caltrans culvert which crosses under Interstate 15. Flows then remain underground until they discharge to an open channel in the mining operations to the west of Black Mountain Road. The southeasterly quarter of the site drains to Carroll Canyon Road through two curb outlets and surface flow from the driveway. This portion of the site has been designated as Basin B. Once in the gutter on Carroll Canyon Road, runoff from the site and the adjacent development flows easterly to a storm drain inlet at the intersection of Business Park Avenue. This storm drain conveys flows to the south and then discharges to a natural channel just to the north of Willow Creek Road.

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

The proposed project will demolish the existing site improvements in preparation for the development of 4 Multi Family Residential Units and 2 Retail Commercial buildings including a fitness center, pool and other ancillary facilities. The proposed land use will change from industrial to commercial.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

Proposed impervious features of the project include new buildings parking lots and hardscape features such as walk ways and recreational areas.

List/describe proposed pervious features of the project (e.g., landscape areas):

Proposed pervious features include new landscape areas maintenance of existing slopes and pervious pavers.

Does the project include grading and changes to site topography?

☒ Yes
☐ No

Description / Additional Information:

The Site is proposed to be lowered by approximately 7 to 8 feet, but maintain existing drainage patterns.

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

☒ Yes
☐ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural and constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Description / Additional Information:

New storm drains, ribbon gutters and self-retaining planters are proposed to convey the site runoff to storm water vaults which will be installed for HMP detention and DCV Retention. The DCV volume and a portion of the HMP volume captured in the vaults will be infiltrated in Dry Wells.

See the Hydrology Report listed in Appendix 5

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply):

- ☒ On-site storm drain inlets
- ☐ Interior floor drains and elevator shaft sump pumps
- ☒ Interior parking garages
- ☐ Need for future indoor & structural pest control
- ☒ Landscape/Outdoor Pesticide Use
- ☒ Pools, spas, ponds, decorative fountains, and other water features
- ☒ Food service
- ☒ Refuse areas
- ☐ Industrial processes
- ☐ Outdoor storage of equipment or materials
- ☐ Vehicle and Equipment Cleaning
- ☐ Vehicle/Equipment Repair and Maintenance
- ☐ Fuel Dispensing Areas
- ☐ Loading Docks
- ☐ Fire Sprinkler Test Water
- ☒ Miscellaneous Drain or Wash Water
- ☒ Plazas, sidewalks, and parking lots

Identification and Narrative of Receiving Water

Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable)

The existing discharge locations for the site ; two concrete ditches to the north and curb outlets to the south are proposed to be utilized for the proposed conditions which result in drainage flow in Carroll Canyon Creek flowing thru hard piped systems and open natural channels and subsequently to the Los Penasquitos Lagoon and ultimately to the Pacific Ocean.

Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations.

Los Penasquitos Creek:
Soledad Canyon

AGR (Agricultural Supply)
IND (Industrial Service Supply)
REC2 (Non-contact Water Recreation)
BIOL (Preservation of Biological Habitats of Special Significance)
WARM (Warm Freshwater Habitat)
WILD (Wildlife Habitat)

Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations.

The project and downstream receiving waters do not have ASBS.

Provide distance from project outfall location to impaired or sensitive receiving waters.

Approx. 7 miles

Identification of Receiving Water Pollutants of Concern

List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs/ WQIP Highest Priority Pollutant
Soledad Canyon	Sediment Selenium	None Established

Identification of Project Site Pollutants*

*Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)

Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6):

Pollutant	Not Applicable to the Project Site	Expected from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment			
Nutrients			
Heavy Metals			
Organic Compounds			
Trash & Debris			
Oxygen Demanding Substances			
Oil & Grease			
Bacteria & Viruses			
Pesticides			

Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)?

☒ Yes, hydromodification management flow control structural BMPs required.

☐ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐ No, the project will discharge runoff directly to 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.

☐ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):

Critical Coarse Sediment Yield Areas*
***This Section only required if hydromodification management requirements apply**

Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries?

☐ Yes

☒ No, No critical coarse sediment yield areas to be protected based on WMAA maps

If yes, have any of the optional analyses presented in Section 6.2 of the BMP Design Manual been performed?

☐ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite

☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment

☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite

☐ No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

If optional analyses were performed, what is the final result?

☐ No critical coarse sediment yield areas to be protected based on verification of GLUs onsite

☐ Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 8 of the SWQMP.

☐ Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

Discussion / Additional Information:

See Step 5 of Section 1.0 above. (See Appendix 2b)

Flow Control for Post-Project Runoff*
***This Section only required if hydromodification management requirements apply**

List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.

Based on the HMP Management Exhibit in Appendix 2a the project has 3 POC's

Each POC POC A-1, POC A-2, and POC B numerical designation corresponds to each DMA discharge point.

The HMP Management for each POC is designed as an underground vault sized to 1)retain the DCV and divert the DCV to an infiltration well and 2)detain the HMP volume and release through orifice discharge in a steel plate with overflow bypass capacity.

See Basin A-1/A-2 HMP Management Exhibit and Basin B HMP Management Exhibit in Appendix 2a

Appendix 2d provides flow control facility design calculations. The project's subsurface hydromodification storage vaults were sized using the bioretention plus vault for HMP sizing. The project is proposing dry wells for treating (infiltrating) the project's DCV only, not to infiltrate calculated HMP volume. The detained HMP volume will be released, not infiltrated, through a low flow orifice to mimic the 0.5Q2 to Q10 rates to the project's POCs per the HMP Exhibit in Appendix 2a. Therefore, the BMP sizing calculator's results are used only for the HMP vault sizing since the project's DCV will be treated via infiltration.

The proposed road widening of Carroll Canyon Road will incorporate Green Streets BMP features into the design. Therefore, only a portion of the proposed project (widening of Carroll Canyon Road along project's frontage) will be exempt from PDP requirements per Section 1.4.3 of the BMP Design Manual as a PDP Exemption Category 2.

Has a geomorphic assessment been performed for the receiving channel(s)?

☐ No, the low flow threshold is 0.1Q2 (default low flow threshold)
☐ Yes, the result is the low flow threshold is 0.1Q2
☐ Yes, the result is the low flow threshold is 0.3Q2
☒ Yes, the result is the low flow threshold is 0.5Q2

If a geomorphic assessment has been performed, provide title, date, and preparer:

Chang Consultants
Wayne Chang, MS, PE
June 17, 2015
Carroll Canyon Mixed Use

Discussion / Additional Information: (optional):

See Appendix 2c. As discussed with City of San Diego staff, the project will perform a complete channel assessment study during the preparation of the project's construction documents to confirm the low flow threshold of 0.52Q2 is acceptable to use.

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Other Site Requirements and Constraints

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

N/A

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.

Source Control BMP Checklist for All Development Projects

Section 3.0

Project Identification

Project Name: Carroll Canyon Mixed Use Project

Permit Application Number PTS 240716

Source Control BMPs

All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.

Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	☒Yes	☐No	☐N/A
Discussion / justification if SC-1 not implemented:			
SC-2 Storm Drain Stenciling or Signage	☒Yes	☐No	☐N/A
Discussion / justification if SC-2 not implemented:			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A
Discussion / justification if SC-3 not implemented:			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A
Discussion / justification if SC-4 not implemented:			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A

Discussion / justification if SC-4 not implemented:

Section 3.0 Page 2 of 2

Source Control Requirement	Applied?		
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
• On-site storm drain inlets	☒Yes	☐No	☐N/A
• Interior floor drains and elevator shaft sump pumps	☒Yes	☐No	☐N/A
• Interior parking garages	☒Yes	☐No	☐N/A
• Need for future indoor & structural pest control	☐Yes	☐No	☒N/A
• Landscape/Outdoor Pesticide Use	☒Yes	☐No	☐N/A
• Pools, spas, ponds, decorative fountains, and other water features	☒Yes	☐No	☐N/A
• Food service	☒Yes	☐No	☐N/A
• Refuse areas	☒Yes	☐No	☐N/A
• Industrial processes	☐Yes	☐No	☒N/A
• Outdoor storage of equipment or materials	☒Yes	☐No	☐N/A
• Vehicle and Equipment Cleaning	☐Yes	☐No	☒N/A
• Vehicle/Equipment Repair and Maintenance	☐Yes	☐No	☒N/A
• Fuel Dispensing Areas	☐Yes	☐No	☒N/A
• Loading Docks	☒Yes	☐No	☐N/A
• Fire Sprinkler Test Water	☒Yes	☐No	☐N/A
• Miscellaneous Drain or Wash Water	☒Yes	☐No	☐N/A
• Plazas, sidewalks, and parking lots	☒Yes	☐No	☐N/A
• SC-6A: Large Trash Generating Facilities	☐Yes	☐No	☒N/A
• SC-6B: Animal Facilities	☐Yes	☐No	☒N/A
• SC-6C: Plant Nurseries and Garden Centers	☐Yes	☐No	☒N/A
• SC-6D: Automotive-related Uses	☐Yes	☐No	☒N/A

Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.

Site Design BMP Checklist for All Development Projects

Section 4.0

Project Identification

Project Name: Carroll Canyon Mixed Use Project

Permit Application Number: PTS 240716

Site Design BMPs

All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.

Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☒Yes	☐No	☐N/A
Discussion / justification if SD-1 not implemented:			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☒Yes	☐No	☐N/A
Discussion / justification if SD-2 not implemented:			
SD-3 Minimize Impervious Area	☒Yes	☐No	☐N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	☒Yes	☐No	☐N/A
Discussion / justification if SD-4 not implemented:			

Section 4.0 Page 2 of 2

Site Design Requirement	Applied?		
SD-5 Impervious Area Dispersion	☒Yes	☐No	☐N/A
Discussion / justification if SD-5 not implemented:			
SD-6 Runoff Collection	☒Yes	☐No	☐N/A
Discussion / justification if SD-6 not implemented:			
SD-7 Landscaping with Native or Drought Tolerant Species	☒Yes	☐No	☐N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☐Yes	☒No	☐N/A
Discussion / justification if SD-8 not implemented: Harvest and Use of precipitation is not proposed on the project. Storm Water runoff is proposed to be captured by site BMP areas designed to comply with HMP sizing requirements.			

Summary of PDP Structural BMPs	Section 5.0

Project Identification

Project Name:	Carroll Canyon Mixed Use Project
Permit Application Number:	PTS 240716

PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual).

Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

Following the decision matrix of Figure 5-1 and Figure 5-2 leads to the design of BMPs using full infiltration, The sizing for the infiltration BMP was based on Appendix D and E of the BMP design Manual. Infiltration Testing and Drywell Depths were provided for in the Geotechnical Report located in Appendix 6.
Pretreatment is included in the Maxwell Plus system in the Pre settling Chamber and all inlets having maintainable inserts.

Full Infiltration is based on analysis according to sections 5.1 and 5.4.2 Pollutant and Flow controls are integrated. Retention via infiltration of the required DCV will achieve 100 percent removal efficiency, thus is the most effective way to reduce pollutants in the site's storm water discharge.

Design notes;

- Basin A-1 and A-2 DCV was oversized 3% to account for drawdown and 80% annual capture and 2 Drywells installed for infiltration of the DCV.
- Basin B DCV is oversized to account for additional pollutant capture related to the infeasibility of capturing the main driveway and 1 Drywell installed for infiltration of the DCV.

The proposed road widening of Carroll Canyon Road will incorporate Green Streets BMP features into the design. Therefore, only a portion of the proposed project (widening of Carroll Canyon Road along project's frontage) will be exempt from PDP requirements per Section 1.4.3 of the BMP Design Manual as a PDP Exemption Category 2. The Green Streets BMPs that will be implemented are: Sidewalk Planters, Green Gutters, and Street Trees.

Section 5.0 Page 2 of 2

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. Drywell A and Drywell B

Construction Plan Sheet No.

Type of structural BMP:

☐ Retention by harvest and use (HU-1)
☒ Retention by infiltration basin (INF-1)
☐ Retention by bioretention (INF-2)
☐ Retention by permeable pavement (INF-3)
☐ Partial retention by biofiltration with partial retention (PR-1)
☐ Biofiltration (BF-1)
☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below)
☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below)
☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below)
☐ Detention pond or vault for hydromodification management
☐ Other (describe in discussion section below)

Purpose:

☐ Pollutant control only
☐ Hydromodification control only
☒ Combined pollutant control and hydromodification control
☐ Pre-treatment/forebay for another structural BMP
☐ Other (describe in discussion section below)

Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Gregory W. Lang, PE Engineer of Work Pasco Laret Suiter & Associates
Who will be the final owner of this BMP?	Sudberry Development, Inc.
Who will maintain this BMP into perpetuity?	Sudberry Development, Inc.
What is the funding mechanism for maintenance?	Common area maintenance (CAM) fees, agreements and apartment rents

APPENDICES

APPENDIX 1 - Backup for PDP Pollutant Control BMPs

Appendix 1a .... DMA Exhibit
Appendix 1b......... Tabular Summary of DMAs and Design Capture Volume Calculations
Appendix 1c .... Harvest and Use Feasibility Screening (when applicable)
Appendix 1d...........Categorization of Infiltration Feasibility Condition (when applicable)
Appendix 1e……………………Pollutant Control BMP Design Worksheets / Calculations

APPENDIX 2 – Backup for PDP Hydromodification Control Measures

Appendix 2a ....Hydromodification Management Exhibit
Appendix 2b......................................Management of Critical Coarse Sediment Yield Areas
Appendix 2c ....Geomorphic Assessment of Receiving Channels
Appendix 2d.. Flow Control Facility Design

APPENDIX 3 – Structural BMP Maintenance Plan

Appendix 3a .... Structural BMP Maintenance Thresholds and Actions
Appendix 3b..Draft Maintenance Agreement (when applicable)

APPENDIX 4 – Permanent Storm Water BMP Plan Sheets

APPENDIX 5 – Project Drainage Report

APPENDIX 6 – Project Geotechnical Investigation Report

APPENDIX 7 – Form J-1 – BMP Applicability and Selection for Green Street Exemption

Appendix 1

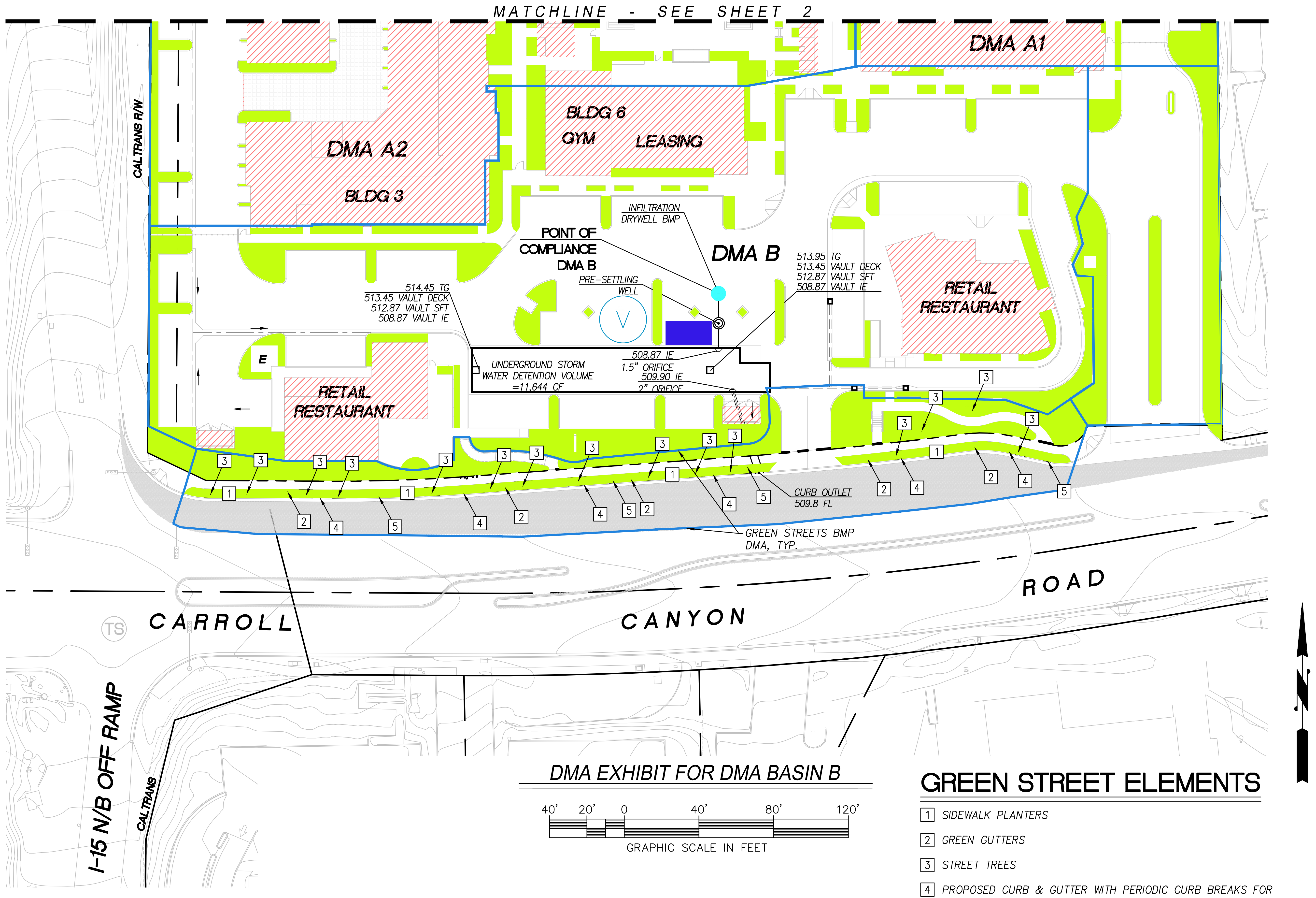
Backup for PDP Pollutant Control BMPs

Indicate which Items are Included:

Appendix Sequence	Contents	Checklist
Appendix 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	☒Included
Appendix1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	☒Included on DMA Exhibit in Appendix 1a ☒Included as Attachment 1b, separate from DMA Exhibit
Appendix 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	☐Included ☒Not included because the entire project will use infiltration BMPs
Appendix 1d	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	☒Included ☐Not included because the entire project will use harvest and use BMPs
Appendix 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines	☒Included

Appendix 1a

DMA Exhibit



DMA EXHIBIT FOR DMA BASIN B

40' 20' 0 40' 80' 120'

GRAPHIC SCALE IN FEET

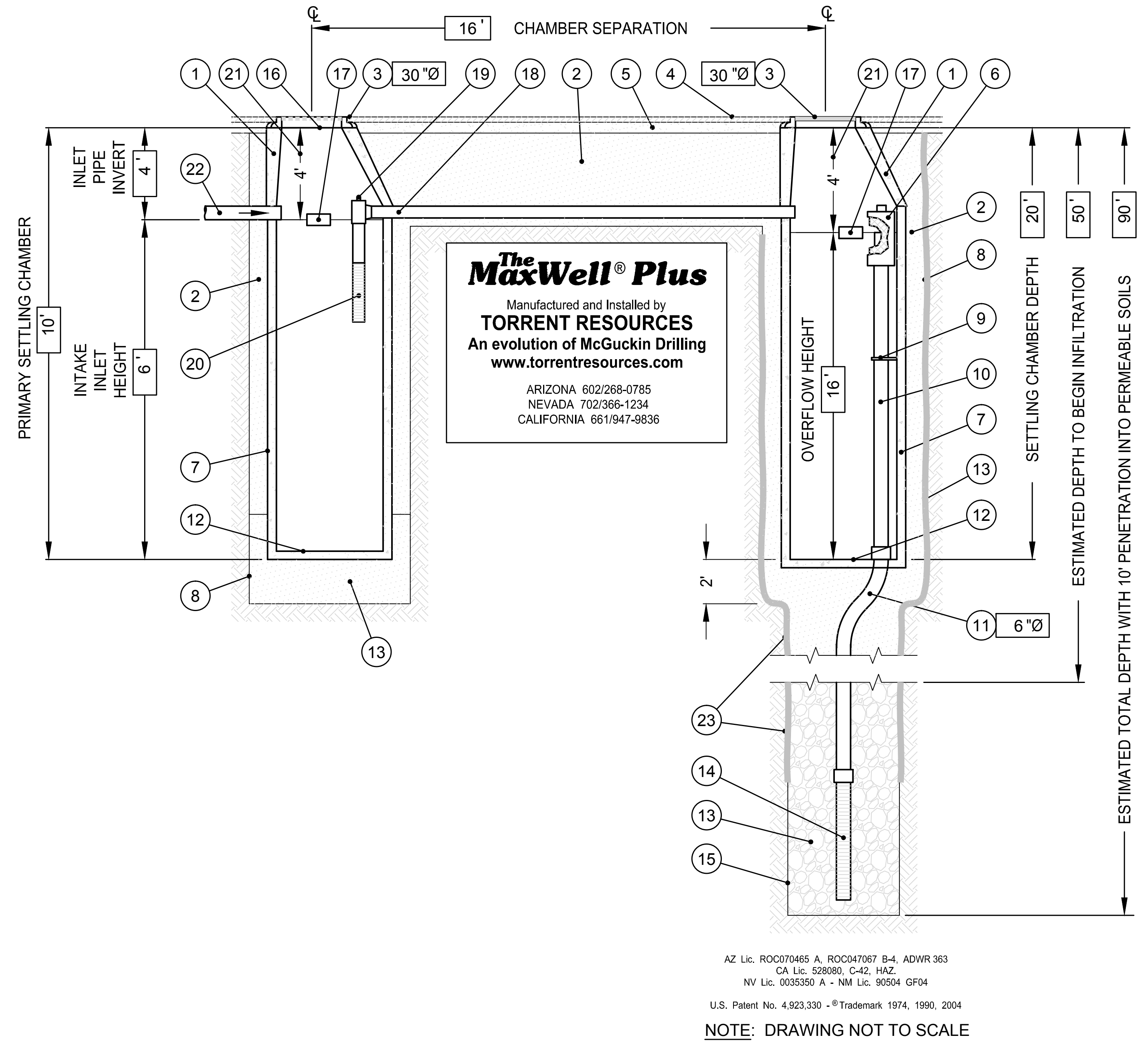
GREEN STREET ELEMENTS

- 1 SIDEWALK PLANTERS
- 2 GREEN GUTTERS
- 3 STREET TREES
- 4 PROPOSED CURB & GUTTER WITH PERIODIC CURB BREAKS FOR STORM WATER TO FLOW INTO GREEN GUTTER
- 5 PROPOSED CURB OUTLET LOCATION FOR GREEN GUTTER FLOW

ITEM NUMBERS

1. **MANHOLE CONE** - MODIFIED FLAT BOTTOM.
2. **STABILIZED BACKFILL** - TWO-SACK SLURRY MIX.
3. **BOLTED RING & GRATE/COVER** - DIAMETER AS SHOWN. CLEAN CAST IRON WITH WORDING "STORM WATER ONLY" IN RAISED LETTERS. BOLTED IN 2 LOCATIONS AND SECURED TO CONE WITH MORTAR. RIM ELEVATION ±0.02' OF PLANS.
4. **GRADED BASIN OR PAVING** (BY OTHERS).
5. **COMPACTED BASE MATERIAL** (BY OTHERS).
6. **PUREFLO® DEBRIS SHIELD** - ROLLED 16 GA. STEEL X 24" LENGTH WITH VENTED ANTI-SIPHON AND INTERNAL .265" MAX. SWO FLATTENED EXPANDED STEEL SCREEN X 12" LENGTH. **FUSION BONDED EPOXY COATED**.
7. **PRE-CAST LINER** - 4000 PSI CONCRETE 48" ID. X 54" OD. **CENTER IN HOLE** AND ALIGN SECTIONS TO **MAXIMIZE BEARING SURFACE**.
8. **MIN. 6' Ø DRILLED SHAFT**.
9. **SUPPORT BRACKET** - FORMED 12 GA. STEEL. **FUSION BONDED EPOXY COATED.**
10. **OVERFLOW PIPE** - SCH. 40 PVC MATED TO DRAINAGE PIPE AT BASE SEAL.
11. **DRAINAGE PIPE** - ADS HIGHWAY GRADE WITH TRI-A COUPLER. **SUSPEND PIPE** DURING BACKFILL OPERATIONS TO PREVENT BUCKLING OR BREAKAGE. DIAMETER AS NOTED.
12. **BASE SEAL** - CONCRETE SLURRY.
13. **ROCK** - CLEAN AND WASHED 3/8" TO 1-1/2" AGGREGATE.
14. **FLOFAST DRAINAGE SCREEN** - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. DIAMETER VARIES 96" OVERALL LENGTH WITH TRI-B COUPLER.
15. **MIN. 4' Ø SHAFT** - DRILLED TO **MAINTAIN PERMEABILITY** OF DRAINAGE SOILS.
16. **FABRIC SEAL** - U.V. RESISTANT GEOTEXTILE - **TO BE REMOVED BY CUSTOMER** AT PROJECT COMPLETION.
17. **ABSORBENT** - HYDROPHOBIC PETROCHEMICAL SPONGE. MIN. 128 OZ. CAPACITY. TYPICAL, TWO (2) PER CHAMBER.
18. **CONNECTOR PIPE** - 4" Ø SCH. 40 PVC.
19. **VENTED ANTI-SIPHON INTAKE WITH FLOW REGULATOR.**
20. **INTAKE SCREEN** - 4" Ø SCH. 40 PVC 0.120" MODIFIED SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. 48" OVERALL LENGTH WITH TRI-C END CAP.
21. **FREEBOARD DEPTH VARIES** WITH INLET PIPE ELEVATION. INCREASE PRIMARY / SECONDARY SETTLING CHAMBER DEPTHS AS NEEDED TO MAINTAIN ALL INLET PIPE ELEVATIONS ABOVE CONNECTOR PIPE OVERFLOW.
22. **OPTIONAL INLET PIPE** (BY OTHERS).
23. **NON-WOVEN GEOTEXTILE SLEEVE,** MIRAFI 140 NL. MIN. 6 FT Ø, HELD APPROX. 10 FEET OFF THE BOTTOM OF EXCAVATION.

Modified MaxWell® Plus Drainage System Detail And Specifications



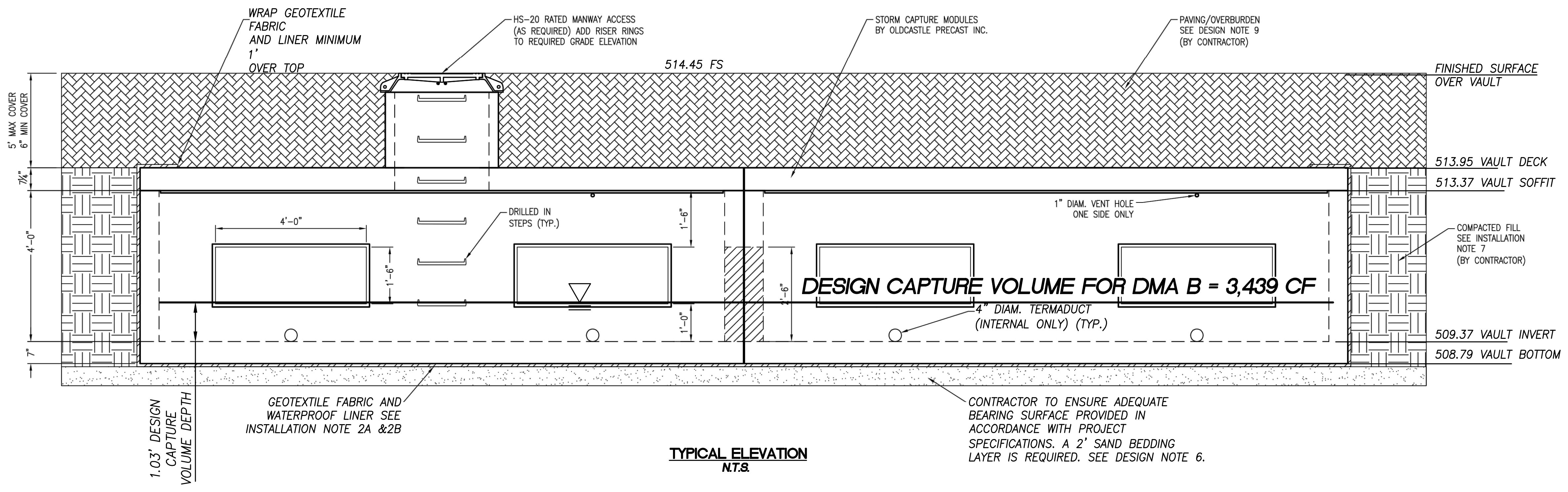
AZ Lic. ROC070465 A, ROC047067 B-4, ADWR 363
CA Lic. 528080, C-42, HAZ.
NV Lic. 0035350 A - NM Lic. 90504 GF04

U.S. Patent No. 4,923,330 - ®Trademark 1974, 1990, 2004

NOTE: DRAWING NOT TO SCALE

LEGEND

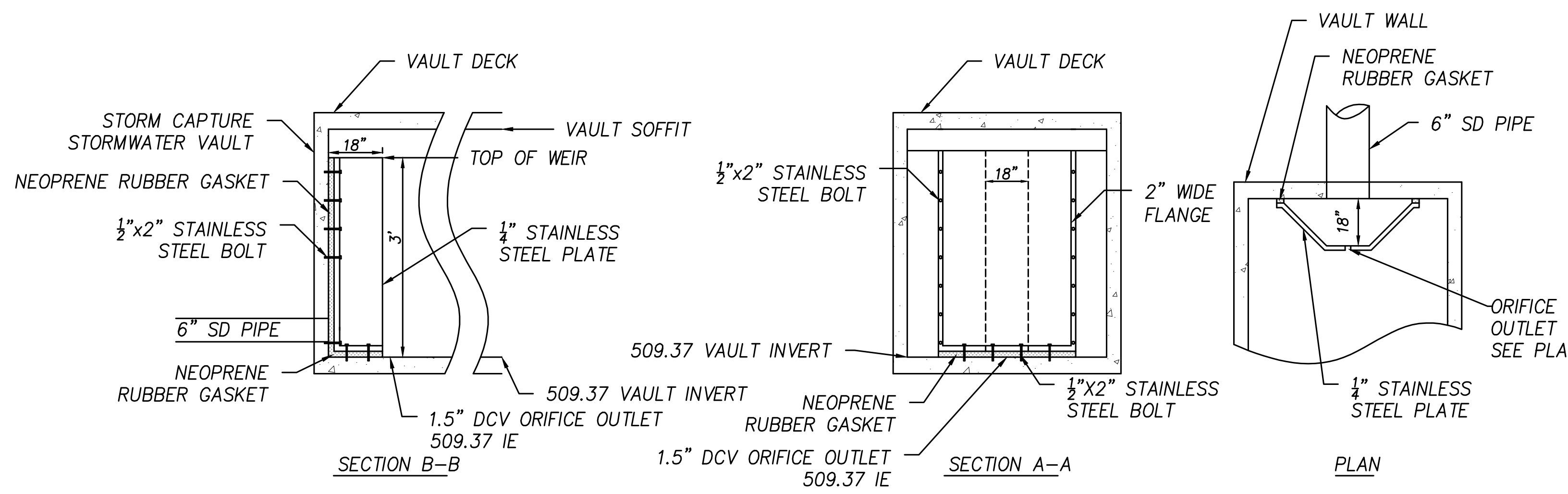
DESCRIPTION	SYMBOL
RIGHT-OF-WAY / PROPERTY LINE	— — —
MAJOR BASIN	━━
INFEASIBILITY AREA	▨
PROPOSED LANDSCAPING (SELF TREATING/RETAINING)	🟩
PAVERS	▨
IMPERVIOUS AREA - BLDG ROOF	▨
IMPERVIOUS AREA - CARPORT ROOF	☒
IMPERVIOUS AREA - PAVEMENT	☐
STORM CAPTURE UNDERGROUND VAULT	V 🟦
DRY WELL	DW ●



TYPICAL ELEVATION
N.T.S.

STORM CAPTURE SC1 VAULT DETAILS - 4' INSIDE DEPTH

N.T.S.



WEIR DETAIL (INSIDE VAULT)

N.T.S.

DMA AREA ANALYSIS / DESIGN CAPTURE VOLUME

DMA	IMP AREA (ACRES)	PERVIOUS AREA (ACRES)	TOTAL (ACRE)	C (NO UNIT)	d (in)	DESIGN CAPTURE VOLUME (CF)
B	1.84	0.35	2.19	0.77	0.56	3,439

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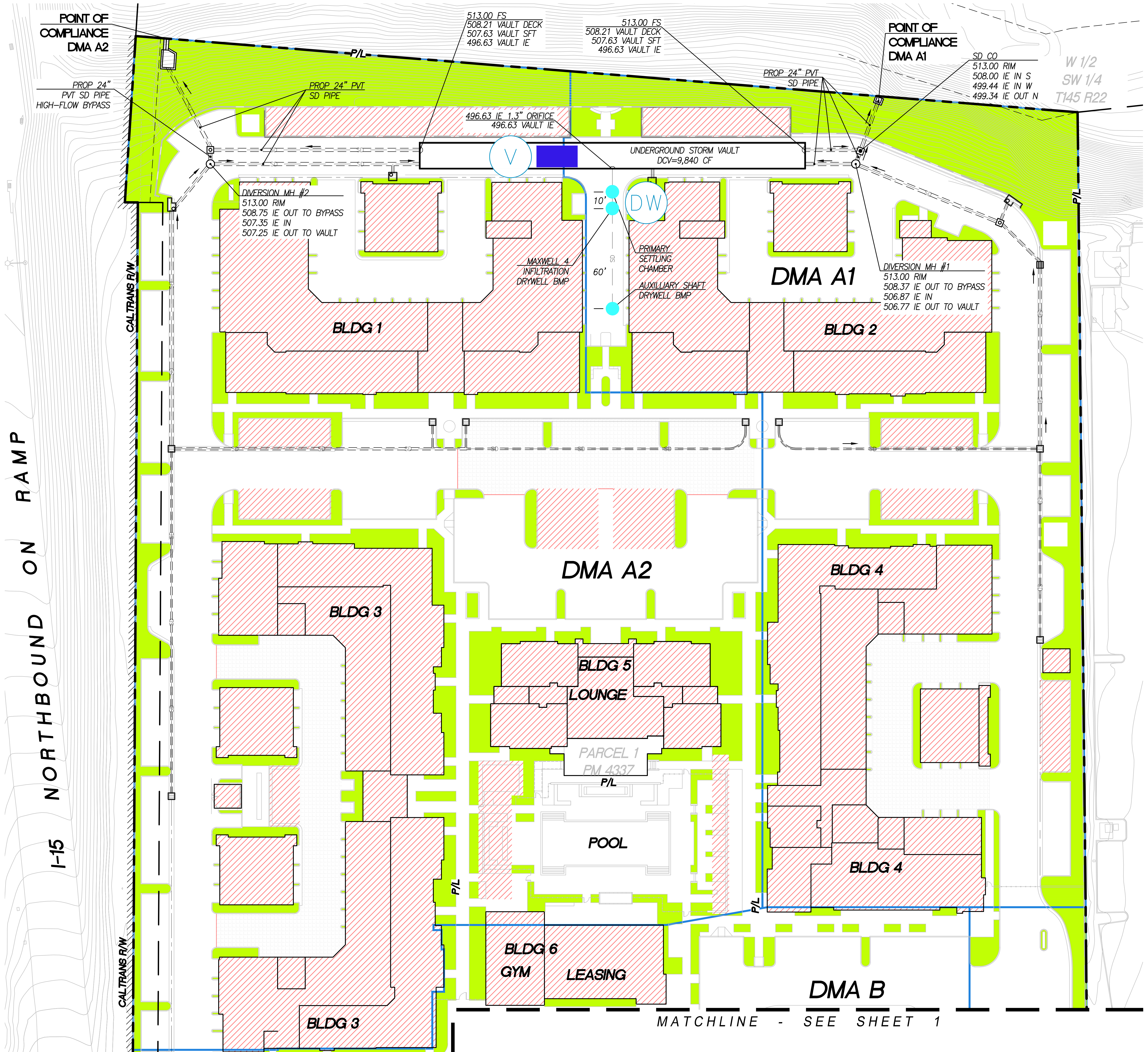
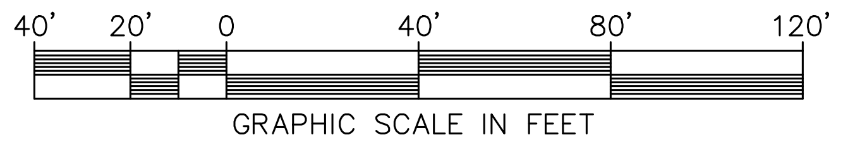
ph 858.259.8212 | fx 858.259.4812 | plsaengineering.com

DMA EXHIBIT
FOR DMA BASIN B

CARROLL CANYON MIXED USE
CARROLL CANYON ROAD, SAN DIEGO, CA
PROJECT NUMBER: PE 2314
SCALE: 1" = 40'
DATE: AUGUST 30, 2016
SHEET 1 OF 2



DMA A1 & A2 DMA EXHIBIT



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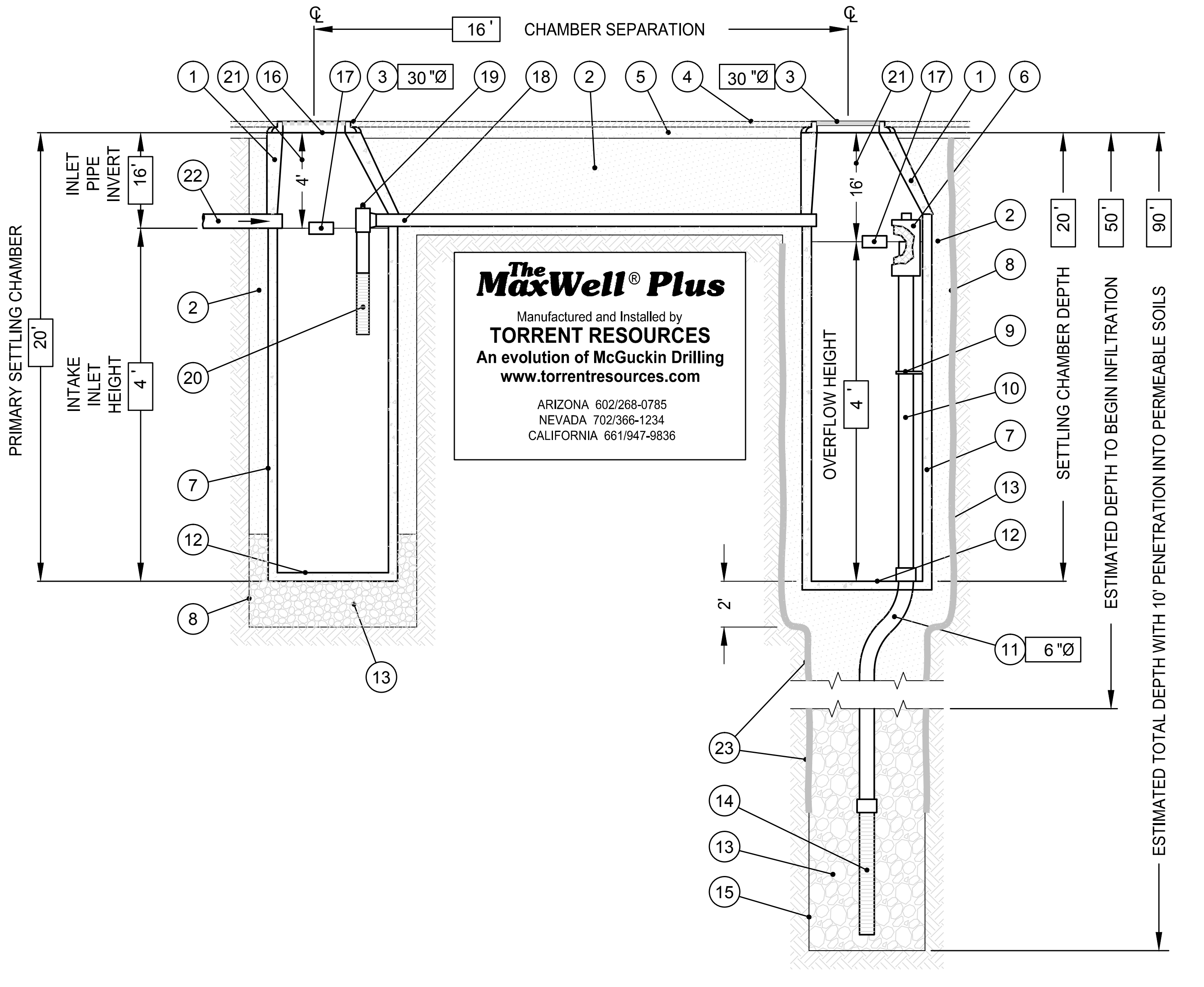
ph 858.259.8212 | fx 858.259.4812 | plsaengineering.com

LEGEND

DESCRIPTION	SYMBOL
RIGHT–OF–WAY / PROPERTY LINE	—— – – ——
MAJOR BASIN	▬
INFEASIBILITY AREA	▨
PROPOSED LANDSCAPING (SELF TREATING/RETAINING)	🟩
PAVERS	▦
IMPERVIOUS AREA – BLDG ROOF	▨
IMPERVIOUS AREA – CARPORT ROOF	☒
IMPERVIOUS AREA – PAVEMENT	☐
STORM CAPTURE UNDERGROUND VAULT	V 🟦
DRY WELL	DW ●

Modified MaxWell® Plus Drainage System Detail And Specifications



○ ITEM NUMBERS

1. **MANHOLE CONE** - MODIFIED FLAT BOTTOM.
2. **STABILIZED BACKFILL** - TWO-SACK SLURRY MIX.
3. **BOLTED RING & GRATE/COVER** - DIAMETER AS SHOWN. CLEAN CAST IRON WITH WORDING "STORM WATER ONLY" IN RAISED LETTERS. BOLTED IN 2 LOCATIONS AND SECURED TO CONE WITH MORTAR. RIM ELEVATION ±0.02' OF PLANS.
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12. **BASE SEAL** - CONCRETE SLURRY.
13. **ROCK** - CLEAN AND WASHED 3/8" TO 1-1/2" AGGREGATE.
14. **FLOFAST ® DRAINAGE SCREEN** - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. DIAMETER VARIES 96" OVERALL LENGTH WITH TRI-B COUPLER.
15. **MIN. 4' Ø SHAFT** - DRILLED TO **MAINTAIN PERMEABILITY** OF DRAINAGE SOILS.
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23. **NON-WOVEN GEOTEXTILE SLEEVE,** MIRAFI 140 NL. MIN. 6 FT Ø, HELD APPROX. 10 FEET OFF THE BOTTOM OF EXCAVATION.

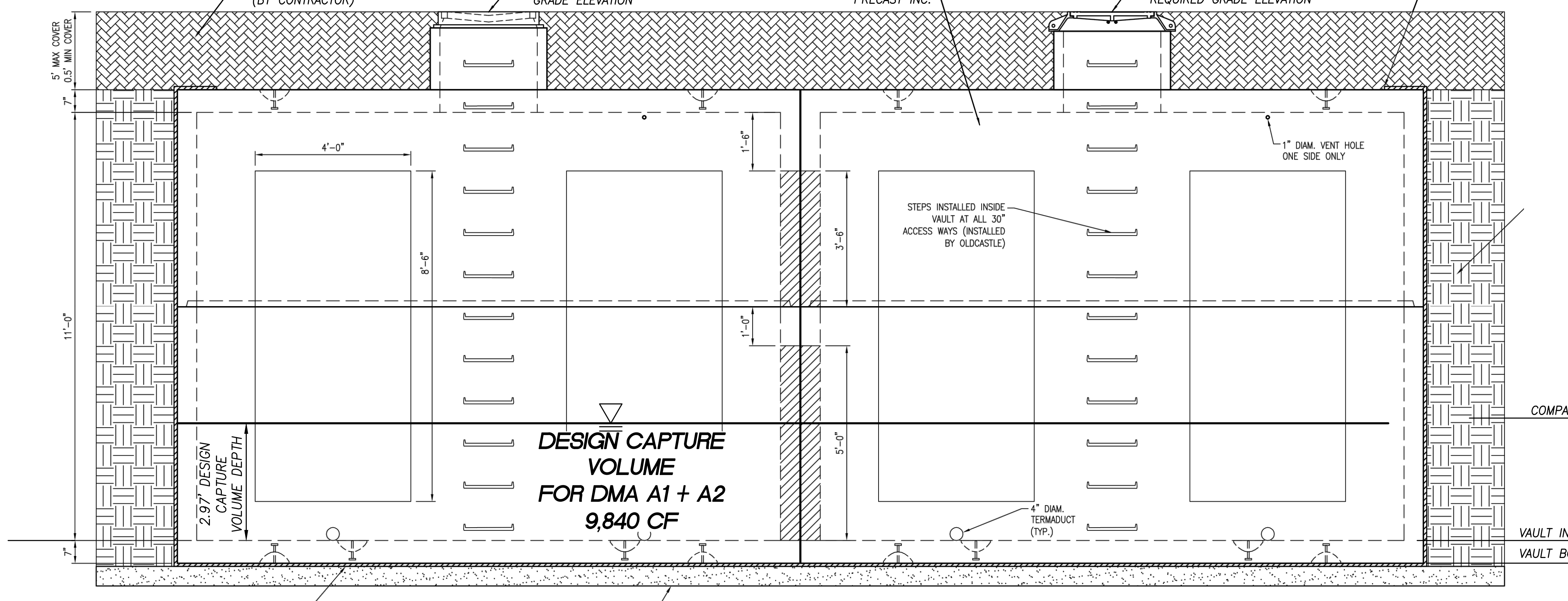
AZ Lic. ROC070465 A, ROC047067 B-4, ADWR 363
CA Lic. 528080, C-42, HAZ.
NV Lic. 0035350 A - NM Lic. 90504 GF04

U.S. Patent No. 4,923,330 - ® Trademark 1974, 1990, 2004

NOTE: DRAWING NOT TO SCALE

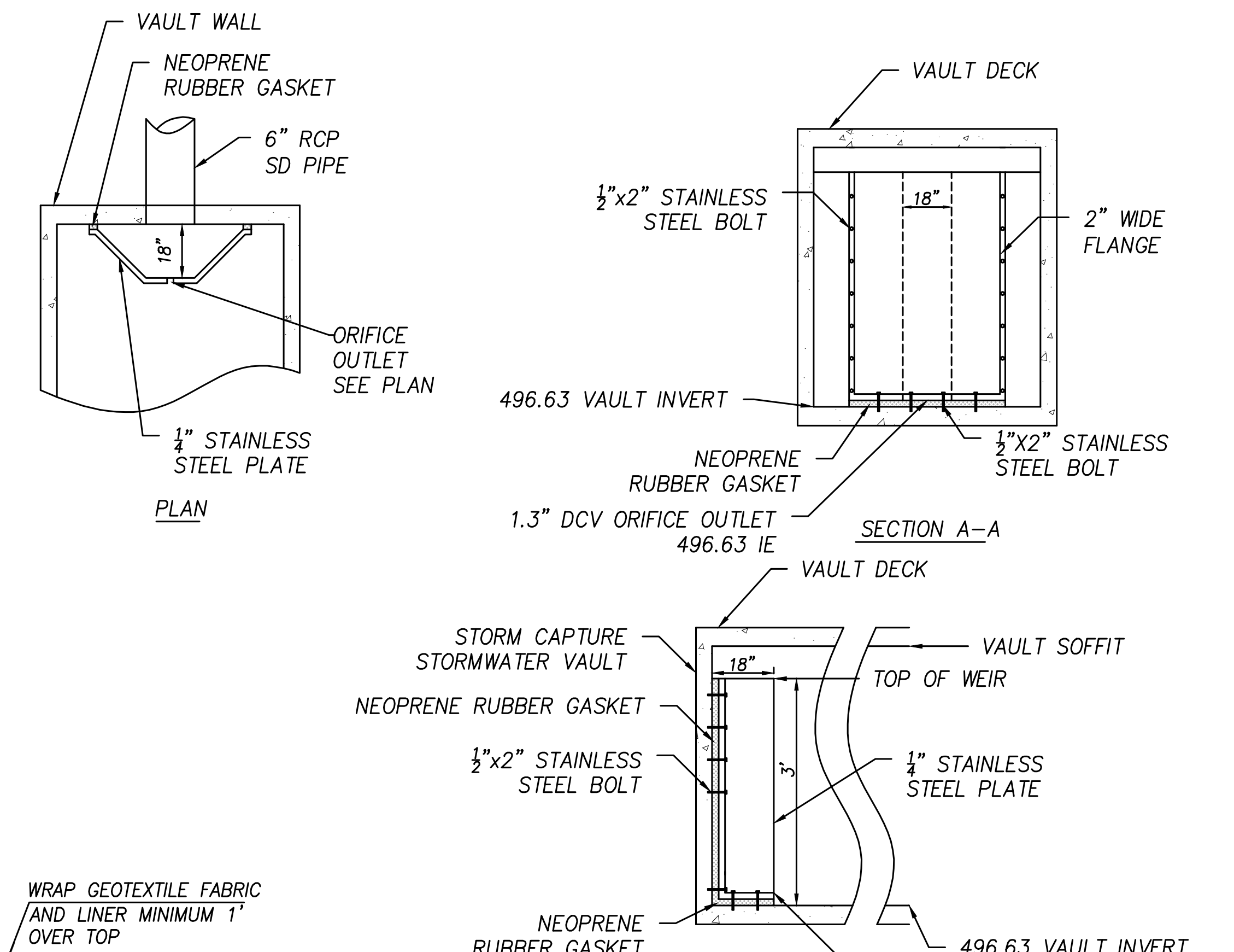
DMA AREA ANALYSIS / DESIGN CAPTURE VOLUME

DMA	IMP AREA (ACRES)	PERVIOUS AREA (ACRES)	TOTAL (ACRE)	C (NO UNIT)	d (in)	DESIGN CAPTURE VOLUME (CF)
A1	1.95	0.66	2.61	0.70	0.56	3,697
A2	3.24	1.08	4.32	0.70	0.56	6,144
TOTAL	5.19	1.74	6.92	0.70	0.56	9,840



STORM CAPTURE SC2 VAULT DETAILS - 11' INSIDE DEPTH

N.T.S.



TYP. WEIR DETAIL (INSIDE VAULT)

N.T.S.

DMA EXHIBIT
FOR DMA BASIN A1 + A2

CARROLL CANYON MIXED USE
CARROLL CANYON ROAD, SAN DIEGO, CA
PROJECT NUMBER: PE 2314
SCALE: 1" = 40'
DATE: AUGUST 30, 2016
SHEET 2 OF 2

Appendix 1b

Tabular Summary of DMAs and Design Capture Volume Calculations

PASCO LARET SUITER
& ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: June 2016
Checked:GWL Date: June 2016
Sheet: 1 of 3

DMA - A1

Appendix B: Storm Pollutant Control Hydrologic Calculations and Sizing Methods

Table B.1-1 Runoff factors for surfaces draining to BMPs - Pollutant Control BMPs

Surface	Runoff Factor - C	Tributary Area (ac)	C x A
Roofs	0.90	1.06	0.96
Concrete or Asphalt	0.90	0.88	0.80
Unit Pavers (grouted)	0.90	-	-
Decomposed Granite	0.30	-	-
Cobbles or Crushed Aggregate	0.30	-	-
Amended, Mulched Soils or Landscape	0.10	0.66	0.07
Compacted Soil	0.30	-	-
Natural (A Soil)	0.10	-	-
Natural (B Soil)	0.14	-	-
Natural (C Soil)	0.23	-	-
Natural (D Soil)	0.30	-	-
	Total	2.61	1.82

Weighted Runoff Factor C= Sum (CxA) / Sum (Area)

Weighted Runoff Factor C= 0.70

Worksheet B.2.1. DCV

Design Capture Volume		Worksheet B-2.1		
1	85th percentile 24-hour storm depth from Figure B.1-1	d=	0.56	inches
2	Area tributary to BMP (s)	A=	2.61	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 & B.2.1	C=	0.70	unitless
4	Street tree volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) - TCV - RCV	**DCV=**	**3,697**	**cubic-feet**

Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: June 2016
Checked:GWL Date: June 2016
Sheet: 2 of 3

DMA - A2

Appendix B: Storm Pollutant Control Hydrologic Calculations and Sizing Methods

Table B.1-1 Runoff factors for surfaces draining to BMPs - Pollutant Control BMPs

Surface	Runoff Factor - C	Tributary Area (ac)	C x A
Roofs	0.90	1.57	1.41
Concrete or Asphalt	0.90	1.67	1.50
Unit Pavers (grouted)	0.90	-	-
Decomposed Granite	0.30	-	-
Cobbles or Crushed Aggregate	0.30	-	-
Amended, Mulched Soils or Landscape	0.10	1.08	0.11
Compacted Soil	0.30	-	-
Natural (A Soil)	0.10	-	-
Natural (B Soil)	0.14	-	-
Natural (C Soil)	0.23	-	-
Natural (D Soil)	0.30	-	-
	Total	4.32	3.02

Weighted Runoff Factor C= Sum (CxA) / Sum (Area)

Weighted Runoff Factor C= 0.70

Worksheet B.2.1. DCV

Design Capture Volume		Worksheet B-2.1		
1	85th percentile 24-hour storm depth from Figure B.1-1	d=	0.56	inches
2	Area tributary to BMP (s)	A=	4.32	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 & B.2.1	C=	0.70	unitless
4	Street tree volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) - TCV - RCV	**DCV=**	**6,144**	**cubic-feet**

Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: June 2016
Checked:GWL Date: June 2016
Sheet: 3 of 3

DMA - B

Appendix B: Storm Pollutant Control Hydrologic Calculations and Sizing Methods

Table B.1-1 Runoff factors for surfaces draining to BMPs - Pollutant Control BMPs

Surface	Runoff Factor - C	Tributary Area (ac)	C x A
Roofs	0.90	0.26	0.23
Concrete or Asphalt	0.90	1.58	1.43
Unit Pavers (grouted)	0.90	-	-
Decomposed Granite	0.30	-	-
Cobbles or Crushed Aggregate	0.30	-	-
Amended, Mulched Soils or Landscape	0.10	0.35	0.03
Compacted Soil	0.30	-	-
Natural (A Soil)	0.10	-	-
Natural (B Soil)	0.14	-	-
Natural (C Soil)	0.23	-	-
Natural (D Soil)	0.30	-	-
	Total	2.19	1.69

Weighted Runoff Factor C= Sum (CxA) / Sum (Area)

Weighted Runoff Factor C= 0.77

Worksheet B.2.1. DCV

Design Capture Volume		Worksheet B-2.1		
1	85th percentile 24-hour storm depth from Figure B.1-1	d=	0.56	inches
2	Area tributary to BMP (s)	A=	2.19	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 & B.2.1	C=	0.77	unitless
4	Street tree volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) - TCV - RCV	**DCV=**	**3,439**	**cubic-feet**

Appendix 1d

Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition

Worksheet C.4-1

Part 1 - Full Infiltration Feasibility Screening Criteria

Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

Calculated hydraulic conductivity values of 0.2 in/hr were calculated for soil between a depth of 0 to 40 feet and 0.38 in/hr for soil at a depth greater than 40 feet (see Appendix B of Geocon's report dated January 21, 2016).

The rates are less than 0.5 inches/hour. Therefore, full infiltration is not feasible.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Criteria	Screening Question	Yes	No
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Provide basis:

The area of infiltration for the proposed dry well will be at a depth of at least 50 feet below the ground surface and below the toe of adjacent slopes. In our opinion the use of dry wells at this depth will not increase the risk of geotechnical hazards (slope stability, groundwater mounding, or impact utilities).

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

<table>
<tr><th colspan="4">Worksheet C.4-1 Page 2 of 4</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>3</td><td>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:
We did not encounter groundwater within 10 feet of the bottom of the boring performed for the infiltration testing. It is our opinion that infiltration from the drywell should not impact groundwater.
Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</td></tr>
<tr><td>4</td><td>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:
It is our opinion that infiltration from the proposed drywells should not impact water balance issues. Response provided by Pasco Laret Suiter & Associates, the project's civil engineer.</td></tr>
<tr><td>Part 1 Result*</td><td colspan="2">If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration
If any answer from row 1-4 is "No", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2</td><td></td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

Calculated hydraulic conductivity values of 0.2 in/hr were calculated for soil between a depth of 0 to 40 feet and 0.38 in/hr for soil at a depth greater than 40 feet (see Appendix B of Geocon's report dated January 21, 2016).

The rates indicate the geologic conditions allow for appreciable rates.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Criteria	Screening Question	Yes	No
6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Provide basis:

The area of infiltration for the proposed dry well will be at a depth of at least 50 feet below the ground surface and below the toe of adjacent slopes. In our opinion the use of dry wells at this depth will not increase the risk of geotechnical hazards (slope stability, groundwater mounding, or impact utilities).

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

<table>
<tr><th colspan="4">Worksheet C.4-1 Page 4 of 4</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>7</td><td>Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:
We did not encounter groundwater within 10 feet of the bottom of the boring performed for the infiltration testing. It is our opinion that infiltration from the drywell should not impact groundwater.
Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</td></tr>
<tr><td>8</td><td>Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:
It is our opinion that downstream water rights should not be impacted. Response provided by Pasco Laret Suiter & Associates, the project's civil engineer.
Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</td></tr>
<tr><td>Part 2 Result*</td><td colspan="2">If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.
If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</td><td></td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Factor of Safety and Design Infiltration Rate Worksheet

Form I-9

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25	3	0.75
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			2
B	Design	Level of pretreatment/ expected sediment loads	0.5	1	0.5
		Redundancy/resiliency	0.25	1	0.25
		Compaction during construction	0.25	1	0.25
		Design Safety Factor, $S_B = \Sigma p$			1.0
Combined Safety Factor, $S_{total} = S_A \times S_B$					2.0
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)					0.07 cfs
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$					0.035 cfs

Supporting Data

Briefly describe infiltration test and provide reference to test forms:

We performed falling-head borehole tests to estimate hydraulic conductivity using methods described in Hvorslev (1949).

Using the estimated hydraulic conductivity in a finite element analysis, an average infiltration rate was determined over a wetted surface area that was 4 ft diameter and 50 feet in length. The infiltration rate accounts for pressure head within the dry well. See Geocon report dated January 21, 2016

Appendix 1e

Pollutant Control BMP Design Worksheets / Calculations

PASCO LARET SUITER
& ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: June 2016
Checked:GWL Date: June 16

Sheet: 1 of 1

Carroll Canyon Mixed Use Pollutant Control BMP Design Worksheets / Calculations - DMAs A1 & A2 Combined

DMA	REQUIRED	7x15x11
	VOLUME (CF)	1144
A-1 & A-2	32683	29

HMP Summary

OUTFLOW Q (CFS)		ORIFICE DIAMETER (IN)		DRAWDOWN	STORAGE	TANK	NUMBER	STORAGE
ALLOWED	PROPOSED	ALLOWED	PROPOSED	HOURS	DEPTH (FT)	I.D. (FT)	UNITS	PROVIDED
0.228	0.196	1.71	1.5	32.1	10	11	29	33176

DESIGN CAPTURE VOLJME (DCV)

DMA	(2) VOLUME (CF)	DEPTH (FT)	(1) INFILTRATION RATE (Geo) CFS	(2) DRAWDOWN TIME W/O ORIFICE (HR)
A-1 & A-2	10136	3.06	0.0700	40.22

(1) The Geotech Infiltration rate of 0.070 cfs was reduced by the FS of 2. This revised rate proced a drawdown time of 78 hours. Therefore 2 drywells are proposed and the resultant rate utilized for the DCV is 0.070 cfs

(2) The original drawdown time of 39.05 and the DCV were increased based on the attached Figure B-4.1

DCV Orifice Parameter

Q Infiltration Rate Controls			Q det =	0.070	cfs
DCV Orifice Area (sf) =		0.0083	Equals	1.20	in^2
Max DCV Orifice Diameter (in) =		1.2349			

< -------------Q at Infiltration rate Controls

< -------------Minimum orifice area to drain DCV @ Infiltration Rate @ h=DCV Depth (2.97')

<--------------Max Orifice diameter to meter outflow @ Infiltration Rate @ h=DCV Depth (2.97')

Where Q = Cd x A x [(2gh)^.5]

Time = Volume / Q

DCV Orifice Sizing

Set Orifice Diameter at:		1.23	Inch		
Orifice Area (in^2) =		1.1882	=	0.0083	sf
Q act =	0.0694	cfs			
Det Time act=	40.5	Hours	40.5 APPROX = 40.22		

<--------------Pick orifice diameter larger than the minimum above

<--------------Orifice Area based on picked orifice diameter

<--------------Actual Q based on set orifice diameter @ h=DCV Depth

<--------------Drawdown time based on picked orifice diameter (36 hours max) @ h=DCV Depth

PASCO LARET SUITER
& ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: June 2016
Checked:GWL Date: June 2016
Sheet: 1 of 1

Carroll Canyon Mixed Use Pollutant Control BMP Design Worksheets / Calculations - DMA B

DMA	REQUIRED	7x15x4
	VOLUME (CF)	401.5
B	11441	28

HMP Summary								
OUTFLOW Q (CFS)		ORIFICE DIAMETER (IN)		DRAWDOWN	STORAGE	TANK	NUMBER	STORAGE
ALLOWED	PROPOSED	ALLOWED	PROPOSED	HOURS	DEPTH (FT)	I.D. (FT)	UNITS	PROVIDED
0.191	0.161	2.31	2	36	3.5	4	29	11643.5

DESIGN CAPTURE VOLJME (DCV)				
DMA	VOLUME	DEPTH	(1) INFILTRATION RATE (GEO)	DRAWDOWN TIME W/O ORIFICE (HR)
	(CF)	(FT)	CFS	
B	3439	1.03	0.035	27.29

(1) The infiltration Rate of 0.070 cfs has been adjusted by the FS of 2

DCV Orifice Parameter					
Q Infiltration Rate Controls			Q det =	0.035	cfs
DCV Orifice Area (sf) =		0.0071	In (sf) =	1.03	in^2
Max DCV Orifice Diameter (in) =		1.1449			

< -------------Q at Infiltration rate Controls

< -------------Orifice area to drain DCV @ Infiltration Rate @ h=DCV Depth (1.03')

<--------------Orifice diameter to meter outflow @ Infiltration Rate @ h=DCV Depth (1.03')

Where Q = Cd x A x [(2gh)^.5]

Time = Volume / Q

DCV Orifice Sizing					
Set Orifice Diameter at:		1.125	Inch		
Orifice Area (in^2) =		0.9940	=	0.0069	sf
Q act =	0.0338	cfs			
Det Time act=	28.3	Hours			

<--------------Pick orifice diameter larger than the minimum above

<--------------Orifice Area based on picked orifice diameter

<--------------Actual Q based on set orifice diameter @ h=DCV Depth

<--------------Drawdown time based on picked orifice diameter (36 hours max) @ h=DCV Depth

B.4.2 Percent Capture Method

This section describes the recommended method of sizing volume-based BMPs to achieve the 80 percent capture performance criterion. This method has a number of potential applications for sizing BMPs, including:

- Use this method when a BMP can draw down in less than 36 hours and it is desired to demonstrate that 80 percent capture can be achieved using a BMP volume smaller than the DCV.
- Use this method to determine how much volume (greater than the DCV) must be provided to achieve 80 percent capture when the drawdown time of the BMP exceeds 36 hours.
- Use this method to determine how much volume should be provided to achieve 80 percent capture when upstream BMP(s) have achieved some capture, but have not achieved 80 percent capture.

By nature, the percent capture method is an iterative process that requires some initial assumptions about BMP design parameters and subsequent confirmation that these assumptions are valid. For example, sizing calculations depend on the assumed drawdown time which depends on BMP depth, which may in turn need to be adjusted to provide the required volume within the allowable footprint. In general, the selection of reasonable BMP design parameters in the first iteration will result in minimal required additional iterations. Figure B.4-1 presents the nomograph for use in sizing retention BMPs in San Diego County.

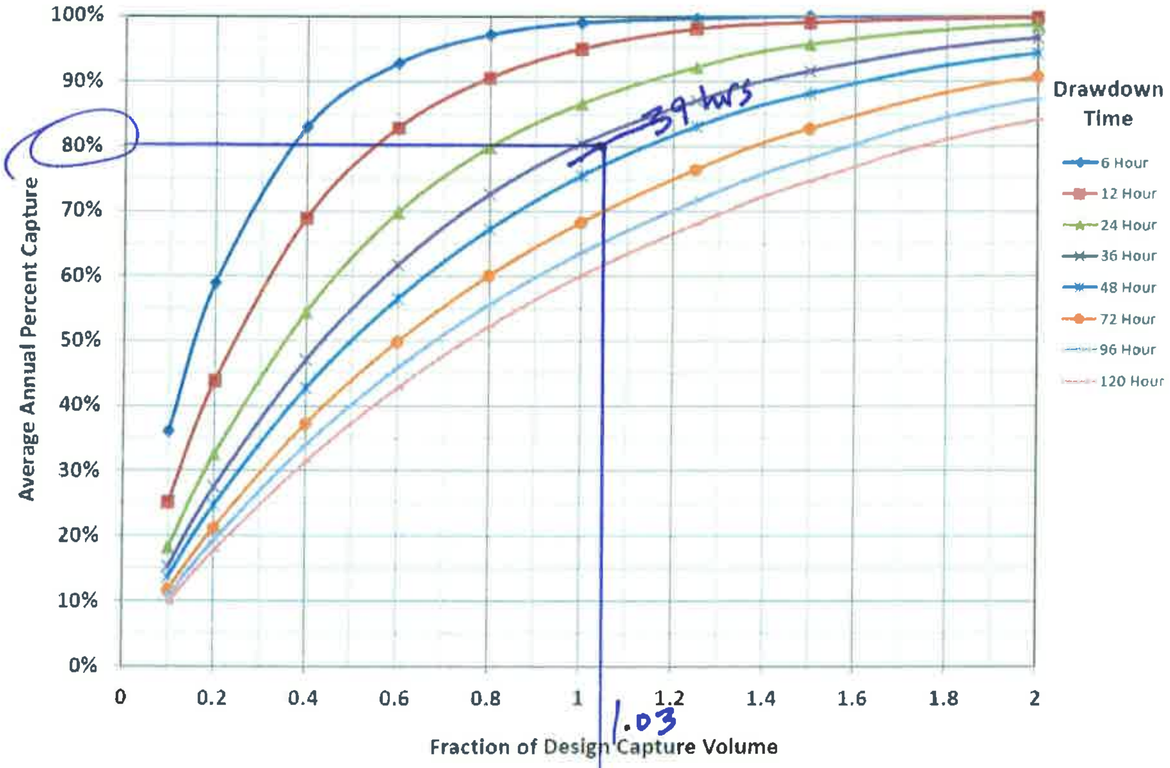


Figure B.4-1. Percent Capture Nomograph

B.4.2.1 Stepwise Instructions for sizing a single BMP:

39.05 hrs

1. Estimate the drawdown time of the proposed BMP by estimating the design infiltration rate (Worksheet D.5-1) and accounting for BMP dimensions/geometry. See the applicable BMP Fact Sheet for specific guidance on how to convert BMP geometry to estimated drawdown time.

1.03

9841 × 1.03 =
10136 cf DCV ✓
@0.070 cfs
= 40.22
≈3% ∴ OK

2. Using the estimated drawdown time and the nomograph from Figure B.4-1 locate where the line corresponding to the estimated drawdown time intersects with 80 percent capture. Pivot to the X axis and read the fraction of the DCV that needs to be provided in the BMP to achieve this level of capture.
3. Calculate the DCV using Worksheet B.2-1.
4. Multiply the result of Step 2 by the DCV (Step 3). This is the required BMP design volume.
5. Design the BMP to retain the required volume, and confirm that the drawdown time is no more than 25 percent greater than estimated in Step 1. If the computed drawdown time is greater than 125 percent of the estimated drawdown, then return to Step 1 and revise the initial drawdown time assumption.

See the respective BMP facts sheets for BMP-specific instructions for the calculation of volume and drawdown time. The above method can also be used to size and/or evaluate the performance of other retention BMPs (evapotranspiration, harvest and use) that have a drawdown rate that can be approximated as constant throughout the year or over the wet season. In order to use this method for other retention BMPs, drawdown time in Step 1 will need to be evaluated using an applicable method for the type of BMP selected. After completing Step 1 continue to Step 2 listed above.

Appendix 2

Backup for PDP Hydromodification Control Measures

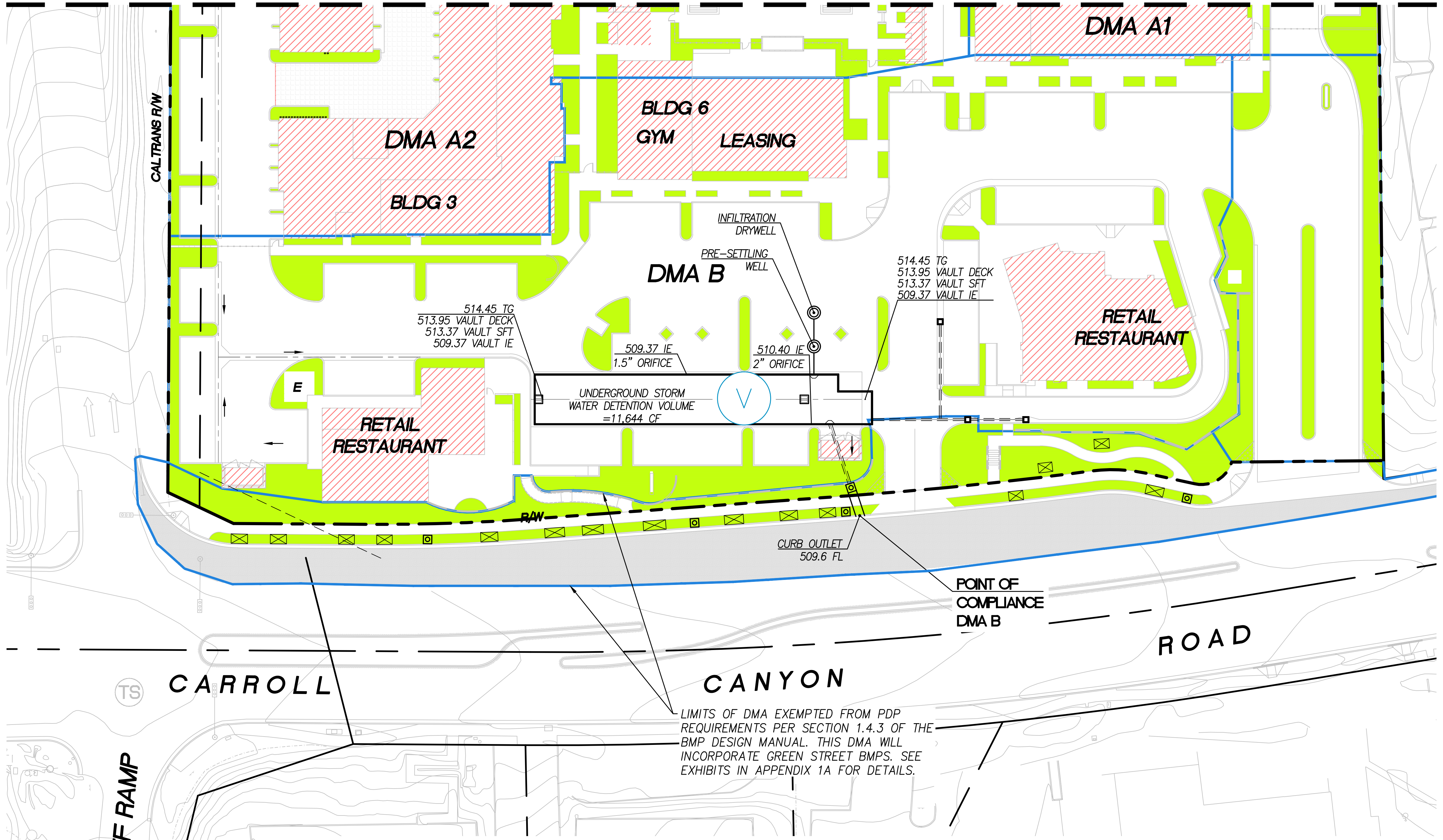
☐ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Indicate which Items are Included:

Appendix Sequence	Contents	Checklist
Appendix 2a	1. Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist.
Appendix 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☒ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Appendix 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☐ Not performed ☒ Included ☐ Submitted as separate stand-alone document
Appendix 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	☒ Included ☐ Submitted as separate stand-alone document
Appendix 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☒ Not required because BMPs will drain in less than 96 hours

Appendix 2a

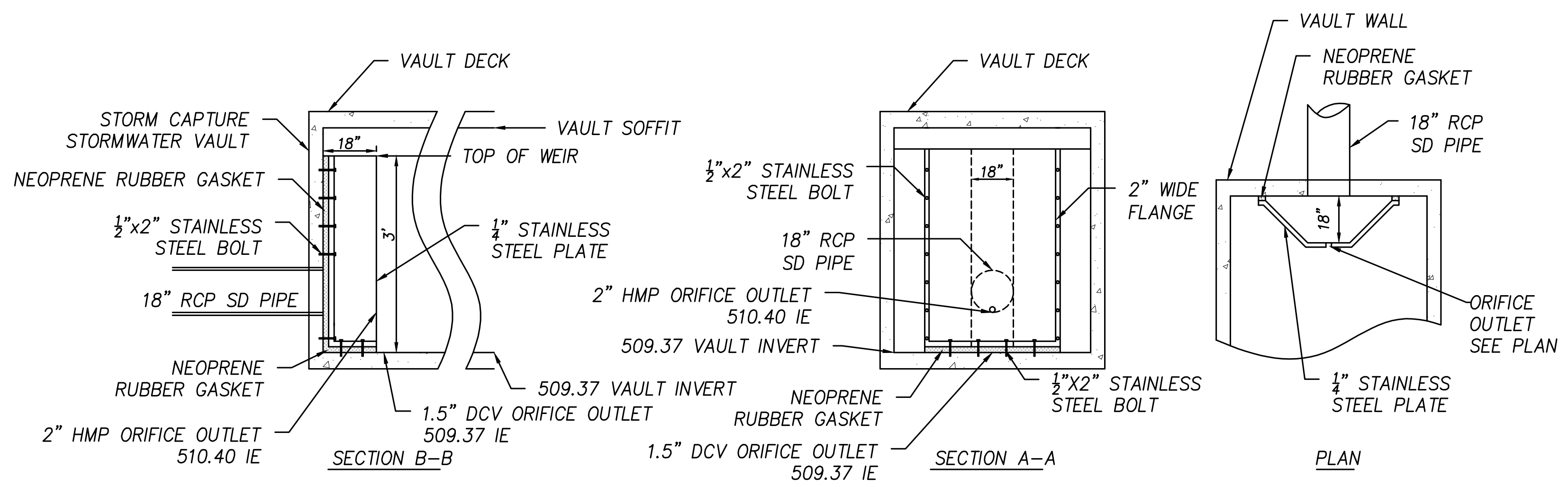
Hydromodification Management Exhibit



HYDROMODIFICATION EXHIBIT FOR DMA B

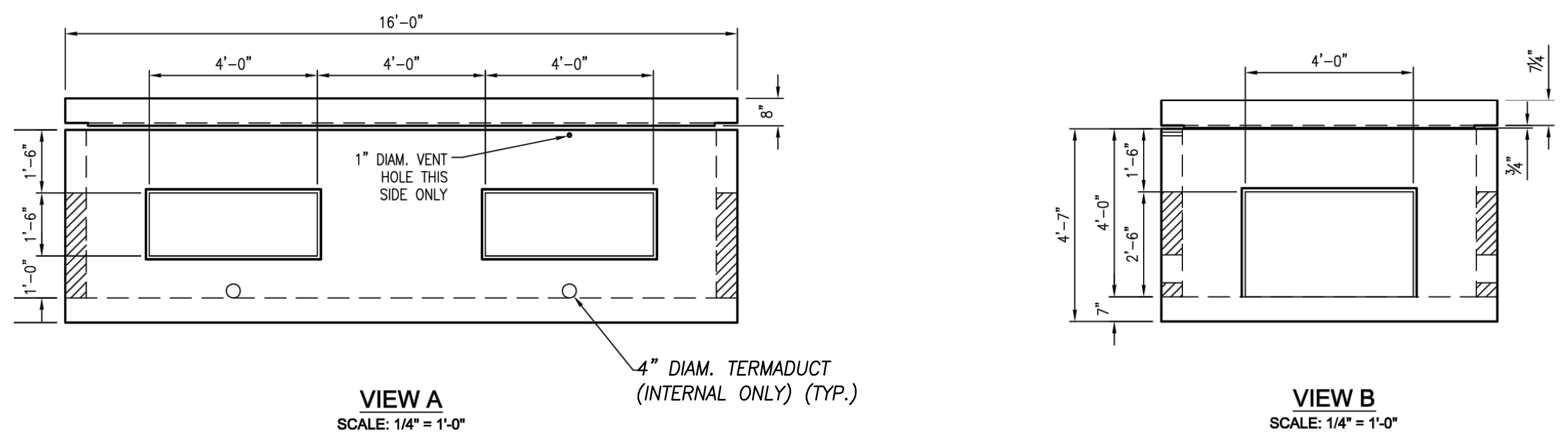
40' 20' 0 40' 80' 120'

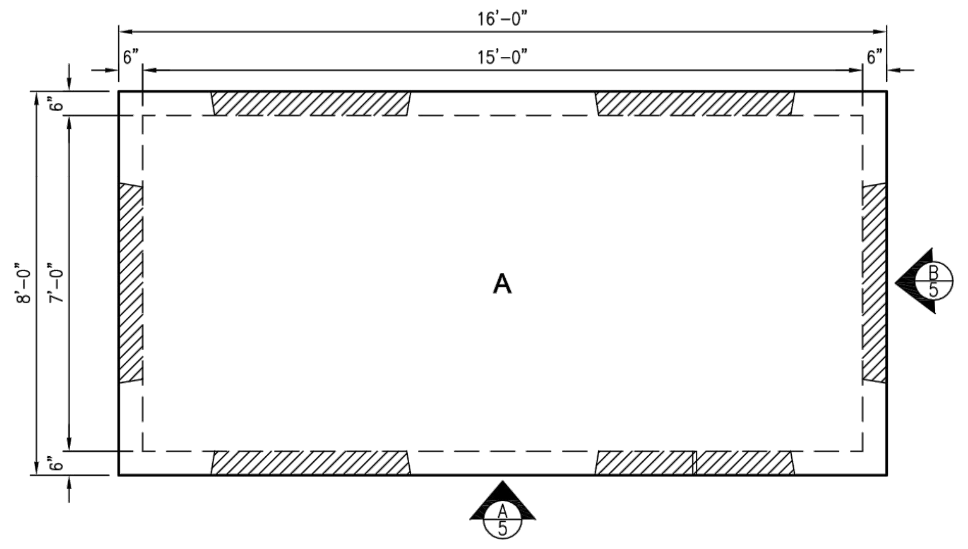
GRAPHIC SCALE IN FEET



WEIR DETAIL (INSIDE VAULT)

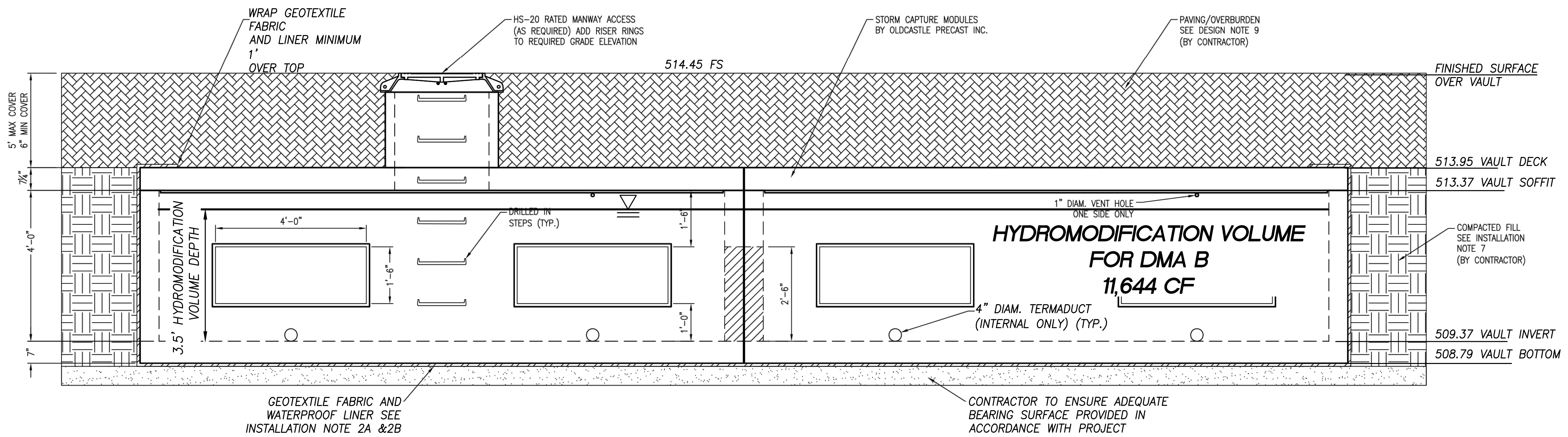
N.T.S.





STORM CAPTURE PLAN VIEW

SCALE: 1/4" = 1'-0"



TYPICAL ELEVATION

N.T.S.

STORM CAPTURE SC1 VAULT DETAILS - 4' INSIDE DEPTH

N.T.S.

DMA AREA ANALYSIS				
DMA	AREA (ACRES)	PROPOSED PERVIOUS AREA (ACRES)	% IMPERVIOUS	C FACTOR
B	2.19	0.35	84.0%	0.77

LEGEND

DESCRIPTION	SYMBOL
RIGHT-OF-WAY / PROPERTY LINE	— — —
MAJOR BASIN	▬
INFEASIBILITY AREA	▨
PROPOSED LANDSCAPING (SELF TREATING/RETAINING)	🟩
PAVERS	▨
IMPERVIOUS AREA - BLDG ROOF	▨
IMPERVIOUS AREA - CARPORT ROOF	☒
IMPERVIOUS AREA - PAVEMENT	☐
STORM CAPTURE UNDERGROUND VAULT	Ⓥ

HYDROMODIFICATION COMPLIANCE SUMMARY							
DMA	REQUIRED HMP STORAGE VOLUME (CF)	PROPOSED HMP STORAGE VOLUME (CF)	ALLOWED OUTFLOW (CFS)	PROPOSED OUTFLOW (CF)	MAX ORIFICE DIAMETER (IN)	PROPOSED ORIFICE DIAMETER (IN)	DRAWDOWN TIME (HOURS)
B	11,441	11,644	0.191	0.161	2.31	2.00	36

GENERAL NOTES:

THE STORM CAPTURE™ SYSTEM BY OLDCASTLE PRECAST IS PART OF THE STORMWATER MANAGEMENT SYSTEM FOR THE RESPECTIVE SITE, AS PREPARED BY THE PROJECT DESIGN ENGINEER. IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO DETERMINE DESIGN FLOW RATES, PRE-TREATMENT AND POST-TREATMENT REQUIREMENTS, STORAGE VOLUME, AND ENSURE THE FINAL DESIGN MEETS ALL CONVEYANCE AND STORAGE REQUIREMENTS. SYSTEM DESIGN AND TYPE, SOIL ANALYSIS, LOADING REQUIREMENTS, COVER HEIGHT AND MODULE SIZE DETERMINE THE FOUNDATION TYPE AND REQUIREMENTS AS STATED HEREIN. ANY VARIATIONS FOUND DURING CONSTRUCTION FROM THE SITE AND SYSTEM ANALYSIS MUST BE REPORTED TO THE PROJECT DESIGN ENGINEER. THE PROJECT DESIGN ENGINEER IS RESPONSIBLE FOR OBTAINING A GEOTECHNICAL ENGINEERING REPORT VERIFYING THE BEARING CAPACITY STATED IN DESIGN NOTES.

DESIGN NOTES:

1. DESIGN LOADINGS:
   A. AASHTO HS-20-44 W/ IMPACT.
   B. DEPTH OF COVER = 6" - 5'-0".
   C. ASSUMED WATER TABLE = BELOW BOTTOM.
   D. EQUIVALENT FLUID PRESSURE = 45 PCF.
   E. LATERAL LIVE LOAD SURCHARGE = 80 PSF.
   F. NO LATERAL SURCHARGE FROM ADJACENT STRUCTURES.
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 6,000 PSI.
3. STEEL REINFORCEMENT: REBAR, ASTM A-615, GRADE 60.
4. CEMENT: ASTM C-150 SPECIFICATION.
5. STORM CAPTURE MODULE TYPE = DETENTION.
6. REQUIRED BASE LAYER DEPTH = 2" SAND BEDDING LAYER.
7. REQUIRED NATIVE ALLOWABLE SOIL BEARING PRESSURE = 3,000 PSF.
8. REFERENCE STANDARDS:
A. ASTM C 890
B. ASTM C 891
C. ASTM C 913
9. LESS THAN 6" OR GREATER THAN 5' OF COVER REQUIRES CUSTOM STRUCTURAL DESIGN AND MAY REQUIRE THICKER SUBGRADE.

INSTALLATION NOTES:

THE STORM CAPTURE™ MODULE SYSTEM IS TO BE INSTALLED IN ACCORDANCE WITH ASTM C891, INSTALLATION OF UNDERGROUND PRECAST UTILITY STRUCTURES. PROJECT PLAN AND SPECIFICATIONS MUST BE FOLLOWED ALONG WITH ANY APPLICABLE REGULATIONS.

1. PLAN LINE, GRADE AND ELEVATIONS MUST BE FOLLOWED.

2. A. WHERE SPECIFIED, AN 8 OZ. NON-WOVEN GEOTEXTILE FABRIC AND WATERPROOF LINER MUST BE USED AS A SEPARATION LAYER AROUND THE STORM CAPTURE SYSTEM.

   B. WHERE SPECIFIED, A CONTAINMENT MEMBRANE LINER WITH THE FOLLOWING REQUIREMENTS MUST BE USED: MIN. THICKNESS = 40 MILS, MIN. TENSILE STRENGTH = 600 LBS WORST DIRECTION (ASTM D5034), MIN. MULLEN BURSTING STRENGTH = 1000 PSI (ASTM D3786), AND MIN. MANUFACTURER'S WARRANTY OF 20 YEARS. WHERE THE MEMBRANE IS USED AN 8 OZ. NON-WOVEN GEOTEXTILE MUST BE PLACED ON BOTH THE INSIDE AND OUTSIDE OF THE ACTUAL CONTAINMENT MEMBRANE TO PREVENT PUNCTURES.

3. PENETRATIONS IN THE CONTAINMENT MEMBRANE MAY ONLY BE MADE WITH SMOOTH WALL PIPES. MAKE PENETRATIONS FOR ALL OUTLETS BEFORE MAKING PENETRATIONS FOR ANY INLETS.

4. ALL SUBGRADE MATERIALS IF SPECIFIED, MUST BE CLEAN, DURABLE CRUSHED AGGREGATE COMPACTED OR ROLLED TO ACHIEVE 95% STANDARD PROCTOR DENSITY. OLDCASTLE RECOMMENDS SIZE 5,56,OR 57 (PER ASTM C33).

5. DESIGNATED EMBEDDED LIFTERS MUST BE USED. USE PROPER RIGGING TO ASSURE ALL LIFTERS ARE EQUALLY ENGAGED WITH A MINIMUM 60 DEGREE ANGLE ON SLINGS AS NOTED AND IN ACCORDANCE WITH OLDCASTLE LIFTING PROCEDURES.

6. MODULES MUST BE PLACED AS CLOSE TOGETHER AS POSSIBLE, AND GAPS SHALL NOT BE GREATER THAN 3/4". ALL EXTERIOR SYSTEM JOINTS SHALL BE COVERED WITH A MIN. 8" JOINT WRAP ON SIDES AND TOP (CS-212 CONSEAL OR EQUIVALENT). IN A CLAMSHELL DESIGN INSTALL ONE ROW CS-102 CONSEAL (OR EQUIVALENT) BETWEEN PRECAST PIECES.

7. AUTHORIZATION SHOULD BE GIVEN BY THE PROJECT ENGINEER OR DESIGNATED PERSON PRIOR TO PLACEMENT ON BACKFILL FOR THE SYSTEM. CARE SHOULD BE TAKEN DURING PLACEMENT OF BACKFILL NOT TO DISPLACE MODULES OR JOINT WRAP. BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY OR AS SPECIFIED, AND SHOULD NOT BE COMPACTED WITHIN 6" OF MODULE.

8. CONSTRUCTION EQUIPMENT EXCEEDING DESIGN LOADING SHALL NOT BE ALLOWED ON STRUCTURE.

9. TERMADUCTS TO BE KNOCKED OUT AT SPECIFIED LOCATIONS IN FIELD BY OTHERS. SEE SITE LAYOUT FOR LOCATIONS.

INLETS AND RISERS:

ALL PIPE INLETS SHALL EXTEND INSIDE MODULE A MINIMUM OF 4". PLACE A NON-SHRINK, NON-METALIC GROUT, MIN. 3,000 PSI IN ANNULAR SPACE TO ELIMINATE ALL VOIDS.

STORM CAPTURE MAINTENANCE:

STORM CAPTURE MODULE - SYSTEM INSPECTION AND MAINTENANCE THE STORM CAPTURE SYSTEM EXCELS WHERE MOST OTHER SYSTEMS FAIL, INCORPORATING FEATURES PROVIDING FOR MAXIMUM SYSTEM PERFORMANCE AND LIFE CYCLE. THE STORM CAPTURE SYSTEM IS A MAJOR COMPONENT OF THE STORMWATER MANAGEMENT SYSTEM. DESIGN AND FUNCTION OF THE SYSTEM IS THE RESPONSIBILITY OF THE PROJECT ENGINEER. MAINTENANCE OF THE STORM CAPTURE IS VITAL FOR SATISFACTORY PERFORMANCE AND LIFE CYCLE OF THE STORMWATER MANAGEMENT SYSTEM. PERMIT REQUIREMENTS, LOCAL, STATE AND FEDERAL REGULATIONS, ALONG WITH OLDCASTLE AND ANY INCORPORATED DEVICE MANUFACTURER RECOMMENDATIONS MUST BE FOLLOWED FOR SYSTEM COMPLIANCE. STORM CAPTURE DESIGN PROVIDES MANWAY ACCESS FOR EASE OF INSPECTION AND DEBRIS REMOVAL IF REQUIRED. FLUSHING, WHICH CAN CAUSE PARTICLE DISPLACEMENT, UNDERMINING, AND INTERNAL DISTURBANCE, IS NOT RECOMMENDED FOR GRAVEL FOUNDATION, OPEN BOTTOM SYSTEMS. FLUSHING IS ACCEPTABLE IN SYSTEMS WITH CONCRETE BASES. INLET CONTROLS, INTERNAL OR EXTERNAL, ARE RECOMMENDED FOR CONTROLLING, MONITORING, AND MAINTAINING THE STORM CAPTURE SYSTEM.

EXTERNAL INLETS ARE TYPICALLY DEVICES THAT ARE SEPARATE FROM THE STORM CAPTURE MODULES. THESE EXTERNAL DEVICES RECEIVE SITE STORMWATER AND ARE DESIGNED WITH MANWAY ACCESS FOR MAINTENANCE AND TYPICALLY INCLUDE AN INTERNAL SUMP FOR SEDIMENT CAPTURE. EXTERNAL INLETS MAY RECEIVE SINGLE OR MULTIPLE PIPES AND INCORPORATE AN OPEN GRATED TOP WITH AN OUTFALL PIPE TO THE STORM CAPTURE SYSTEM. GRATED INLETS MAY INCORPORATE PROTECTION DEVICES OR BAFFLES TO CAPTURE FLOATABLES OR THE "FIRST FLUSH." SCHEDULED INSPECTIONS AND MAINTENANCE SHOULD INCLUDE THE REMOVAL OF ANY SEDIMENTATION BUILD-UP. DEBRIS OR SEDIMENTATION BUILD-UP SHOULD NOT EXCEED 3" BELOW AN OUTFALL ELEVATION. INTERNAL COMPONENTS CAN BE INCORPORATED FOR PRE-TREATMENT. MANUFACTURER RECOMMENDATIONS SHOULD BE FOLLOWED. SCHEDULED MAINTENANCE AND INSPECTION WILL INCLUDE REMOVAL OF DEBRIS BY MANUAL OR MECHANICAL MEANS.

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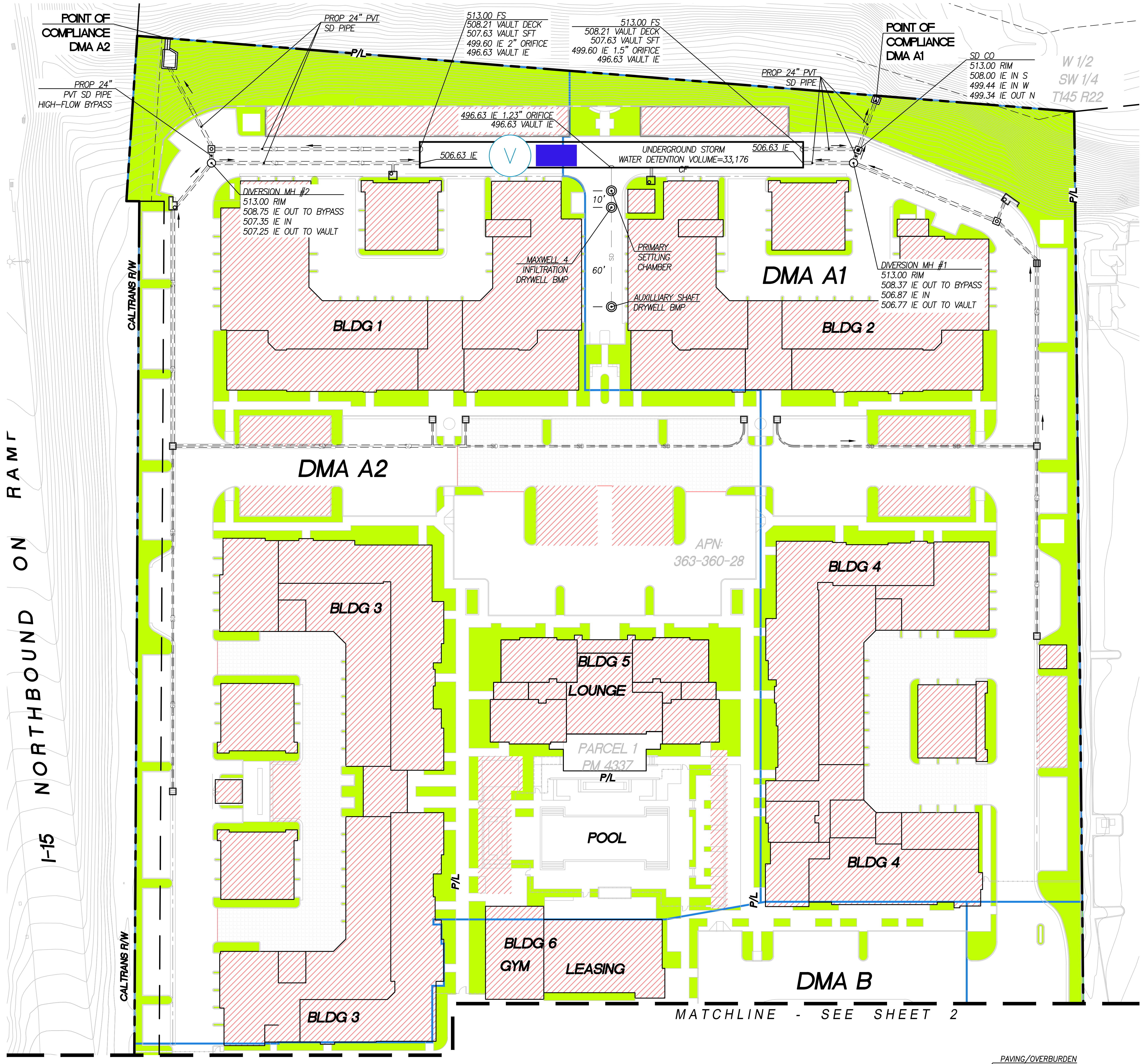
HYDROMODIFICATION MANAGEMENT EXHIBIT FOR DMA BASIN B

CARROLL CANYON MIXED USE
CARROLL CANYON ROAD, SAN DIEGO, CA
PROJECT NUMBER: PE 2314
SCALE: 1" = 40'
DATE: AUGUST 30, 2016
SHEET 1 OF 2

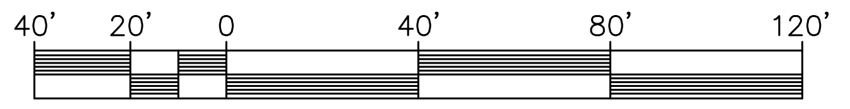
PASCO LARET SUITER
& ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING
535 North Highway 101, Ste A, Solana Beach, CA 92075
ph 858.259.8212 | fx 858.259.4812 | plsaengineering.com



LEGEND

DESCRIPTION	SYMBOL
RIGHT-OF-WAY / PROPERTY LINE	— — — —
MAJOR BASIN	▬
INFEASIBILITY AREA	▨
PROPOSED LANDSCAPING (SELF TREATING/RETAINING)	🟩
PAVERS	▩
IMPERVIOUS AREA – BLDG ROOF	▨
IMPERVIOUS AREA – CARPORT ROOF	☒
IMPERVIOUS AREA – PAVEMENT	☐
STORM CAPTURE UNDERGROUND VAULT	Ⓥ 🟦

HYDROMODIFICATION EXHIBIT FOR DMA A1 & A2



GRAPHIC SCALE IN FEET

DMA AREA ANALYSIS				
DMA	AREA (ACRES)	PROPOSED PERVIOUS AREA (ACRES)	% IMPERVIOUS	C FACTOR
A1	2.61	0.66	74.7%	0.70
A2	4.32	1.08	75.0%	0.70
TOTAL	6.93	1.74 ACRES	74.9%	0.70

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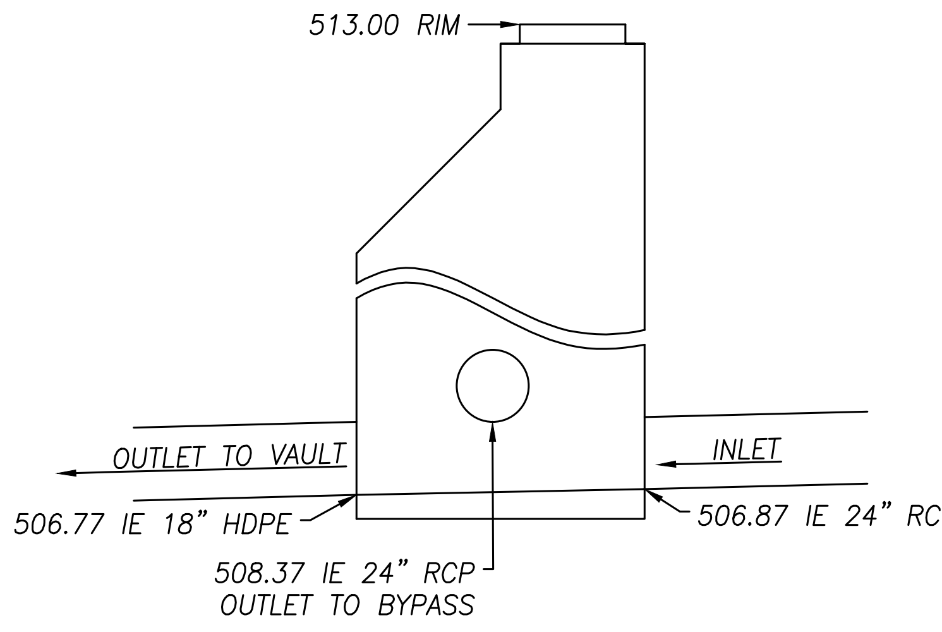
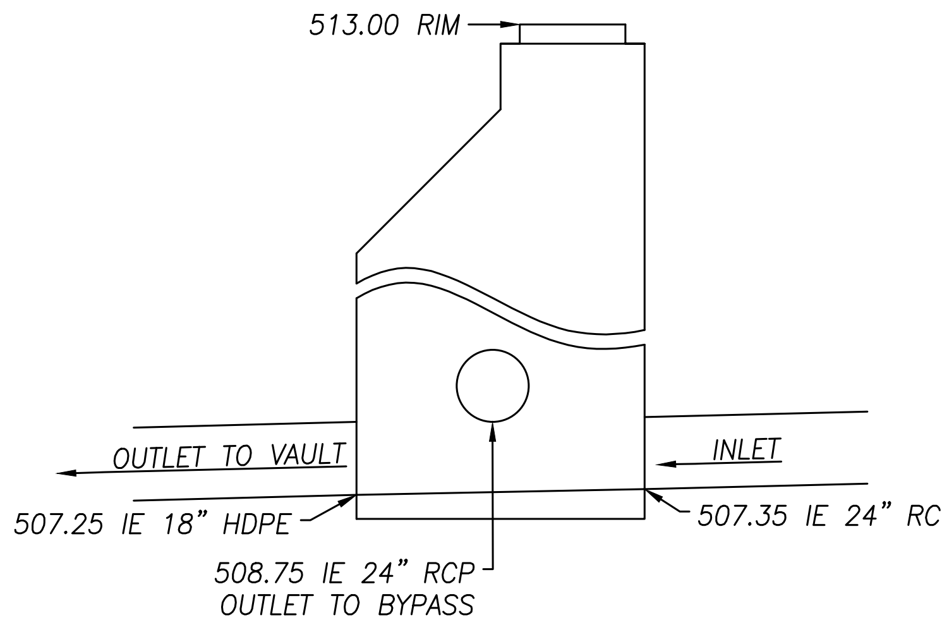
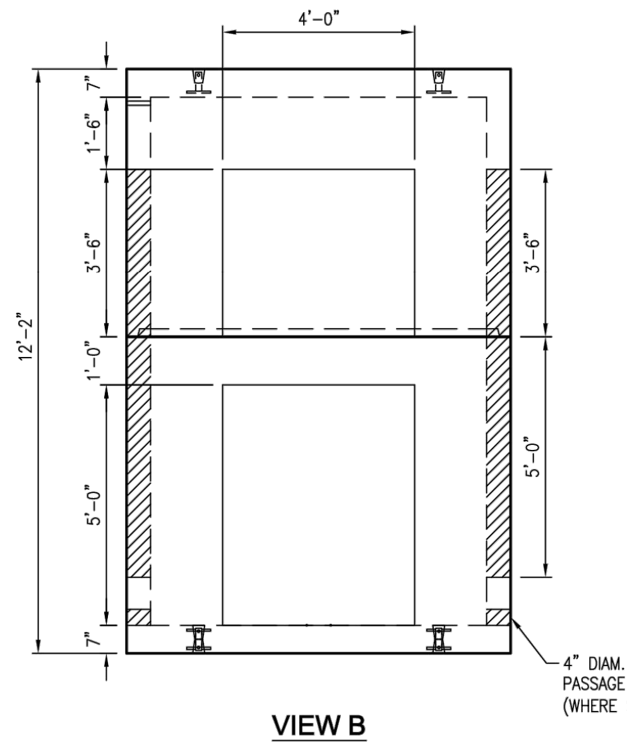


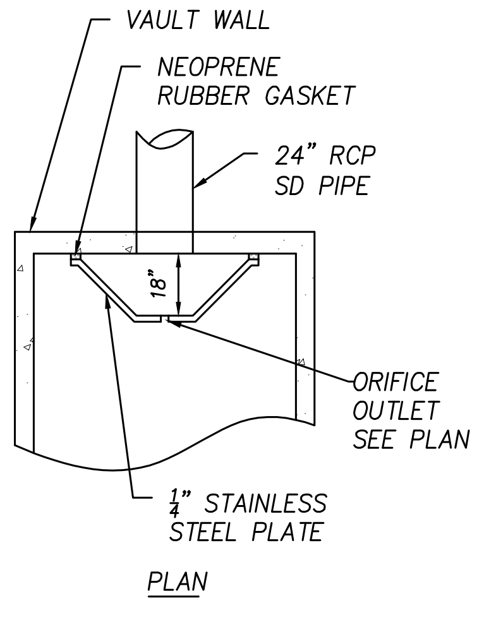
DIVERSION MANHOLE #1 DETAIL



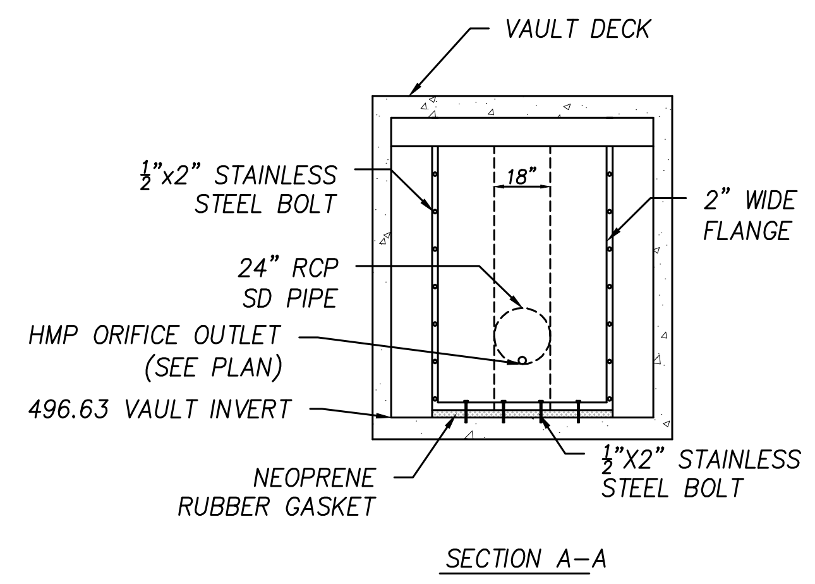
DIVERSION MANHOLE #1 DETAIL



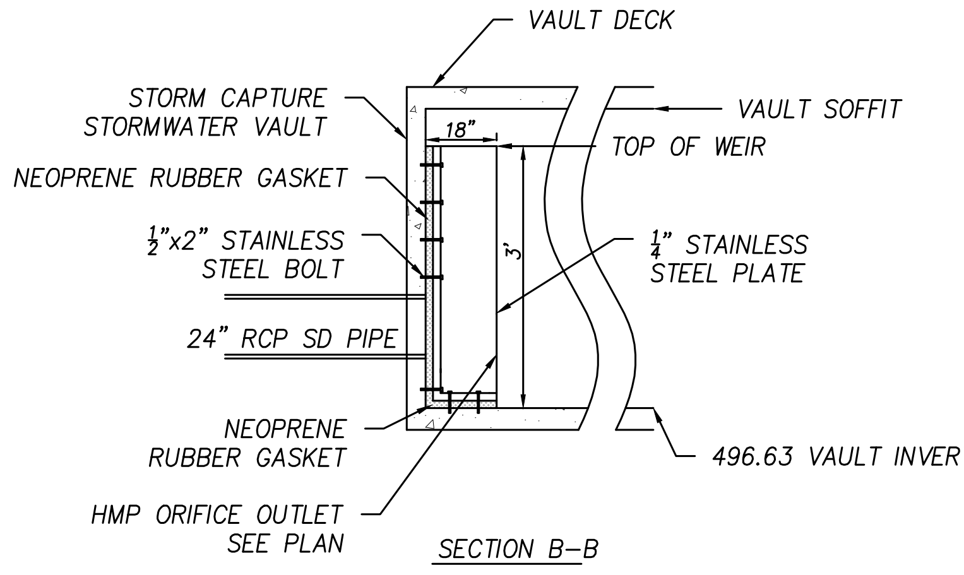
VIEW B
SCALE: 1/4" = 1'-0"



PLAN



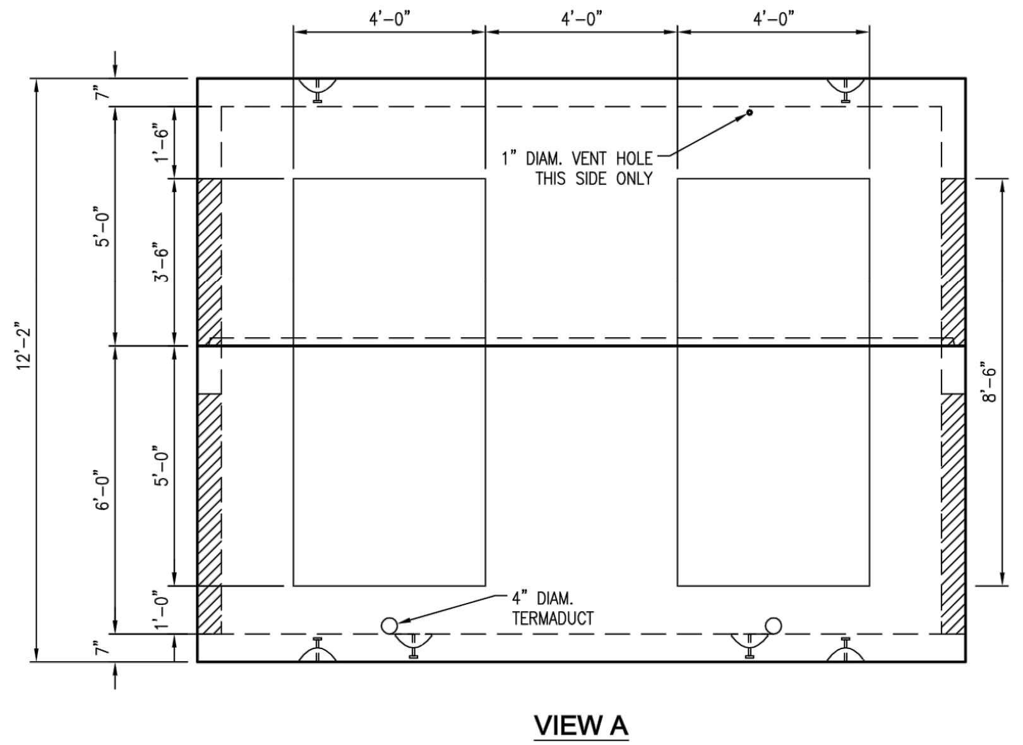
SECTION A-A



SECTION B-B

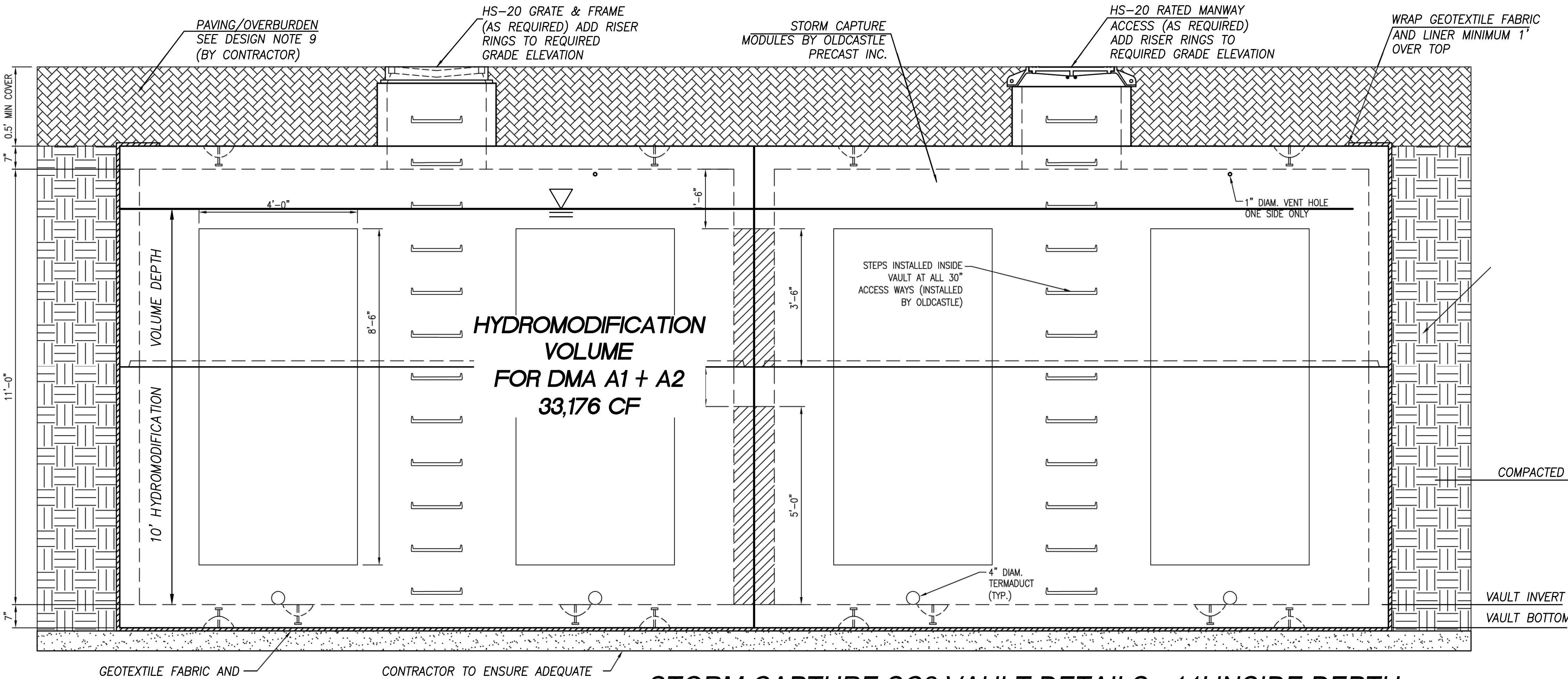
TYP. WEIR DETAIL (INSIDE VAULT)

N.T.S.



VIEW A
SCALE: 1/4" = 1'-0"

HYDROMODIFICATION COMPLIANCE SUMMARY							
DMA	REQUIRED HMP STORAGE VOLUME (CF)	PROPOSED HMP STORAGE VOLUME (CF)	ALLOWED OUTFLOW (CFS)	PROPOSED OUTFLOW (CF)	MAX ORIFICE DIAMETER (IN)	PROPOSED ORIFICE DIAMETER (IN)	DRAWDOWN TIME (HOURS)
A1	12,277	12,584	0.228	0.187	1.75	1.50	37.4
A2	20,406	20,592	0.378	0.332	2.26	2.00	34.4
TOTAL	32,683	33,176	0.606	0.519	–	–	–



STORM CAPTURE SC2 VAULT DETAILS - 11' INSIDE DEPTH

N.T.S.

GENERAL NOTES:

THE STORM CAPTURE™ SYSTEM BY OLDCASTLE PRECAST IS PART OF THE STORMWATER MANAGEMENT SYSTEM FOR THE RESPECTIVE SITE, AS PREPARED BY THE PROJECT DESIGN ENGINEER. IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO DETERMINE DESIGN FLOW RATES, PRE-TREATMENT AND POST-TREATMENT REQUIREMENTS, STORAGE VOLUME, AND ENSURE THE FINAL DESIGN MEETS ALL CONVEYANCE AND STORAGE REQUIREMENTS. SYSTEM DESIGN AND TYPE, SOIL ANALYSIS, LOADING REQUIREMENTS, COVER HEIGHT AND MODULE SIZE DETERMINE THE FOUNDATION TYPE AND REQUIREMENTS AS STATED HEREIN. ANY VARIATIONS FOUND DURING CONSTRUCTION FROM THE SITE AND SYSTEM ANALYSIS MUST BE REPORTED TO THE PROJECT DESIGN ENGINEER. THE PROJECT DESIGN ENGINEER IS RESPONSIBLE FOR OBTAINING A GEOTECHNICAL ENGINEERING REPORT VERIFYING THE BEARING CAPACITY STATED IN DESIGN NOTES.

DESIGN NOTES:

1. DESIGN LOADINGS:
   A. AASHTO HS-20-44 W/ IMPACT.
   B. DEPTH OF COVER = 6" - 5'-0".
   C. ASSUMED WATER TABLE = BELOW BOTTOM.
   D. EQUIVALENT FLUID PRESSURE = 45 PCF.
   E. LATERAL LIVE LOAD SURCHARGE = 80 PSF.
   F. NO LATERAL SURCHARGE FROM ADJACENT STRUCTURES.
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 6,000 PSI.
3. STEEL REINFORCEMENT: REBAR, ASTM A-615, GRADE 60.
4. CEMENT: ASTM C-150 SPECIFICATION.
5. STORM CAPTURE MODULE TYPE = DETENTION.
6. REQUIRED BASE LAYER DEPTH = 2" SAND BEDDING LAYER.
7. REQUIRED NATIVE ALLOWABLE SOIL BEARING PRESSURE = 3,000 PSF.
8. REFERENCE STANDARDS:

A. ASTM C 890
B. ASTM C 891
C. ASTM C 913

9. LESS THAN 6" OR GREATER THAN 5' OF COVER REQUIRES CUSTOM STRUCTURAL DESIGN AND MAY REQUIRE THICKER SUBGRADE.

INSTALLATION NOTES:

THE STORM CAPTURE™ MODULE SYSTEM IS TO BE INSTALLED IN ACCORDANCE WITH ASTM C891, INSTALLATION OF UNDERGROUND PRECAST UTILITY STRUCTURES. PROJECT PLAN AND SPECIFICATIONS MUST BE FOLLOWED ALONG WITH ANY APPLICABLE REGULATIONS.

1. PLAN LINE, GRADE AND ELEVATIONS MUST BE FOLLOWED.

2. A. WHERE SPECIFIED, AN 8 OZ. NON-WOVEN GEOTEXTILE FABRIC AND WATERPROOF LINER MUST BE USED AS A SEPARATION LAYER AROUND THE STORM CAPTURE SYSTEM.

   B. WHERE SPECIFIED, A CONTAINMENT MEMBRANE LINER WITH THE FOLLOWING REQUIREMENTS MUST BE USED: MIN. THICKNESS = 40 MILS, MIN. TENSILE STRENGTH = 600 LBS WORST DIRECTION (ASTM D5034), MIN. MULLEN BURSTING STRENGTH = 1000 PSI (ASTM D3786), AND MIN. MANUFACTURER'S WARRANTY OF 20 YEARS. WHERE THE MEMBRANE IS USED AN 8 OZ. NON-WOVEN GEOTEXTILE MUST BE PLACED ON BOTH THE INSIDE AND OUTSIDE OF THE ACTUAL CONTAINMENT MEMBRANE TO PREVENT PUNCTURES.

3. PENETRATIONS IN THE CONTAINMENT MEMBRANE MAY ONLY BE MADE WITH SMOOTH WALL PIPES. MAKE PENETRATIONS FOR ALL OUTLETS BEFORE MAKING PENETRATIONS FOR ANY INLETS.

4. ALL SUBGRADE MATERIALS IF SPECIFIED, MUST BE CLEAN, DURABLE CRUSHED AGGREGATE COMPACTED OR ROLLED TO ACHIEVE 95% STANDARD PROCTOR DENSITY. OLDCASTLE RECOMMENDS SIZE 5,56,OR 57 (PER ASTM C33).

5. DESIGNATED EMBEDDED LIFTERS MUST BE USED. USE PROPER RIGGING TO ASSURE ALL LIFTERS ARE EQUALLY ENGAGED WITH A MINIMUM 60 DEGREE ANGLE ON SLINGS AS NOTED AND IN ACCORDANCE WITH OLDCASTLE LIFTING PROCEDURES.

6. MODULES MUST BE PLACED AS CLOSE TOGETHER AS POSSIBLE, AND GAPS SHALL NOT BE GREATER THAN 3/4". ALL EXTERIOR SYSTEM JOINTS SHALL BE COVERED WITH A MIN. 8" JOINT WRAP ON SIDES AND TOP (CS-212 CONSEAL OR EQUIVALENT). IN A CLAMSHELL DESIGN INSTALL ONE ROW CS-102 CONSEAL (OR EQUIVALENT) BETWEEN PRECAST PIECES.

7. AUTHORIZATION SHOULD BE GIVEN BY THE PROJECT ENGINEER OR DESIGNATED PERSON PRIOR TO PLACEMENT ON BACKFILL FOR THE SYSTEM. CARE SHOULD BE TAKEN DURING PLACEMENT OF BACKFILL NOT TO DISPLACE MODULES OR JOINT WRAP. BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY OR AS SPECIFIED, AND SHOULD NOT BE COMPACTED WITHIN 6" OF MODULE.

8. CONSTRUCTION EQUIPMENT EXCEEDING DESIGN LOADING SHALL NOT BE ALLOWED ON STRUCTURE.

9. TERMADUCTS TO BE KNOCKED OUT AT SPECIFIED LOCATIONS IN FIELD BY OTHERS. SEE SITE LAYOUT FOR LOCATIONS.

INLETS AND RISERS:

ALL PIPE INLETS SHALL EXTEND INSIDE MODULE A MINIMUM OF 4". PLACE A NON-SHRINK, NON-METALIC GROUT, MIN. 3,000 PSI IN ANNULAR SPACE TO ELIMINATE ALL VOIDS.

STORM CAPTURE MAINTENANCE:

STORM CAPTURE MODULE – SYSTEM INSPECTION AND MAINTENANCE THE STORM CAPTURE SYSTEM EXCELS WHERE MOST OTHER SYSTEMS FAIL, INCORPORATING FEATURES PROVIDING FOR MAXIMUM SYSTEM PERFORMANCE AND LIFE CYCLE. THE STORM CAPTURE SYSTEM IS A MAJOR COMPONENT OF THE STORMWATER MANAGEMENT SYSTEM. DESIGN AND FUNCTION OF THE SYSTEM IS THE RESPONSIBILITY OF THE PROJECT ENGINEER. MAINTENANCE OF THE STORM CAPTURE IS VITAL FOR SATISFACTORY PERFORMANCE AND LIFE CYCLE OF THE STORMWATER MANAGEMENT SYSTEM. PERMIT REQUIREMENTS, LOCAL, STATE AND FEDERAL REGULATIONS, ALONG WITH OLDCASTLE AND ANY INCORPORATED DEVICE MANUFACTURER RECOMMENDATIONS MUST BE FOLLOWED FOR SYSTEM COMPLIANCE. STORM CAPTURE DESIGN PROVIDES MANWAY ACCESS FOR EASE OF INSPECTION AND DEBRIS REMOVAL IF REQUIRED. FLUSHING, WHICH CAN CAUSE PARTICLE DISPLACEMENT, UNDERMINING, AND INTERNAL DISTURBANCE, IS NOT RECOMMENDED FOR GRAVEL FOUNDATION, OPEN BOTTOM SYSTEMS. FLUSHING IS ACCEPTABLE IN SYSTEMS WITH CONCRETE BASES. INLET CONTROLS, INTERNAL OR EXTERNAL, ARE RECOMMENDED FOR CONTROLLING, MONITORING, AND MAINTAINING THE STORM CAPTURE SYSTEM.

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HYDROMODIFICATION MANAGEMENT EXHIBIT FOR DMA BASIN A1 + A2

CARROLL CANYON MIXED USE
CARROLL CANYON ROAD, SAN DIEGO, CA
PROJECT NUMBER: PE 2314
SCALE: 1" = 40'
DATE: AUGUST 30, 2016
SHEET 2 OF 2

Appendix 2b

Management of Critical Coarse Sediment Yield Areas

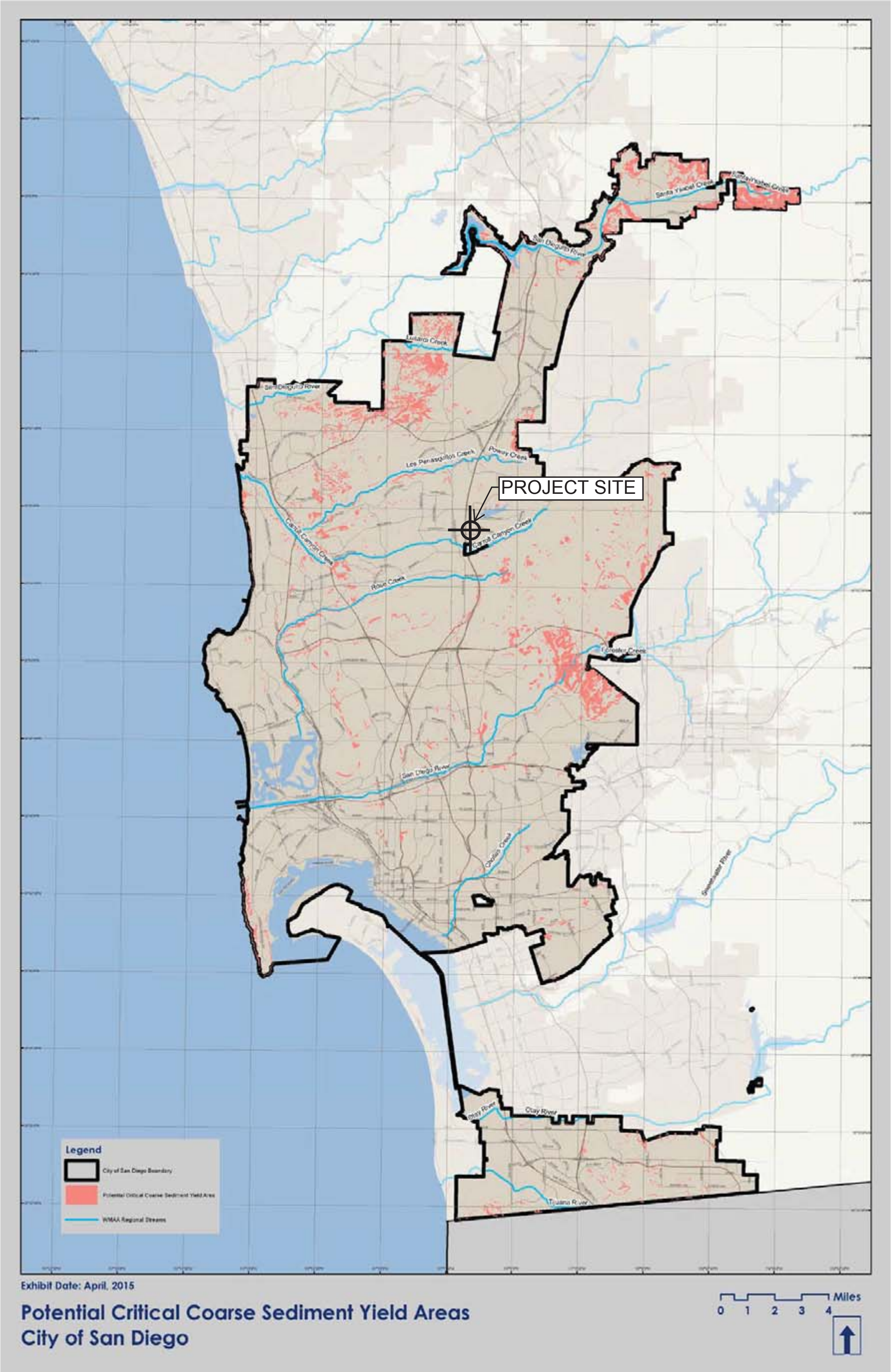

Exhibit Date: April, 2015

Potential Critical Coarse Sediment Yield Areas
City of San Diego

Appendix 2c

Geomorphic Assessment of Receiving Channels

ChangConsultants
Civil Engineering◦Hydrology◦Hydraulics◦Sedimentation

P.O. Box 9496
Rancho Santa Fe, CA 92067-4496
T: 858.692.0760
F: 858.832.1402
wayne@changconsultants.com

June 17, 2015

Mike Wolfe
Pasco Laret Sutter & Associates
535 N. Coast Highway 101, Suite A
Solana Beach, CA 92075

Subject: Carroll Canyon Mixed-Use

Dear Mike:

I have performed an initial channel assessment for the subject project. The domain of analysis (i.e., study area) will be along the natural channel just north of the site between Interstate 15 and Scripps Ranch Road. This segment is densely vegetated and lined with cobbles. Based on my site visit and preliminary calculations, I can support a low susceptibility to erosion for the channel ($0.5Q_2$), which is the best case. In order to support the low susceptibility, I will need to claim that the dense vegetation in the channel acts as effective grade controls. I have made this claim several times in the past and the reports have been approved. However, this is not specifically discussed in the governing documents, so there is a possibility it could be questioned. If so, the fallback position is a medium susceptibility to erosion.

I will not proceed with the final report until directed to.

Sincerely,

Wayne W. Chang, M.S., P.E.

Appendix 2d

Flow Control Facility Design

BMP Sizing Spreadsheet V1.04

Project Name:	Carroll Canyon Mixed Use
Project Applicant:	Sudberry Properties
Jurisdiction:	City of San Diego
Parcel (APN):	363-360-28-00
Hydrologic Unit:	Penasquitos
Rain Gauge:	Oceanside
Total Project Area (sf):	113570
Channel Susceptibility:	Low

BMP Sizing Spreadsheet V1.04			
Project Name:	Carroll Canyon Mixed Use	Hydrologic Unit:	Penasquitos
Project Applicant:	Sudberry Properties	Rain Gauge:	Oceanside
Jurisdiction:	City of San Diego	Total Project Area:	113570
Parcel (APN):	363-360-28-00	Low Flow Threshold:	0.5Q2
BMP Name:	DMA A-1	BMP Type:	Bioretention Plus Vault
BMP Native Soil Type:	D	BMP Infiltration Rate (in/hr):	0.024

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Vault Volume	N/A	Bioretention Surface Area (sf)	Vault Volume (cf)	N/A
PR A1 - Pervious	28750	D	Flat	Landscape	0.1	0.04	0.14	N/A	115	403	N/A
PR A1 - Imperv	84820	D	Flat	Pavement/Bldg	1.0	0.04	0.14	N/A	3393	11875	N/A
Total BMP Area	113570							Minimum BMP Size	3507.8	12277	
								Proposed BMP Size*		N/A	N/A
										18.00	in
								Minimum Vault Depth		N/A	in
								Maximum Vault Depth		N/A	in
								Selected Vault Depth		120.00	in
								Selected Vault Volume		12584	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

This Sizing Calculator has been developed in compliance with the Countywide Model SUSMP. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V1.04			
Project Name:	Carroll Canyon Mixed Us	Hydrologic Unit:	Penasquitos
Project Applicant:	Sudberry Properties	Rain Gauge:	Oceanside
Jurisdiction:	City of San Diego	Total Project Area:	113570
Parcel (APN):	363-360-28-00	Low Flow Threshold:	0.5Q2
BMP Name	DMA A-1	BMP Type:	Bioretention Plus Vault

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q_2 (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
PR A1 - Pervious	Oceanside	D	Scrub	Flat	0.175	0.660	0.058	**0.61**
PR A1 - Imperv	Oceanside	D	Scrub	Flat	0.175	1.947	0.170	**1.80**

0.228	**2.41**	**1.75**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.187	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	37.4

BMP Sizing Spreadsheet V1.04

Project Name:	Carroll Canyon Mixed Use
Project Applicant:	Sudberry Properties
Jurisdiction:	City of San Diego
Parcel (APN):	363-360-28-00
Hydrologic Unit:	Penasquitos
Rain Gauge:	Oceanside
Total Project Area (sf):	188070
Channel Susceptibility:	Low

BMP Sizing Spreadsheet V1.04			
Project Name:	Carroll Canyon Mixed Use	Hydrologic Unit:	Penasquitos
Project Applicant:	Sudberry Properties	Rain Gauge:	Oceanside
Jurisdiction:	City of San Diego	Total Project Area:	188070
Parcel (APN):	363-360-28-00	Low Flow Threshold:	0.5Q2
BMP Name:	DMA A-2	BMP Type:	Bioretention Plus Vault
BMP Native Soil Type:	D	BMP Infiltration Rate (in/hr):	0.024

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Vault Volume	N/A	Bioretention Surface Area (sf)	Vault Volume (cf)	N/A
PR A2 - Perv	47017	D	Flat	Landscape	0.1	0.04	0.14	N/A	188	658	N/A
PR A2 - Imperv	141053	D	Flat	Pavement/Bldg	1.0	0.04	0.14	N/A	5642	19747	N/A
Total BMP Area	188070							Minimum BMP Size	5830.188	20406	
								Proposed BMP Size*		N/A	N/A
										18.00	in
								Minimum Vault Depth		N/A	in
								Maximum Vault Depth		N/A	in
								Selected Vault Depth		120.00	in
								Selected Vault Volume		20592	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
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BMP Sizing Spreadsheet V1.04			
Project Name:	Carroll Canyon Mixed Us	Hydrologic Unit:	Penasquitos
Project Applicant:	Sudberry Properties	Rain Gauge:	Oceanside
Jurisdiction:	City of San Diego	Total Project Area:	188070
Parcel (APN):	363-360-28-00	Low Flow Threshold:	0.5Q2
BMP Name	DMA A-2	BMP Type:	Bioretention Plus Vault

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q_2 (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
PR A2 - Perv	Oceanside	D	Scrub	Flat	0.175	1.079	0.094	**1.00**
PR A2 - Imperv	Oceanside	D	Scrub	Flat	0.175	3.238	0.283	**3.00**

0.378	**3.99**	**2.26**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.332	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	34.4

BMP Sizing Spreadsheet V1.04			
Project Name:	Carroll Canyon Mixed Use	Hydrologic Unit:	Penasquitos
Project Applicant:	Sudberry Properties	Rain Gauge:	Oceanside
Jurisdiction:	City of San Diego	Total Project Area:	95277
Parcel (APN):	363-360-28-00	Low Flow Threshold:	0.5Q2
BMP Name:	DMA B	BMP Type:	Bioretention Plus Vault
BMP Native Soil Type:	D	BMP Infiltration Rate (in/hr):	0.024

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Vault Volume	N/A	Bioretention Surface Area (sf)	Vault Volume (cf)	N/A
PR B - Perv	15064	D	Flat	Landscape	0.1	0.04	0.14	N/A	60	211	N/A
PR B - Imperv	80213	D	Flat	Pavement/Bldg	1.0	0.04	0.14	N/A	3209	11230	N/A
Total BMP Area	95277							Minimum BMP Size	3268.776	11441	
								Proposed BMP Size*		N/A	N/A
											in
								Minimum Vault Depth		N/A	in
								Maximum Vault Depth		N/A	in
								Selected Vault Depth		29.64	in
								Selected Vault Volume		11644	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

This Sizing Calculator has been developed in compliance with the Countywide Model SUSMP. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V1.04			
Project Name:	Carroll Canyon Mixed Us	Hydrologic Unit:	Penasquitos
Project Applicant:	Sudberry Properties	Rain Gauge:	Oceanside
Jurisdiction:	City of San Diego	Total Project Area:	95277
Parcel (APN):	363-360-28-00	Low Flow Threshold:	0.5Q2
BMP Name	DMA B	BMP Type:	Bioretention Plus Vault

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - %Q_2 (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
PR B - Perv	Oceanside	D	Scrub	Flat	0.175	0.346	0.030	**0.64**
PR B - Imperv	Oceanside	D	Scrub	Flat	0.175	1.841	0.161	**3.43**

0.191	**4.07**	**2.28**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.165	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	39.2

Appendix 3

Structural BMP Maintenance Information

Indicate which Items are Included:

Appendix Sequence	Contents	Checklist
Appendix 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☒ Included See Structural BMP Maintenance Information Checklist.
Appendix 3b	Draft Maintenance Agreement (when applicable)	☐ Included ☒ Not Applicable

Appendix 3a

Structural BMP Maintenance Thresholds and Actions

The watermark for drainage solutions.

TORRENT
RESOURCES

OPERATION AND MAINTENANCE OF *MaxWell®* DRYWELL

The Operation and Maintenance Format will include the following key components:

1.) Inspection Guidelines:

New installations
Newly installed systems should receive a thorough visual examination following the first several significant rainfall events. This assessment will assure that there is no standing water, and that runoff or nuisance water flows are being eliminated within the allowable 48 hour draw-down timeframe.

Ongoing Operations
At a minimum, the drainage structures should be inspected annually, and within 48 hours following a significant storm event to ensure that there is no standing water in the chambers.

2.) Maintenance Format:

After the first 12-months of entering service, it is recommended that an initial cleaning be undertaken. This will help to establish the amount of accumulated particulate matter and debris to be expected on a yearly basis. Thereafter, the systems should receive inspection at least annually, and cleaning should be undertaken when the evaluation reveals that 15% or more of the original chamber volume is occupied by silt and sediment.

During the maintenance operation, all screens and filters should be serviced and the floating absorbent blankets replaced, along with the geo-textile fabric at the bottom of the chambers. Should repair be needed, descriptions of deficiencies and estimated costs for suggested corrections should be provided. The above information shall be submitted in writing to the Owner at the conclusion of the maintenance service. Replacement is recommended for drywells that no longer dispose of ponded water within 48 hours after cleaning.

3.) Maintenance Records:

A written log shall be kept on-site of all inspections and maintenance performed on the drainage systems.

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1509 East Elwood Street
Phoenix Arizona 85040-1391

phone 602-268-0785
fax 602-268-0820

www.TorrentResources.com

AZ Lic. ROC070465 A, ROC047067 B-4; ADWR 363
CA Lic. 528080 A, C-42, HAZ
NV Lic. 0035350 A – *NM Lic.* 90504 GF04

An evolution of McGuckin Drilling

6/12/15

STORMCAPTURE INSPECTION & MAINTENANCE

General

Inspection and maintenance of the StormCapture system is vital for the satisfactory performance and life cycle of the stormwater management system. Permit requirements, local, state and federal regulations, along with Oldcastle and any incorporated device manufacturer recommendations must be followed for system compliance. The StormCapture design provides manway access for ease of inspection and debris removal if required. Flushing, which can cause particle displacement, undermining and internal disturbance, is not recommended for gravel foundation, open bottom systems. Flushing is acceptable in systems with concrete bases. Inlet controls, internal or external, are recommended for controlling, monitoring and maintaining the StormCapture system.

External Inlets are typically devices that are separate from the StormCapture modules. These external devices receive site stormwater and are designed with manway access for maintenance and typically include an internal sump for sediment capture. External Inlets may receive single or multiple pipes and incorporate an open grated top with an outfall pipe to the StormCapture system. Grated inlets may incorporate protection devices or baffles to capture floatables or the “first flush.” Scheduled inspections and maintenance shall include the removal of any sedimentation build up in the external inlets. Debris or sedimentation build up shall not exceed 3” below an outfall elevation. Internal components may be incorporated for pretreatment. Manufacturer recommendations must be followed. Scheduled maintenance and inspection will include removal of debris and sediments by manual or mechanical means.

Maintenance Modules (MM's) are optional internal control modules based on design preference. MM's are modules with roof manway access openings and provide the primary means of access to the StormCapture system for scheduled inspection and maintenance. In addition, MM's may incorporate weirs or baffles to enhance reduction or removal of Total Suspended Solids (TSS) from the stormwater. Placement of internal components must be part of the system engineering and design. Grated inlets can be incorporated to accommodate surface stormwater flows into the StormCapture and may include an inlet protection device. Scheduled inspection and manufacturer recommendations for maintenance must be followed.

For open bottom systems (no concrete floor), concrete splash pads may be installed below inlet grate openings and pipe inlets to prevent base erosion. During scheduled inspection and maintenance activities, the concrete splash pads must be inspected for proper function and any sediment shall be removed. Standard StormCapture module design incorporates lateral and longitudinal passageways between modules to accommodate internal stormwater conveyance between modules. These passageways may be of a window configuration with standard 12” tall sediment baffles below the windows extending from the internal module invert, or doorway configurations extending from the floor slab. Any sediment and debris build up over 6” deep inside a module shall be removed by manual or mechanical means. Removal by vacuum is recommended. Internal module flushing, which can cause particle displacement, undermining, or internal disturbance, is prohibited.

Inspection Frequency

Oldcastle recommends that the StormCapture system be inspected quarterly, and following any significant rain events within the first year of operation. Standard Operating Procedures shall specify an annual inspection and maintenance plan as required thereafter or as stated in the permit, or as required by other governing regulations. **Only authorized and trained personnel shall inspect and enter a StormCapture system.** Personnel must be properly trained and equipped before entering any underground or confined space structure. Training includes being familiar with and following any local, state and federal regulations governing the operation, inspection and maintenance of underground structures, as well as specific StormCapture system requirements.

Inspection Activities

During inspection, a minimum of the following shall be inspected:

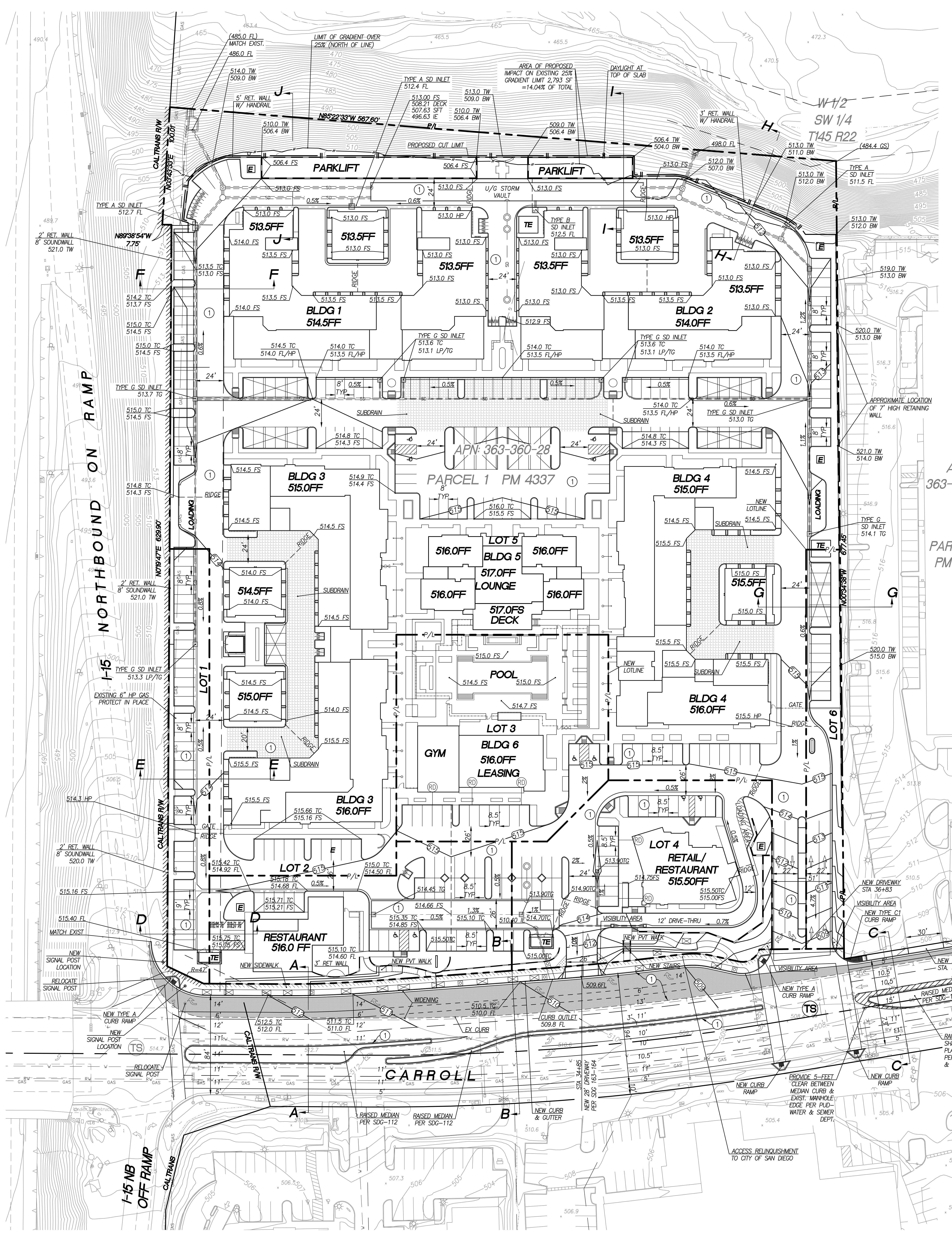
- Contributing drainage area inlets are clear of debris.
- If the StormCapture system is an exfiltration system (open bottom with stormwater percolating into the ground), monitor and confirm that the system drains completely within a reasonable time or the required permit time.
- Sediment depths within modules (anything over 6” deep shall be removed as outlined above).
- Inlet and outlet pipe penetrations to check for movement and/or leakage.
- Movement of modules.
- General interior condition of modules to look for concrete cracking or deterioration.
- Condition of pretreatment devices, baffles, and polishing devices if part of the system.

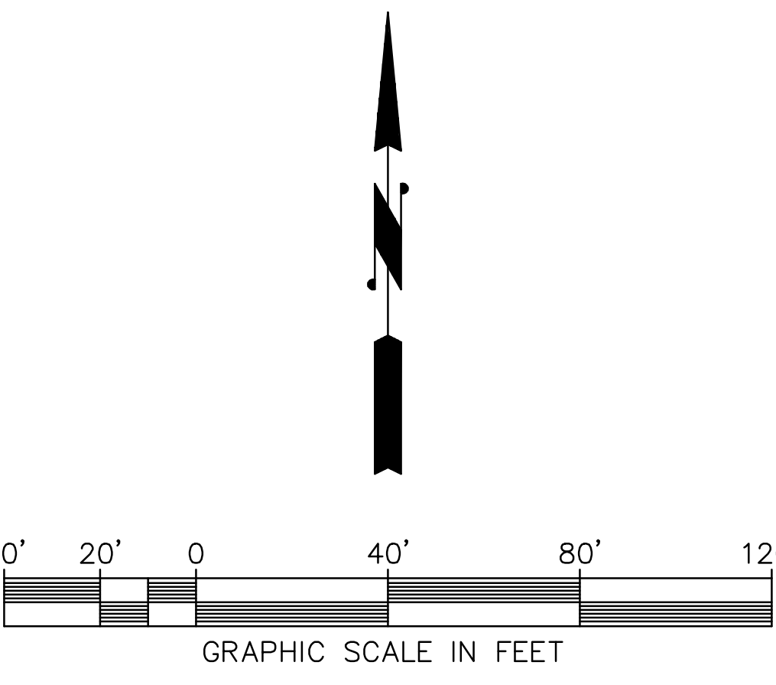
Recordkeeping

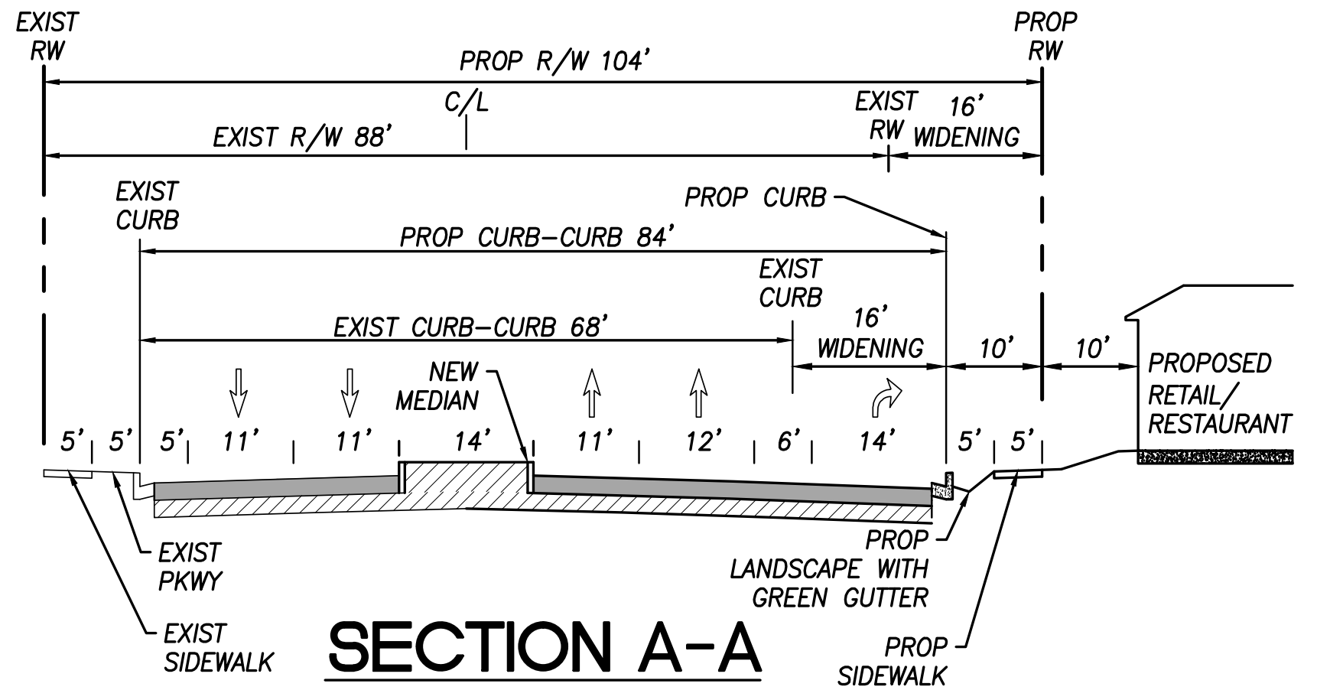
A log must be kept of all inspection and maintenance activities.

Appendix 4

Copy of Plan Sheets Showing Permanent Storm Water BMPs







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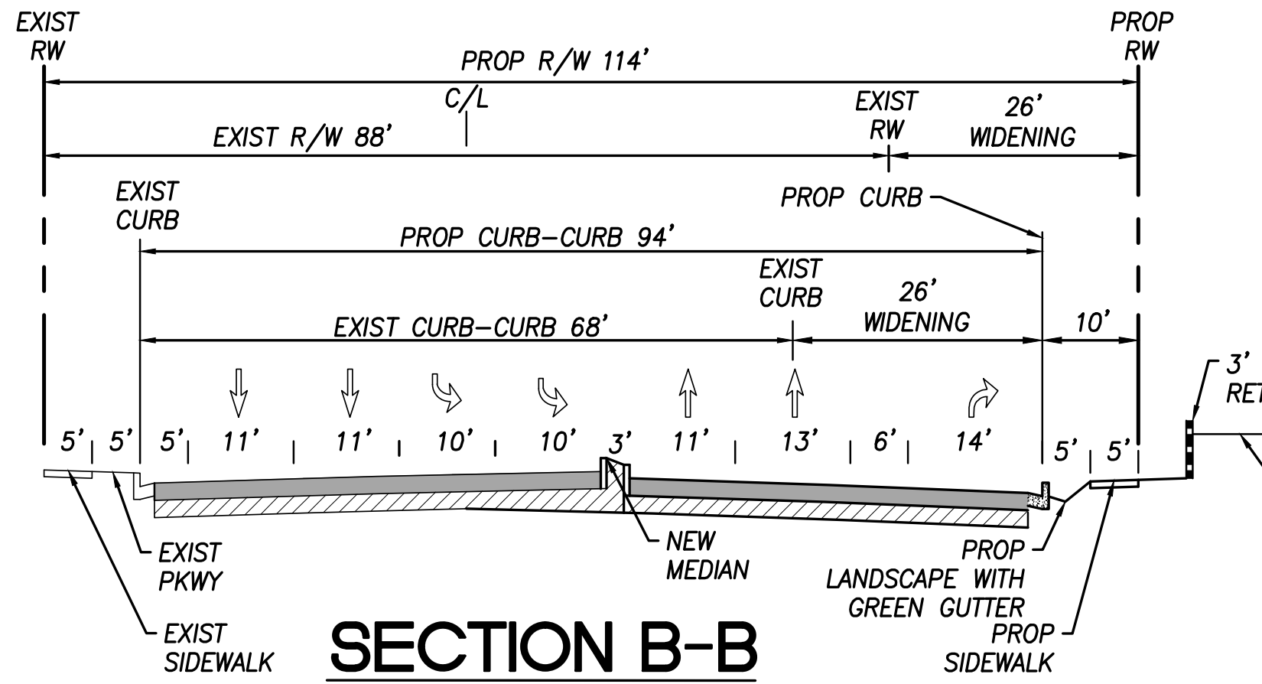

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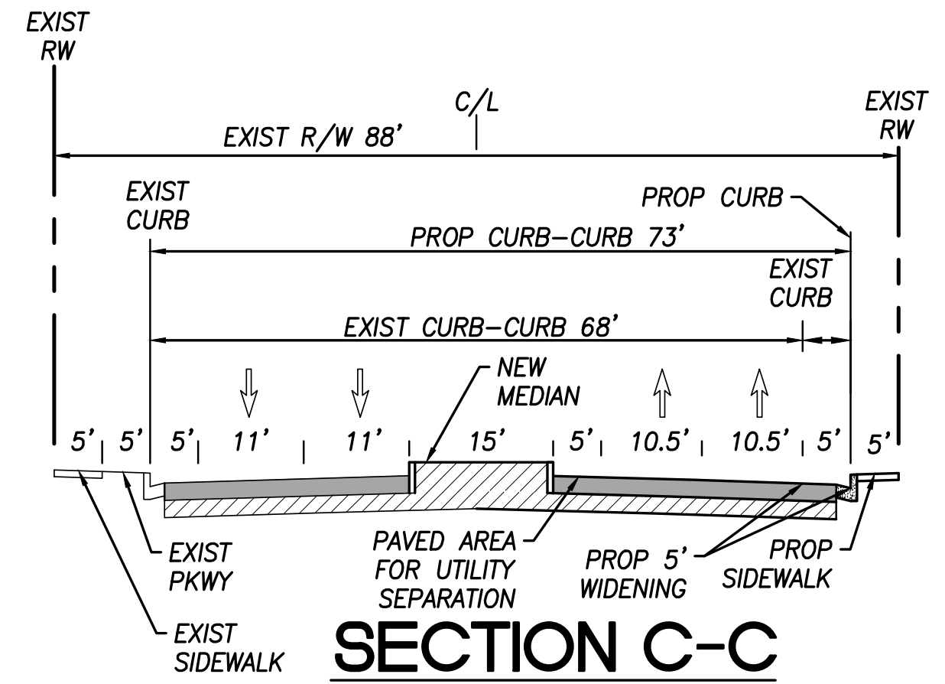

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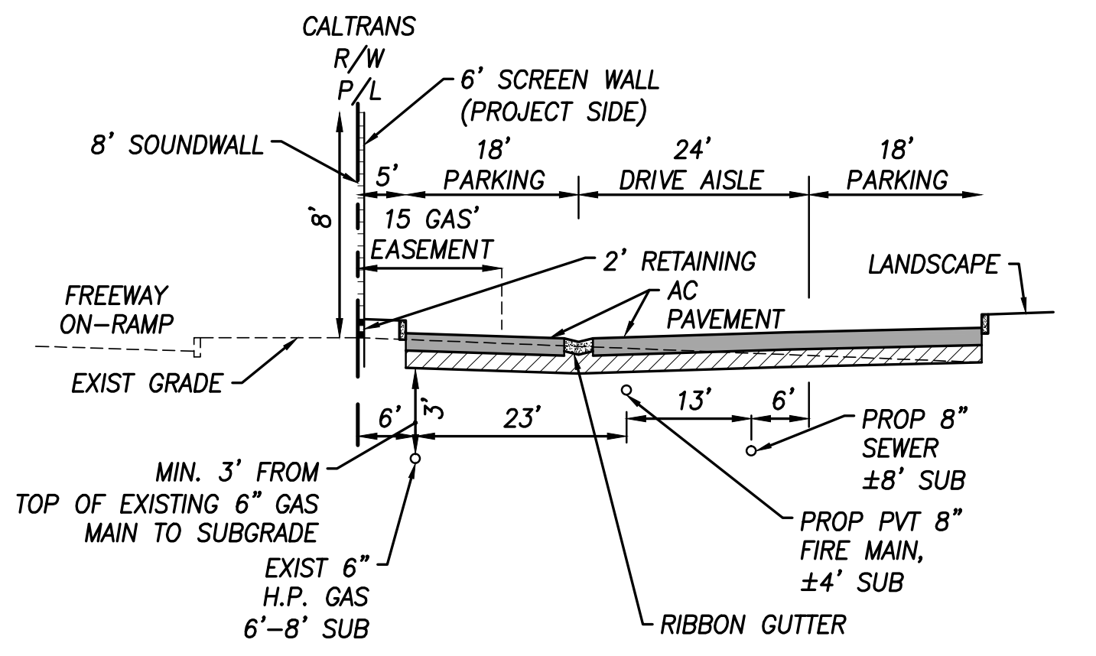

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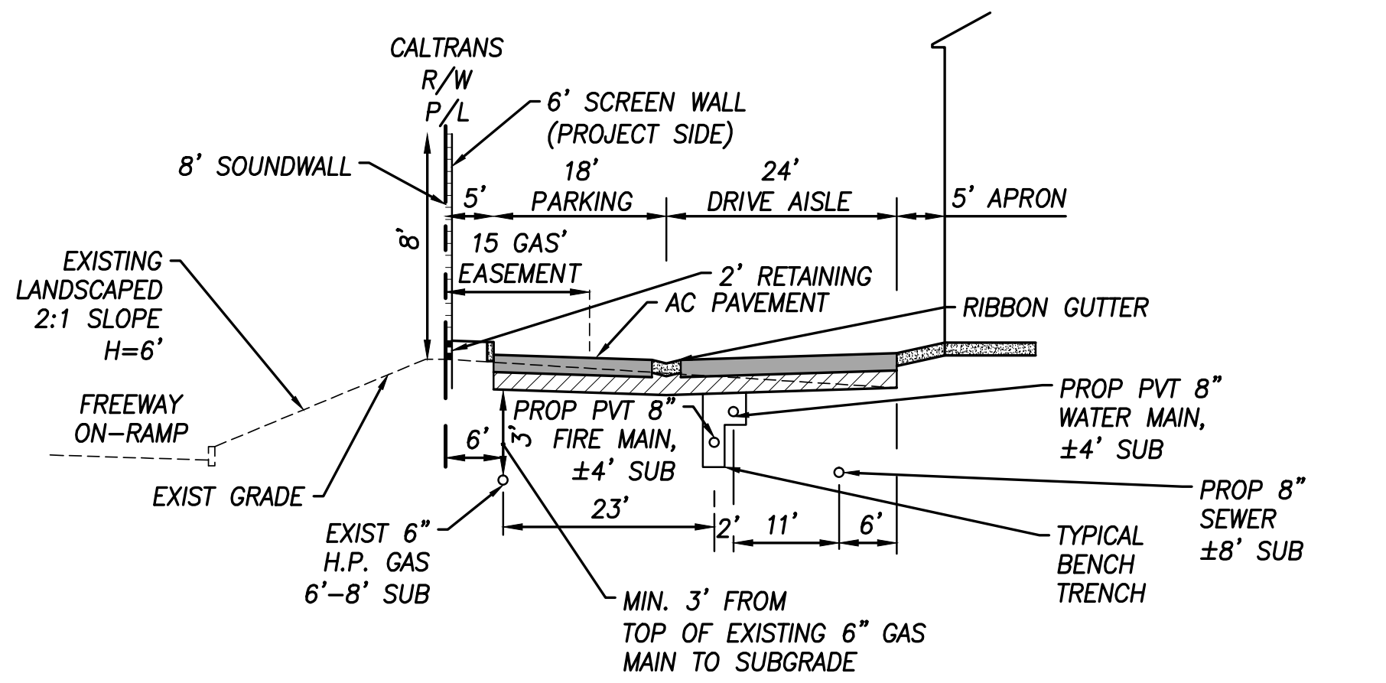

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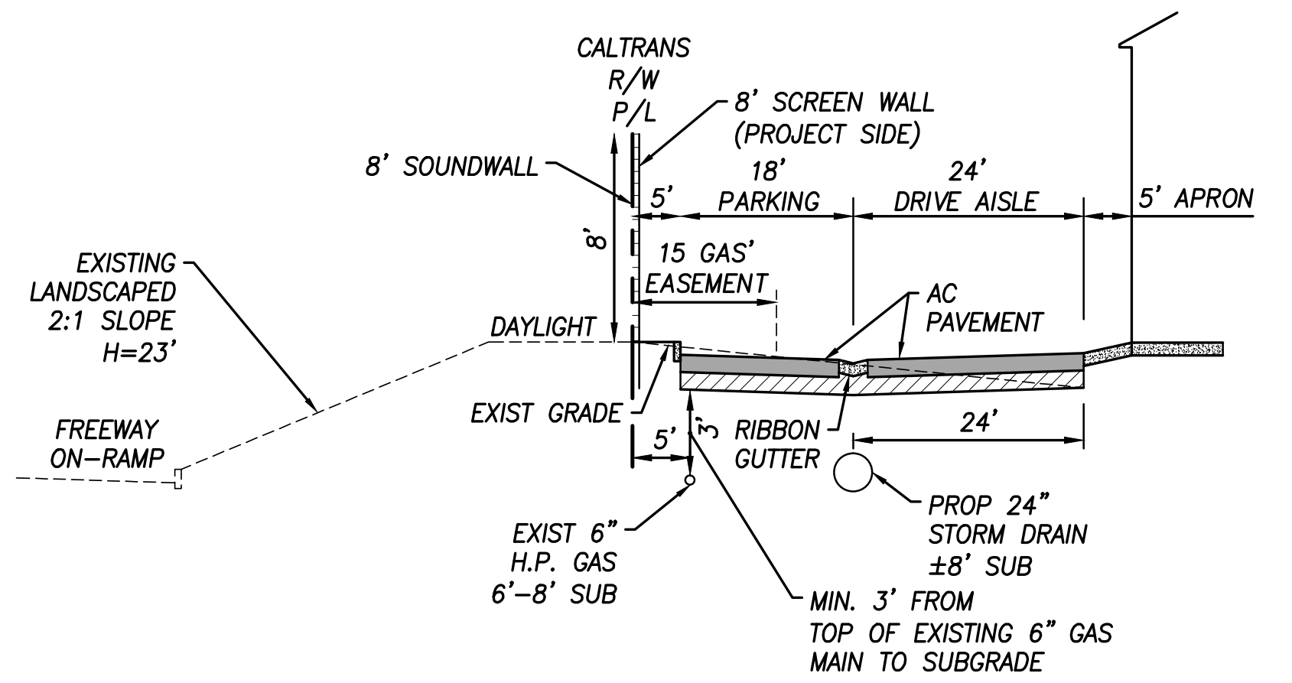

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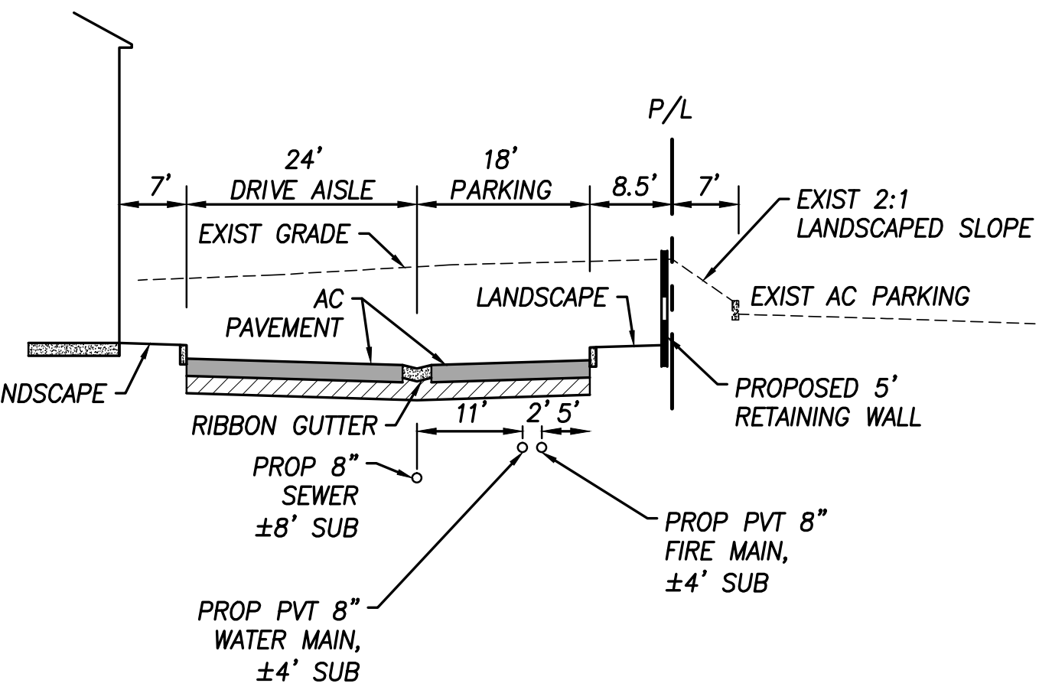

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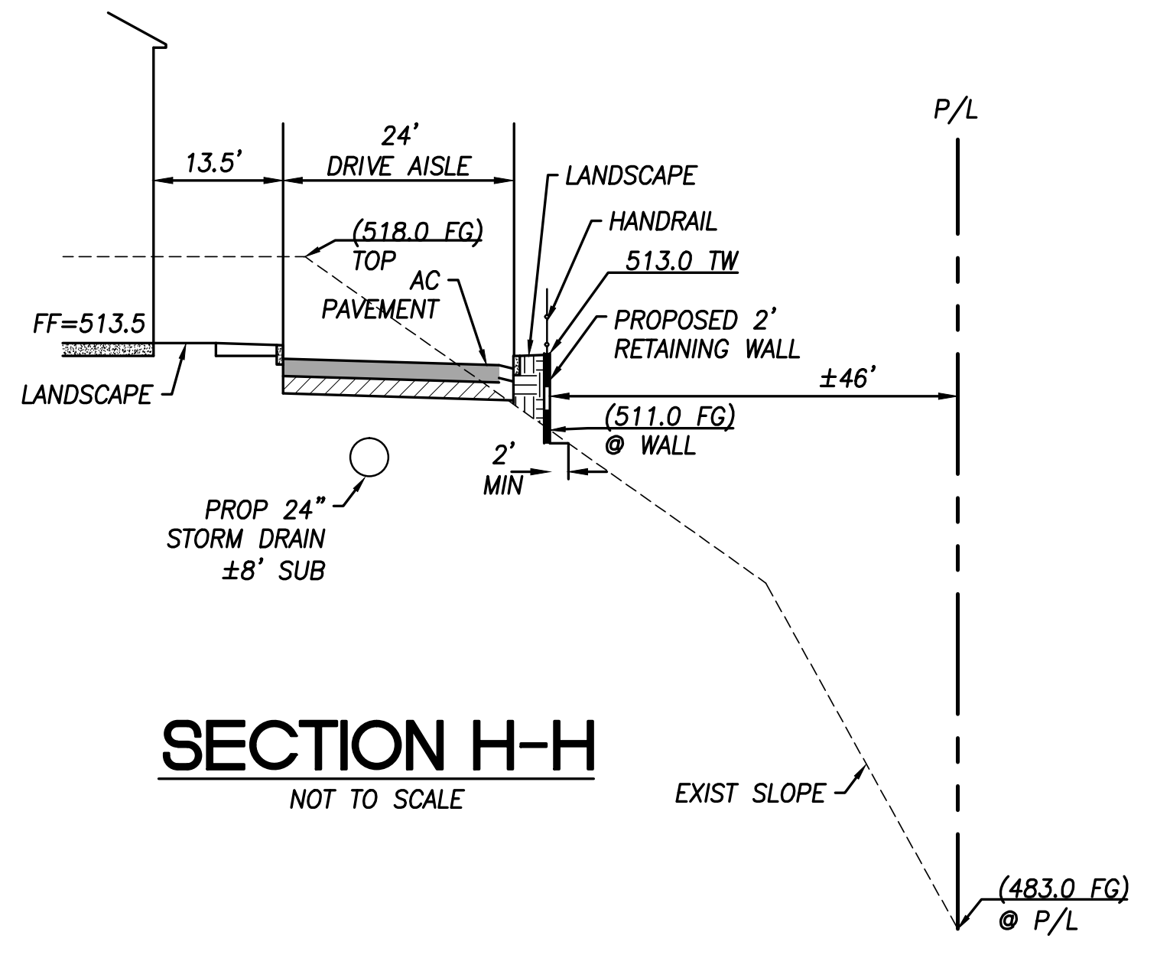

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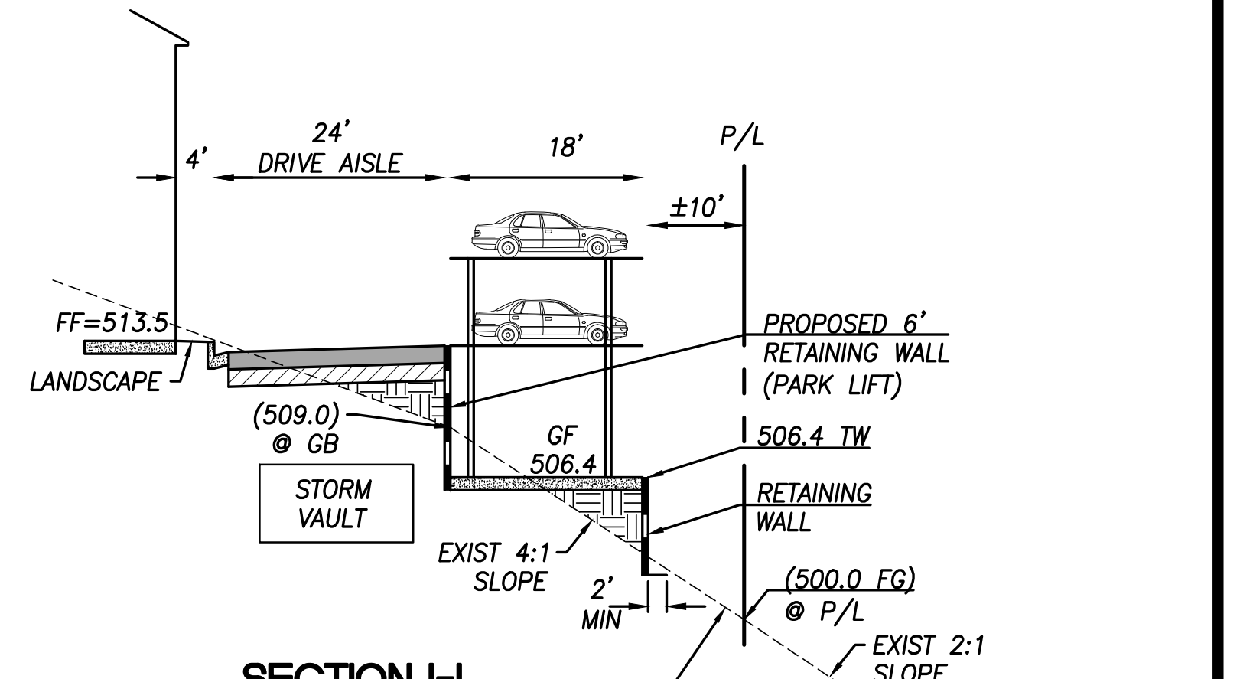

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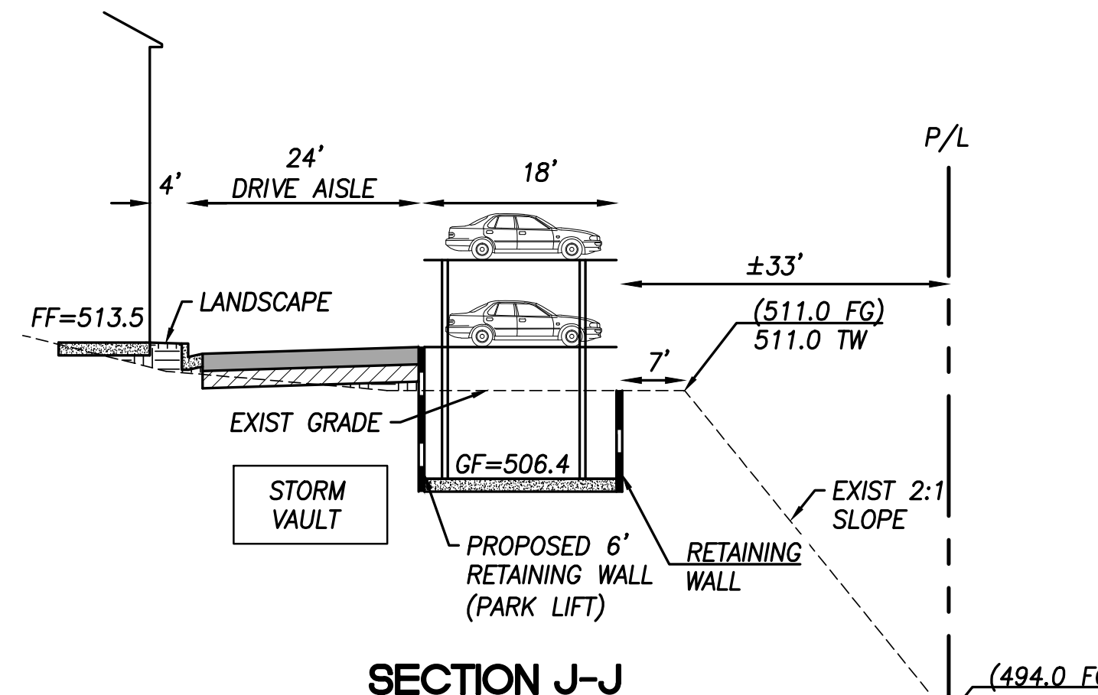

SECTION J-J
NOT TO SCALE

① PRELIMINARY PAVING SECTION

PUBLIC STREET SECTION PER PAVEMENT DESIGN STANDARDS SCHEDULE "J", SDG-113.

AC PAVEMENT ON PARKING AREA, 4" AC ON 8" CRUSHED MISCELLANEOUS BASE.

AC PAVEMENT ON DRIVE AISLE, 6" AC ON 12" CRUSHED MISCELLANEOUS BASE.

PAVERS, 6" THICK PAVER BLOCKS ON 15" CRUSHED MISCELLANEOUS BASE.

LEGEND

ITEM	SYMBOL
PROPERTY LINE / RIGHT-OF-WAY	—— - - —— - - ——
EASEMENT	— — — — — —
EXISTING CONTOUR	～ 58 ～
PROPOSED CONTOUR	～ (58) ～
CUT/FILL SLOPE (2:1 MAX)	▽ ▽ ▽
TOP OF CURB ELEVATION	58.00 TC
LOWLINESS ELEVATION	58.00 FL
FINISH SURFACE ELEVATION	58.00 FS
FINISH GRADE ELEVATION	58.00 FAG
EXISTING ELEVATION	(58.00)
FLOW DIRECTION AND SLOPE	2.0% →
6" CONC. CURB	——
6" CONC. CURB & GUTTER	═══
PROPOSED STORM DRAIN (SEE SHEET 3)	SD
PEDESTRIAN RAMP TYPE A	⌂
NEW AC PAVEMENT	░
NEW PERMEABLE PAVERS	▨
NEW PLANTING AREA	PA
EXISTING SIGNALIZED INTERSECTION	(TS)
PROPOSED SIGNALIZED INTERSECTION	(TS)
TREE PLANTER OR STREET TREE (40 SF MINIMUM ROOT ZONE)	◇
VISIBILITY AREA PER LDC 113.0273(b)3	◺

VISIBILITY AREA NOTE:
NO FENCES / SHRUBS, STRUCTURES OR WALLS HIGHER THAN 36" IN HEIGHT ARE PERMITTED IN THE VISIBILITY AREA OF THE PROPOSED DRIVEWAYS AND STREET INTERSECTION

REGISTERED PROFESSIONAL ENGINEER
GREGORY W. LANG
No. RCE 68075
EXP. 06-30-17
Civil
STATE OF CALIFORNIA

Gregory W. Lang

PREPARED BY:

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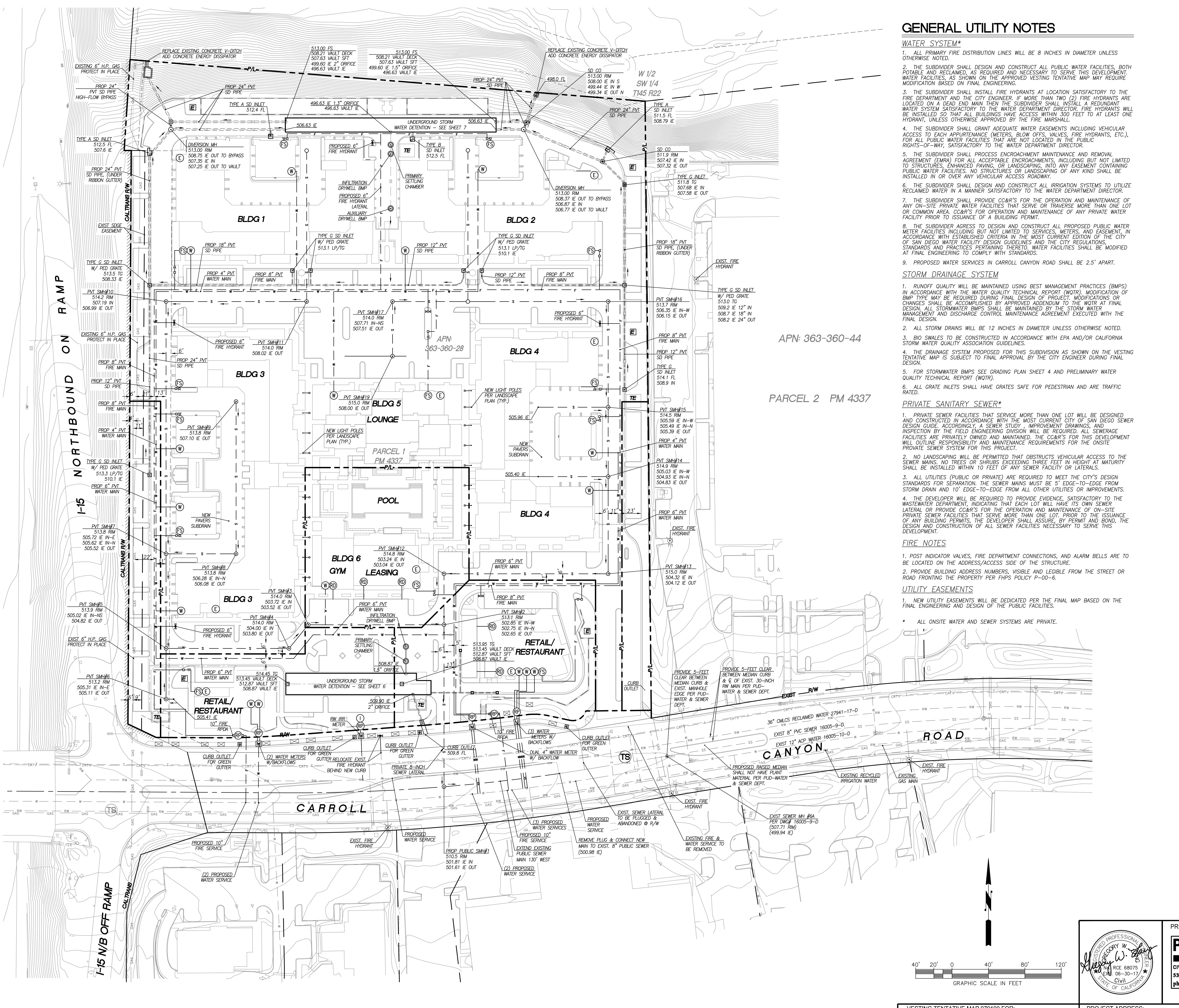
REVISION 4:	05/02/13
REVISION 3:	04/0713
REVISION 2:	12/20/12
REVISION 1:	07/30/12
ORIGINAL DATE:	11/24/14

VESTING TENTATIVE MAP 979190 FOR:
CARROLL CANYON MIXED USE
CITY OF SAN DIEGO, CA
THIS IS A PLANNED COMMERCIAL & RESIDENTIAL DEVELOPMENT PROJECT AS DEFINED IN THE SAN DIEGO LAND DEVELOPMENT CODE

PROJECT ADDRESS:
9850 CARROLL CANYON ROAD
SAN DIEGO, CA 92177

SHEET No. / TITLE:
GRADING PLAN
SHEET 4 OF 8

J:\ACTIVE JOBS\2314 CARROLL CYN MIXED USE\DRAWING\VTM\2314-VTM-04-PG.DWG (08-29-16 8:48:18AM) Plotted by: glang



GENERAL UTILITY NOTES

WATER SYSTEM*

1. ALL PRIMARY FIRE DISTRIBUTION LINES WILL BE 8 INCHES IN DIAMETER UNLESS OTHERWISE NOTED.

2. THE SUBDIVIDER SHALL DESIGN AND CONSTRUCT ALL PUBLIC WATER FACILITIES, BOTH POTABLE AND RECLAIMED, AS REQUIRED AND NECESSARY TO SERVE THIS DEVELOPMENT. WATER FACILITIES, AS SHOWN ON THE APPROVED VESTING TENTATIVE MAP MAY REQUIRE MODIFICATION BASED ON FINAL ENGINEERING.

3. THE SUBDIVIDER SHALL INSTALL FIRE HYDRANTS AT LOCATION SATISFACTORY TO THE FIRE DEPARTMENT AND THE CITY ENGINEER. IF MORE THAN TWO (2) FIRE HYDRANTS ARE LOCATED ON A DEAD END MAIN THEN THE SUBDIVIDER SHALL INSTALL A REDUNDANT WATER SYSTEM SATISFACTORY TO THE WATER DEPARTMENT DIRECTOR. FIRE HYDRANTS WILL BE INSTALLED SO THAT ALL BUILDINGS HAVE ACCESS WITHIN 300 FEET TO AT LEAST ONE HYDRANT, UNLESS OTHERWISE APPROVED BY THE FIRE MARSHALL.

4. THE SUBDIVIDER SHALL GRANT ADEQUATE WATER EASEMENTS INCLUDING VEHICULAR ACCESS TO EACH APPURTENANCE (METERS, BLOW OFFS, VALVES, FIRE HYDRANTS, ETC.), FOR ALL PUBLIC WATER FACILITIES THAT ARE NOT LOCATED IN THE PUBLIC RIGHTS-OF-WAY, SATISFACTORY TO THE WATER DEPARTMENT DIRECTOR.

5. THE SUBDIVIDER SHALL PROCESS ENCROACHMENT MAINTENANCE AND REMOVAL AGREEMENT (EMRA) FOR ALL ACCEPTABLE ENCROACHMENTS, INCLUDING BUT NOT LIMITED TO STRUCTURES, ENHANCED PAVING, OR LANDSCAPING, INTO ANY EASEMENT CONTAINING PUBLIC WATER FACILITIES. NO STRUCTURES OR LANDSCAPING OF ANY KIND SHALL BE INSTALLED IN OR OVER ANY VEHICULAR ACCESS ROADWAY.

6. THE SUBDIVIDER SHALL DESIGN AND CONSTRUCT ALL IRRIGATION SYSTEMS TO UTILIZE RECLAIMED WATER IN A MANNER SATISFACTORY TO THE WATER DEPARTMENT DIRECTOR.

7. THE SUBDIVIDER SHALL PROVIDE CC&R'S FOR THE OPERATION AND MAINTENANCE OF ANY ON-SITE PRIVATE WATER FACILITIES THAT SERVE OR TRAVERSE MORE THAN ONE LOT OR COMMON AREA. CC&R'S FOR OPERATION AND MAINTENANCE OF ANY PRIVATE WATER FACILITY PRIOR TO ISSUANCE OF A BUILIDING PERMIT.

8. THE SUBDIVIDER AGRESS TO DESIGN AND CONSTRUCT ALL PROPOSED PUBLIC WATER METER FACILITIES INCLUDING BUT NOT LIMITED TO SERVICES, METERS, AND EASEMENT, IN ACCORDANCE WITH ESTABLISHED CRITERIA IN THE MOST CURRENT EDITION OF THE CITY OF SAN DIEGO WATER FACILITY DESIGN GUIDELINES AND THE CITY REGULATIONS, STANDARDS AND PRACTICES PERTAINING THERETO. WATER FACILITIES SHALL BE MODIFIED AT FINAL ENGINEERING TO COMPLY WITH STANDARDS.

9. PROPOSED WATER SERVICES IN CARROLL CANYON ROAD SHALL BE 2.5' APART.

STORM DRAINAGE SYSTEM

1. RUNOFF QUALITY WILL BE MAINTAINED USING BEST MANAGEMENT PRACTICES (BMPS) IN ACCORDANCE WITH THE WATER QUALITY TECHNICAL REPORT (WQTR). MODIFICATION OF BMP TYPE MAY BE REQUIRED DURING FINAL DESIGN OF PROJECT. MODIFICATIONS OR CHANGES SHALL BE ACCOMPLISHED BY APPROVED ADDENDUM TO THE WQTR AT FINAL DESIGN. ALL STORMWATER BMPS SHALL BE MAINTAINED BY THE STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT EXECUTED WITH THE FINAL DESIGN.

2. ALL STORM DRAINS WILL BE 12 INCHES IN DIAMETER UNLESS OTHERWISE NOTED.

3. BIO SWALES TO BE CONSTRUCTED IN ACCORDANCE WITH EPA AND/OR CALIFORNIA STORM WATER QUALITY ASSOCIATION GUIDELINES.

4. THE DRAINAGE SYSTEM PROPOSED FOR THIS SUBDIVISION AS SHOWN ON THE VESTING TENTATIVE MAP IS SUBJECT TO FINAL APPROVAL BY THE CITY ENGINEER DURING FINAL DESIGN.

5. FOR STORMWATER BMPS SEE GRADING PLAN SHEET 4 AND PRELIMINARY WATER QUALITY TECHNICAL REPORT (WQTR).

6. ALL GRATE INLETS SHALL HAVE GRATES SAFE FOR PEDESTRIAN AND ARE TRAFFIC RATED.

PRIVATE SANITARY SEWER*

1. PRIVATE SEWER FACILITIES THAT SERVICE MORE THAN ONE LOT WILL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE MOST CURRENT CITY OF SAN DIEGO SEWER DESIGN GUIDE. ACCORDINGLY, A SEWER STUDY , IMPROVEMENT DRAWINGS, AND INSPECTION BY THE FIELD ENGINEERING DIVISION WILL BE REQUIRED. ALL SEWERAGE FACILITIES ARE PRIVATELY OWNED AND MAINTAINED. THE CC&R'S FOR THIS DEVELOPMENT WILL OUTLINE RESPONSIBILITY AND MAINTENANCE REQUIREMENTS FOR THE ONSITE PROVATE SEWER SYSTEM FOR THIS PROJECT.

2. NO LANDSCAPING WILL BE PERMITTED THAT OBSTRUCTS VEHICULAR ACCESS TO THE SEWER MAINS. NO TREES OR SHRUBS EXCEEDING THREE FEET IN HEIGHT AT MATURITY SHALL BE INSTALLED WITHIN 10 FEET OF ANY SEWER FACILITY OR LATERALS.

3. ALL UTILITIES (PUBLIC OR PRIVATE) ARE REQUIRED TO MEET THE CITY'S DESIGN STANDARDS FOR SEPARATION. THE SEWER MAINS MUST BE 5' EDGE-TO-EDGE FROM STORM DRAIN AND 10' EDGE-TO-EDGE FROM ALL OTHER UTILITIES OR IMPROVEMENTS.

4. THE DEVELOPER WILL BE REQUIRED TO PROVIDE EVIDENCE, SATISFACTORY TO THE WASTEWATER DEPARTMENT, INDICATING THAT EACH LOT WILL HAVE ITS OWN SEWER LATERAL OR PROVIDE CC&R'S FOR THE OPERATION AND MAINTENANCE OF ON-SITE PRIVATE SEWER FACILITIES THAT SERVE MORE THAN ONE LOT. PRIOR TO THE ISSUANCE OF ANY BUILDING PERMITS, THE DEVELOPER SHALL ASSURE, BY PERMIT AND BOND, THE DESIGN AND CONSTRUCTION OF ALL SEWER FACILITIES NECESSARY TO SERVE THIS DEVELOPMENT.

FIRE NOTES

1. POST INDICATOR VALVES, FIRE DEPARTMENT CONNECTIONS, AND ALARM BELLS ARE TO BE LOCATED ON THE ADDRESS/ACCESS SIDE OF THE STRUCTURE.

2. PROVIDE BUILDING ADDRESS NUMBERS, VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY PER FHPS POLICY P-00-6.

UTILITY EASEMENTS

1. NEW UTILITY EASEMENTS WILL BE DEDICATED PER THE FINAL MAP BASED ON THE FINAL ENGINEERING AND DESIGN OF THE PUBLIC FACILITIES.

* ALL ONSITE WATER AND SEWER SYSTEMS ARE PRIVATE.

LEGEND

ITEM	SYMBOL
PROPERTY LINE / RIGHT-OF-WAY	— - - — - - —
EXISTING EASEMENT	– – – – – – – –
6" CONC. CURB	—
6" CONC. CURB & GUTTER	═
PEDESTRIAN RAMP	
EXISTING PUBLIC WATER MAIN	— — W — —
EXISTING PUBLIC SANITARY SEWER MAIN	— — S — —
EXISTING FIRE HYDRANT ASSEMBLY	
PROPOSED FIRE HYDRANT ASSEMBLY	
EXISTING SEWER MANHOLE	—○—
PROPOSED SEWER MANHOLE (SMH)	—○—
PROPOSED PRIVATE FIRE MAIN	— — F — —
PROPOSED PRIVATE WATER MAIN	— — W — —
PROPOSED 8" PRIVATE SANITARY SEWER MAIN, MIN GRADE 0.5%	— — S — —
PROPOSED STORM DRAIN	═ ═SD═ ═
EXISTING STORM DRAIN INLET	▢
PROPOSED STORM DRAIN INLET	▢
EXISTING GATE VALVE	⋈
EXISTING GATE VALVE	⊗
PROPOSED GREASE TRAP	⁑
FIRE SERVICE	FS
WATER SERVICE	W
BACKFLOW PREVENTION DEVICE	RP
SEWER SERVICE	S
BUILDING ELECTRIC CONNECTION	E
EXISTING SIGNALIZED INTERSECTION	TS
PROPOSED SIGNALIZED INTERSECTION	TS
PROPOSED LIGHT STANDARD	○—
PROPOSED ELECTRICAL TRANSFORMER	E
PROPOSED TRASH ENCLOSURE	TE
PROPOSED STREET TREE LOCATION (40 S.F. ROOT ZONE)	☒

TREE SEPARATION NOTE

VISIBILITY AREA NOTE:
NO FENCES / SHRUBS, STRUCTURES OR WALLS HIGHER THAN 36" IN HEIGHT ARE PERMITTED IN THE VISIBILITY AREA OF THE PROPOSED DRIVEWAYS AND STREET INTERSECTION.

(PER LDS SECTION 142.0409 & TABLE 142-04E)

IMPROVEMENTS	MINIMUM DISTANCE TO STREET TREE
TRAFFIC SIGNALS/STOP SIGN	20 FEET
UNDERGROUND UTILITY LINES (EXCEPT SEWER)	5 FEET
SEWER	10 FEET
ABOVE GROUND UTILITY STRUCTURE	10 FEET
DRIVEWAYS	10 FEET
INTERSECTIONS (INTERSECTING LINES OF 2 STREETS)	25 FEET

BENCH TRENCH

SEE SECTION E-E ON SHEET 4 FOR TYPICAL BENCH TRENCH ON PRIVATE WATER AND FIRE LINES.

BACKFLOW PREVENTION

ALL WATER SERVICES TO THE SITE, INCLUDING DOMESTIC, IRRIGATION AND FIRE, WILL REQUIRE PRIVATE, ABOVE GROUND BACK FLOW PREVENTION DEVICES (BFPDS). BFPDS SHALL BE LOCATED ON PRIVATE PROPERTY, IN LINE WITH THE SERVICE AND IMMEDIATELY ADJACENT TO THE RIGHT-OF-WAY. THE REQUIRED BFPDS TO BE LOCATED BELOW GRADE OR WITHIN THE STRUCTURE.

PRIVATE SEWER LATERALS

ALL PRIVATE SEWER LATERALS WILL REQUIRE AN ENCROACHMENT, MAINTENANCE AND REMOVAL AGREEMENT (EMRA).

GREGORY W. LANG
No. RCE 68075
EXP. 06-30-17
Civil
Gregory W. Lang

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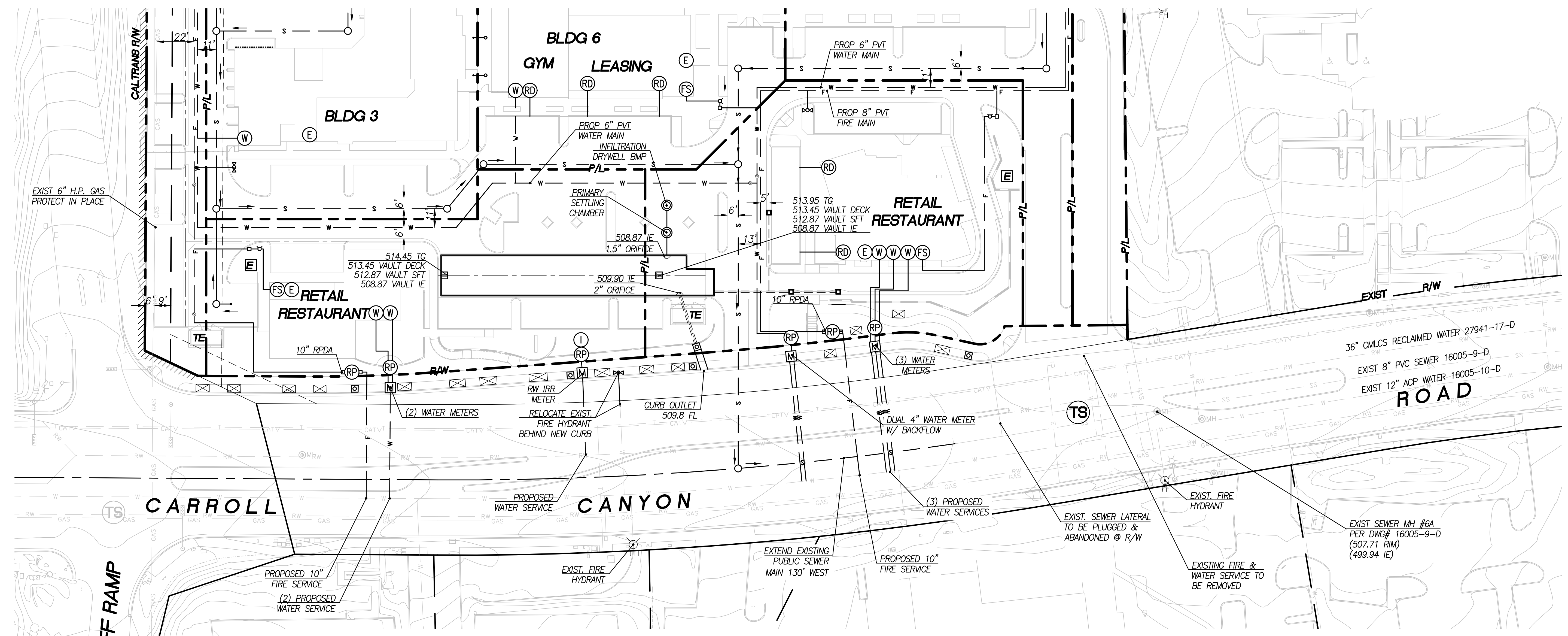
REVISION 6:	07/29/13
REVISION 5:	05/28/13
REVISION 4:	05/02/13
REVISION 3:	04/0713
REVISION 2:	12/20/12
REVISION 1:	07/30/12
ORIGINAL DATE:	11/24/14

VESTING TENTATIVE MAP 979190 FOR:
CARROLL CANYON MIXED USE
CITY OF SAN DIEGO, CA
THIS IS A PLANNED COMMERCIAL & RESIDENTIAL DEVELOPMENT PROJECT AS DEFINED IN THE SAN DIEGO LAND DEVELOPMENT CODE

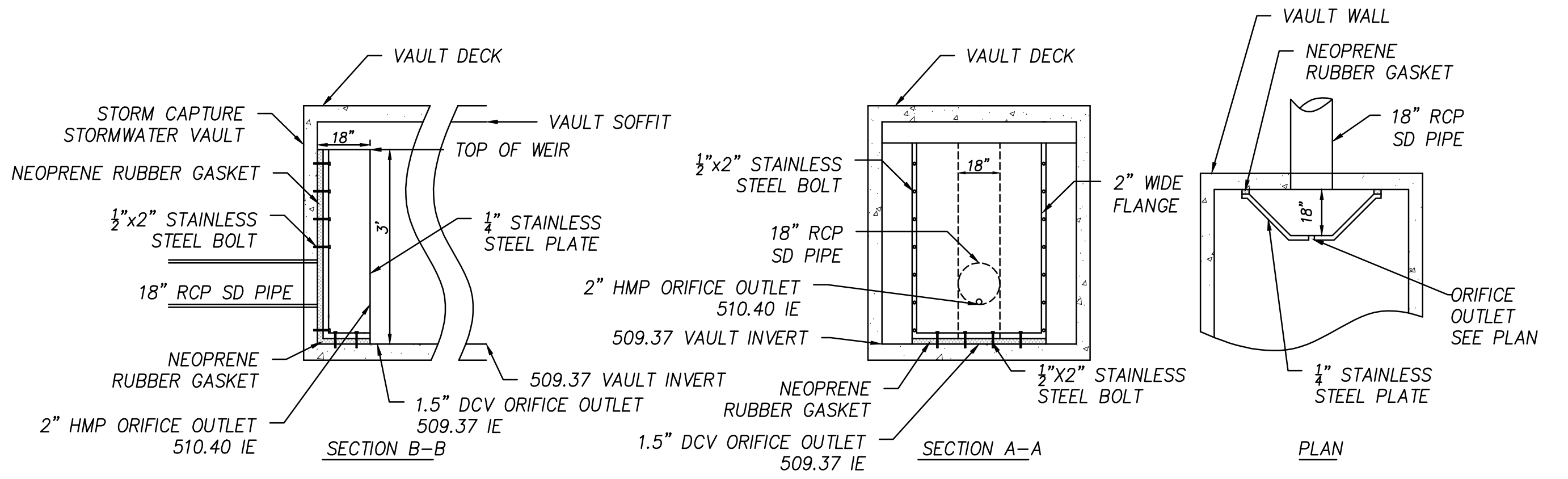
PROJECT ADDRESS:
9850 CARROLL CANYON ROAD
SAN DIEGO, CA 92177

SHEET No. / TITLE:
UTILITY PLAN
SHEET 5 OF 8

J:\ACTIVE JOBS\2314 CARROLL CYN MIXED USE\DRAWING\VTM\2314-VTM-05-UTIL.DWG
by: glang

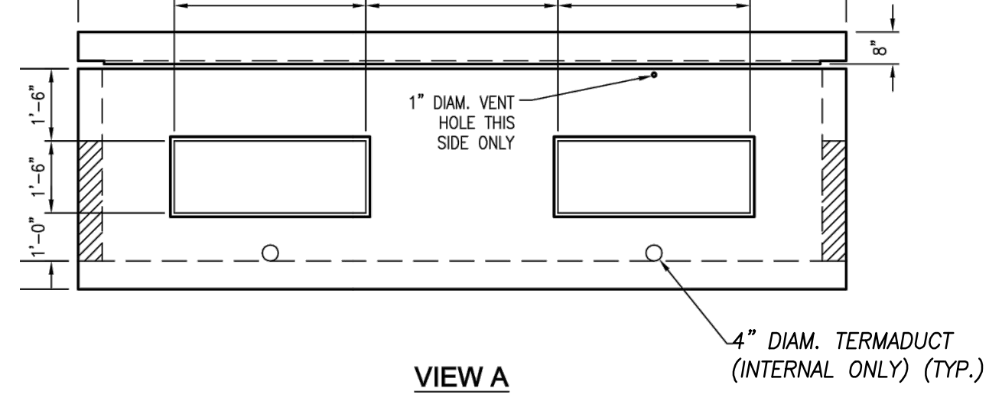


SOUTH BASIN STORM WATER DETAIL

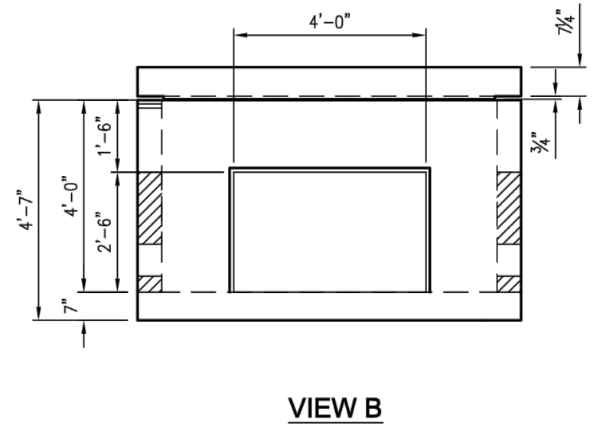


WEIR DETAIL (INSIDE VAULT)

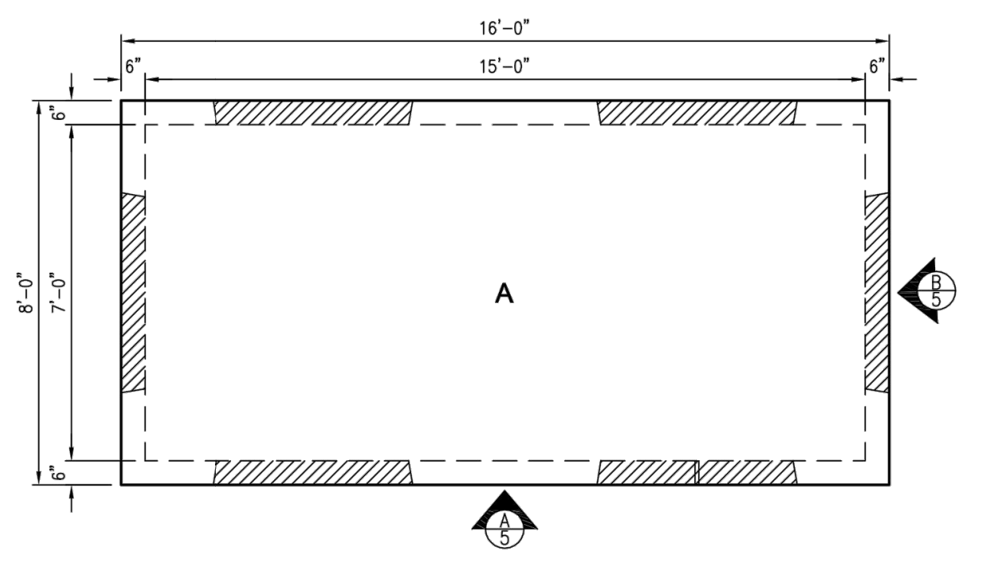
N.T.S.



VIEW A
SCALE: 1/4" = 1'-0"



VIEW B
SCALE: 1/4" = 1'-0"



STORM CAPTURE PLAN VIEW
SCALE: 1/4" = 1'-0"

GENERAL NOTES:

THE STORM CAPTURE™ SYSTEM BY OLDCASTLE PRECAST IS PART OF THE STORMWATER MANAGEMENT SYSTEM FOR THE RESPECTIVE SITE, AS PREPARED BY THE PROJECT DESIGN ENGINEER. IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO DETERMINE DESIGN FLOW RATES, PRE–TREATMENT AND POST–TREATMENT REQUIREMENTS, STORAGE VOLUME, AND ENSURE THE FINAL DESIGN MEETS ALL CONVEYANCE AND STORAGE REQUIREMENTS. SYSTEM DESIGN AND TYPE, SOIL ANALYSIS, LOADING REQUIREMENTS, COVER HEIGHT AND MODULE SIZE DETERMINE THE FOUNDATION TYPE AND REQUIREMENTS AS STATED HEREIN. ANY VARIATIONS FOUND DURING CONSTRUCTION FROM THE SITE AND SYSTEM ANALYSIS MUST BE REPORTED TO THE PROJECT DESIGN ENGINEER. THE PROJECT DESIGN ENGINEER IS RESPONSIBLE FOR OBTAINING A GEOTECHNICAL ENGINEERING REPORT VERIFYING THE BEARING CAPACITY STATED IN DESIGN NOTES.

DESIGN NOTES:

1. DESIGN LOADINGS:
   - A. AASHTO HS–20–44 W/ IMPACT.
   - B. DEPTH OF COVER = 6" – 5'–0".
   - C. ASSUMED WATER TABLE = BELOW BOTTOM.
   - D. EQUIVALENT FLUID PRESSURE = 45 PCF.
   - E. LATERAL LIVE LOAD SURCHARGE = 80 PSF.
   - F. NO LATERAL SURCHARGE FROM ADJACENT STRUCTURES.
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 6,000 PSI.
3. STEEL REINFORCEMENT: REBAR, ASTM A–615, GRADE 60.
4. CEMENT: ASTM C–150 SPECIFICATION.
5. STORM CAPTURE MODULE TYPE = DETENTION.
6. REQUIRED BASE LAYER DEPTH = 2" SAND BEDDING LAYER.
7. REQUIRED NATIVE ALLOWABLE SOIL BEARING PRESSURE = 3,000 PSF.
8. REFERENCE STANDARDS:

A. ASTM C 890
B. ASTM C 891
C. ASTM C 913

9. LESS THAN 6" OR GREATER THAN 5' OF COVER REQUIRES CUSTOM STRUCTURAL DESIGN AND MAY REQUIRE THICKER SUBGRADE.

INSTALLATION NOTES:

THE STORM CAPTURE™ MODULE SYSTEM IS TO BE INSTALLED IN ACCORDANCE WITH ASTM C891, INSTALLATION OF UNDERGROUND PRECAST UTILITY STRUCTURES. PROJECT PLAN AND SPECIFICATIONS MUST BE FOLLOWED ALONG WITH ANY APPLICABLE REGULATIONS.

1. PLAN LINE, GRADE AND ELEVATIONS MUST BE FOLLOWED.

2. A. WHERE SPECIFIED, AN 8 OZ. NON–WOVEN GEOTEXTILE FABRIC AND WATERPROOF LINER MUST BE USED AS A SEPARATION LAYER AROUND THE STORM CAPTURE SYSTEM.

   B. WHERE SPECIFIED, A CONTAINMENT MEMBRANE LINER WITH THE FOLLOWING REQUIREMENTS MUST BE USED: MIN. THICKNESS = 40 MILS, MIN.
   TENSILE STRENGTH = 600 LBS WORST DIRECTION (ASTM D5034), MIN. MULLEN BURSTING STRENGTH = 1000 PSI (ASTM D3786), AND MIN. MANUFACTURER'S WARRANTY OF 20 YEARS. WHERE THE MEMBRANE IS USED AN 8 OZ. NON–WOVEN GEOTEXTILE MUST BE PLACED ON BOTH THE INSIDE AND OUTSIDE OF THE ACTUAL CONTAINMENT MEMBRANE TO PREVENT PUNCTURES.

3. PENETRATIONS IN THE CONTAINMENT MEMBRANE MAY ONLY BE MADE WITH SMOOTH WALL PIPES. MAKE PENETRATIONS FOR ALL OUTLETS BEFORE MAKING PENETRATIONS FOR ANY INLETS.

4. ALL SUBGRADE MATERIALS IF SPECIFIED, MUST BE CLEAN, DURABLE CRUSHED AGGREGATE COMPACTED OR ROLLED TO ACHIEVE 95% STANDARD PROCTOR DENSITY. OLDCASTLE RECOMMENDS SIZE 5,56,OR 57 (PER ASTM C33).

5. DESIGNATED EMBEDDED LIFTERS MUST BE USED. USE PROPER RIGGING TO ASSURE ALL LIFTERS ARE EQUALLY ENGAGED WITH A MINIMUM 60 DEGREE ANGLE ON SLINGS AS NOTED AND IN ACCORDANCE WITH OLDCASTLE LIFTING PROCEDURES.

6. MODULES MUST BE PLACED AS CLOSE TOGETHER AS POSSIBLE, AND GAPS SHALL NOT BE GREATER THAN 3/4". ALL EXTERIOR SYSTEM JOINTS SHALL BE COVERED WITH A MIN. 8" JOINT WRAP ON SIDES AND TOP (CS–212 CONSEAL OR EQUIVALENT). IN A CLAMSHELL DESIGN INSTALL ONE ROW CS–102 CONSEAL (OR EQUIVALENT) BETWEEN PRECAST PIECES.

7. AUTHORIZATION SHOULD BE GIVEN BY THE PROJECT ENGINEER OR DESIGNATED PERSON PRIOR TO PLACEMENT ON BACKFILL FOR THE SYSTEM. CARE SHOULD BE TAKEN DURING PLACEMENT OF BACKFILL NOT TO DISPLACE MODULES OR JOINT WRAP. BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY OR AS SPECIFIED, AND SHOULD NOT BE COMPACTED WITHIN 6" OF MODULE.

8. CONSTRUCTION EQUIPMENT EXCEEDING DESIGN LOADING SHALL NOT BE ALLOWED ON STRUCTURE.

9. TERMADUCTS TO BE KNOCKED OUT AT SPECIFIED LOCATIONS IN FIELD BY OTHERS. SEE SITE LAYOUT FOR LOCATIONS.

INLETS AND RISERS:

ALL PIPE INLETS SHALL EXTEND INSIDE MODULE A MINIMUM OF 4". PLACE A NON–SHRINK, NON–METALIC GROUT, MIN. 3,000 PSI IN ANNULAR SPACE TO ELIMINATE ALL VOIDS.

STORM CAPTURE MAINTENANCE:

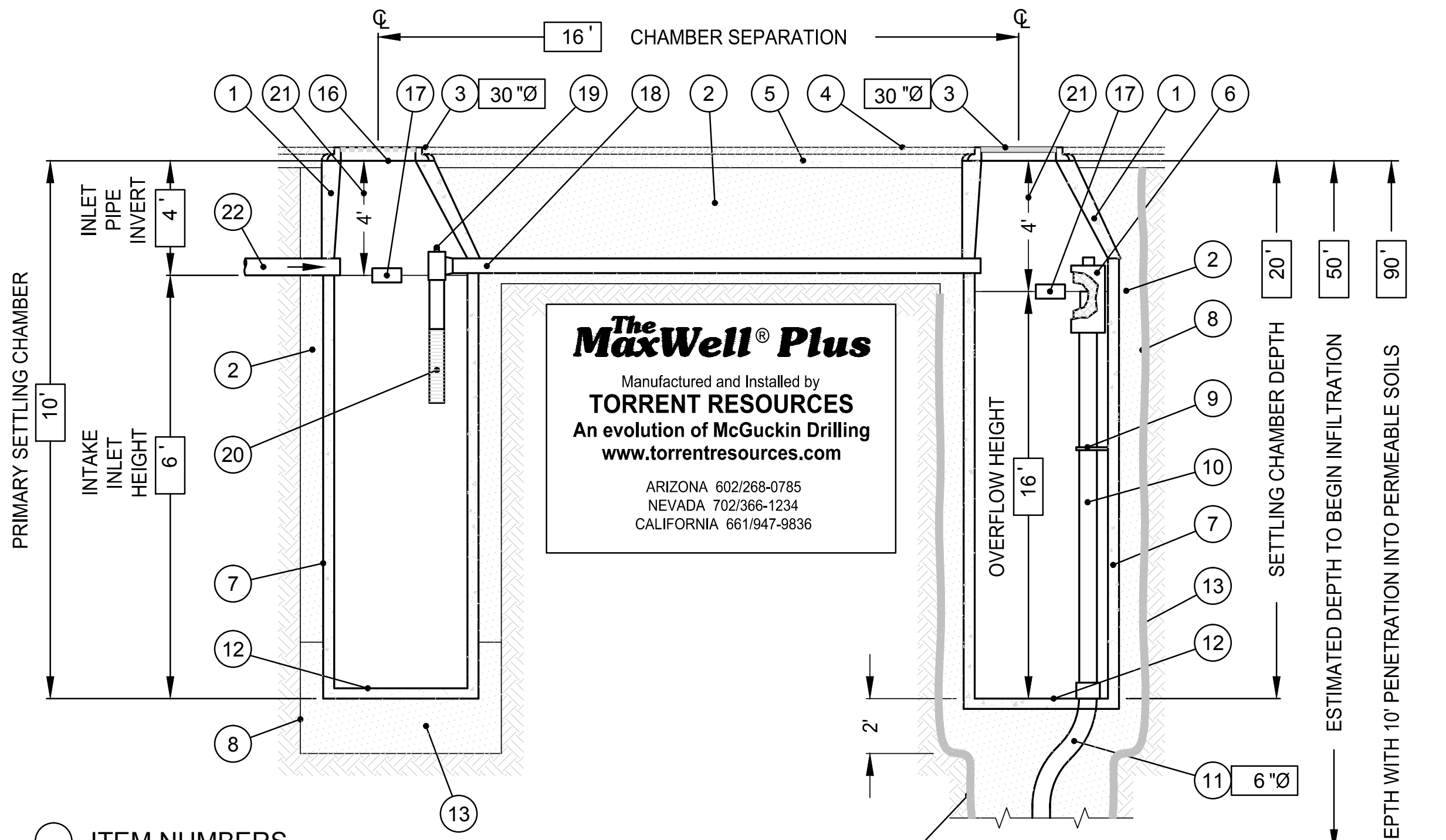
STORM CAPTURE MODULE – SYSTEM INSPECTION AND MAINTENANCE THE STORM CAPTURE SYSTEM EXCELS WHERE MOST OTHER SYSTEMS FAIL, INCORPORATING FEATURES PROVIDING FOR MAXIMUM SYSTEM PERFORMANCE AND LIFE CYCLE. THE STORM CAPTURE SYSTEM IS A MAJOR COMPONENT OF THE STORMWATER MANAGEMENT SYSTEM. DESIGN AND FUNCTION OF THE SYSTEM IS THE RESPONSIBILITY OF THE PROJECT ENGINEER. MAINTENANCE OF THE STORM CAPTURE IS VITAL FOR SATISFACTORY PERFORMANCE AND LIFE CYCLE OF THE STORMWATER MANAGEMENT SYSTEM. PERMIT REQUIREMENTS, LOCAL, STATE AND FEDERAL REGULATIONS, ALONG WITH OLDCASTLE AND ANY INCORPORATED DEVICE MANUFACTURER RECOMMENDATIONS MUST BE FOLLOWED FOR SYSTEM COMPLIANCE. STORM CAPTURE DESIGN PROVIDES MANWAY ACCESS FOR EASE OF INSPECTION AND DEBRIS REMOVAL IF REQUIRED. FLUSHING, WHICH CAN CAUSE PARTICLE DISPLACEMENT, UNDERMINING, AND INTERNAL DISTURBANCE, IS NOT RECOMMENDED FOR GRAVEL FOUNDATION, OPEN BOTTOM SYSTEMS. FLUSHING IS ACCEPTABLE IN SYSTEMS WITH CONCRETE BASES. INLET CONTROLS, INTERNAL OR EXTERNAL, ARE RECOMMENDED FOR CONTROLLING, MONITORING, AND MAINTAINING THE STORM CAPTURE SYSTEM.

EXTERNAL INLETS ARE TYPICALLY DEVICES THAT ARE SEPARATE FROM THE STORM CAPTURE MODULES. THESE EXTERNAL DEVICES RECEIVE SITE STORMWATER AND ARE DESIGNED WITH MANWAY ACCESS FOR MAINTENANCE AND TYPICALLY INCLUDE AN INTERNAL SUMP FOR SEDIMENT CAPTURE. EXTERNAL INLETS MAY RECEIVE SINGLE OR MULTIPLE PIPES AND INCORPORATE AN OPEN GRATED TOP WITH AN OUTFALL PIPE TO THE STORM CAPTURE SYSTEM. GRATED INLETS MAY INCORPORATE PROTECTION DEVICES OR BAFFLES TO CAPTURE FLOATABLES OR THE "FIRST FLUSH." SCHEDULED INSPECTIONS AND MAINTENANCE SHOULD INCLUDE THE REMOVAL OF ANY SEDIMENTATION BUILD–UP. DEBRIS OR SEDIMENTATION BUILD–UP SHOULD NOT EXCEED 3" BELOW AN OUTFALL ELEVATION. INTERNAL COMPONENTS CAN BE INCORPORATED FOR PRE–TREATMENT. MANUFACTURER RECOMMENDATIONS SHOULD BE FOLLOWED. SCHEDULED MAINTENANCE AND INSPECTION WILL INCLUDE REMOVAL OF DEBRIS BY MANUAL OR MECHANICAL MEANS.

MAINTENANCE MODULES (MM'S) ARE OPTIONAL INTERNAL CONTROL MODULES BASED ON DESIGN PREFERENCE. MM'S ARE MODULES WITH ROOF MANWAY ACCESS OPENINGS AND PROVIDE THE PRIMARY MEANS OF ACCESS TO THE STORM CAPTURE SYSTEM FOR SCHEDULED INSPECTION AND MAINTENANCE. IN ADDITION, MM'S CAN INCORPORATE WEIRS OR BAFFLES TO ENHANCE REDUCTION OR REMOVAL OF TOTAL SUSPENDED SOLIDS (TSS) FROM THE STORMWATER. PLACEMENT OF INTERNAL COMPONENTS MUST BE PART OF THE SYSTEM ENGINEERING AND DESIGN. GRATED INLETS CAN BE INCORPORATED TO ACCOMMODATE SURFACE STORMWATER FLOWS INTO THE STORM CAPTURE AND MAY INCLUDE AN INLET PROTECTION DEVICE. SCHEDULED INSPECTION AND MANUFACTURER RECOMMENDATIONS FOR MAINTENANCE SHOULD BE FOLLOWED.

STANDARD STORM CAPTURE MODULE DESIGN INCORPORATES"WINDOWS" TO ACCOMMODATE INTERNAL STORMWATER CONVEYANCE BETWEEN MODULES. STANDARD PLACEMENT IS 12" ABOVE THE INTERNAL MODULE INVERT. ANY SEDIMENT AND DEBRIS BUILD–UP OVER 6" INSIDE A MODULE SHOULD BE REMOVED BY MANUAL OR MECHANICAL MEANS. REMOVAL BY VACUUM IS RECOMMENDED.

Modified MaxWell® Plus Drainage System Detail And Specifications



AZ Lic. ROC070465 A, ROC047067 B-4, ADWR 363
CA Lic. 528080, C-42, HAZ.
NV Lic. 0035350 A - NM Lic. 90504 GF04

U.S. Patent No. 4,923,330 - ® Trademark 1974, 1990, 2004

NOTE: DRAWING NOT TO SCALE

ITEM NUMBERS

1. **MANHOLE CONE -** MODIFIED FLAT BOTTOM.
2. **STABILIZED BACKFILL -** TWO-SACK SLURRY MIX.
3. **BOLTED RING & GRATE/COVER -** DIAMETER AS SHOWN. CLEAN CAST IRON WITH WORDING "STORM WATER ONLY" IN RAISED LETTERS. BOLTED IN 2 LOCATIONS AND SECURED TO CONE WITH MORTAR. RIM ELEVATION ±0.02' OF PLANS.
4. **GRADED BASIN OR PAVING** (BY OTHERS).
5. **COMPACTED BASE MATERIAL** (BY OTHERS).
6. **PUREFLO® DEBRIS SHIELD -** ROLLED 16 GA. STEEL X 24" LENGTH WITH VENTED ANTI-SIPHON AND INTERNAL .265" MAX. SWO FLATTENED EXPANDED STEEL SCREEN X 12" LENGTH. **FUSION BONDED EPOXY COATED.**
7. **PRE-CAST LINER -** 4000 PSI CONCRETE 48" ID. X 54" OD. **CENTER IN HOLE** AND ALIGN SECTIONS TO **MAXIMIZE BEARING SURFACE.**
8. **MIN. 6' Ø DRILLED SHAFT.**
9. **SUPPORT BRACKET -** FORMED 12 GA. STEEL. **FUSION BONDED EPOXY COATED.**
10. **OVERFLOW PIPE -** SCH. 40 PVC MATED TO DRAINAGE PIPE AT BASE SEAL.
11. **DRAINAGE PIPE -** ADS HIGHWAY GRADE WITH TRI-A COUPLER. **SUSPEND PIPE** DURING BACKFILL OPERATIONS TO PREVENT BUCKLING OR BREAKAGE. DIAMETER AS NOTED.
12. **BASE SEAL -** CONCRETE SLURRY.
13. **ROCK -** CLEAN AND WASHED 3/8" TO 1-1/2" AGGREGATE.
14. **FLOFAST ® DRAINAGE SCREEN -** SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. DIAMETER VARIES 96" OVERALL LENGTH WITH TRI-B COUPLER.
15. **MIN. 4' Ø SHAFT -** DRILLED TO **MAINTAIN PERMEABILITY** OF DRAINAGE SOILS.
16. **FABRIC SEAL -** U.V. RESISTANT GEOTEXTILE **- TO BE REMOVED BY CUSTOMER** AT PROJECT COMPLETION.
17. **ABSORBENT -** HYDROPHOBIC PETROCHEMICAL SPONGE. MIN. 128 OZ. CAPACITY. TYPICAL, TWO (2) PER CHAMBER.
18. **CONNECTOR PIPE -** 4" Ø SCH. 40 PVC.
19. **VENTED ANTI-SIPHON INTAKE WITH FLOW REGULATOR.**
20. **INTAKE SCREEN -** 4" Ø SCH. 40 PVC 0.120" MODIFIED SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. 48" OVERALL LENGTH WITH TRI-C END CAP.
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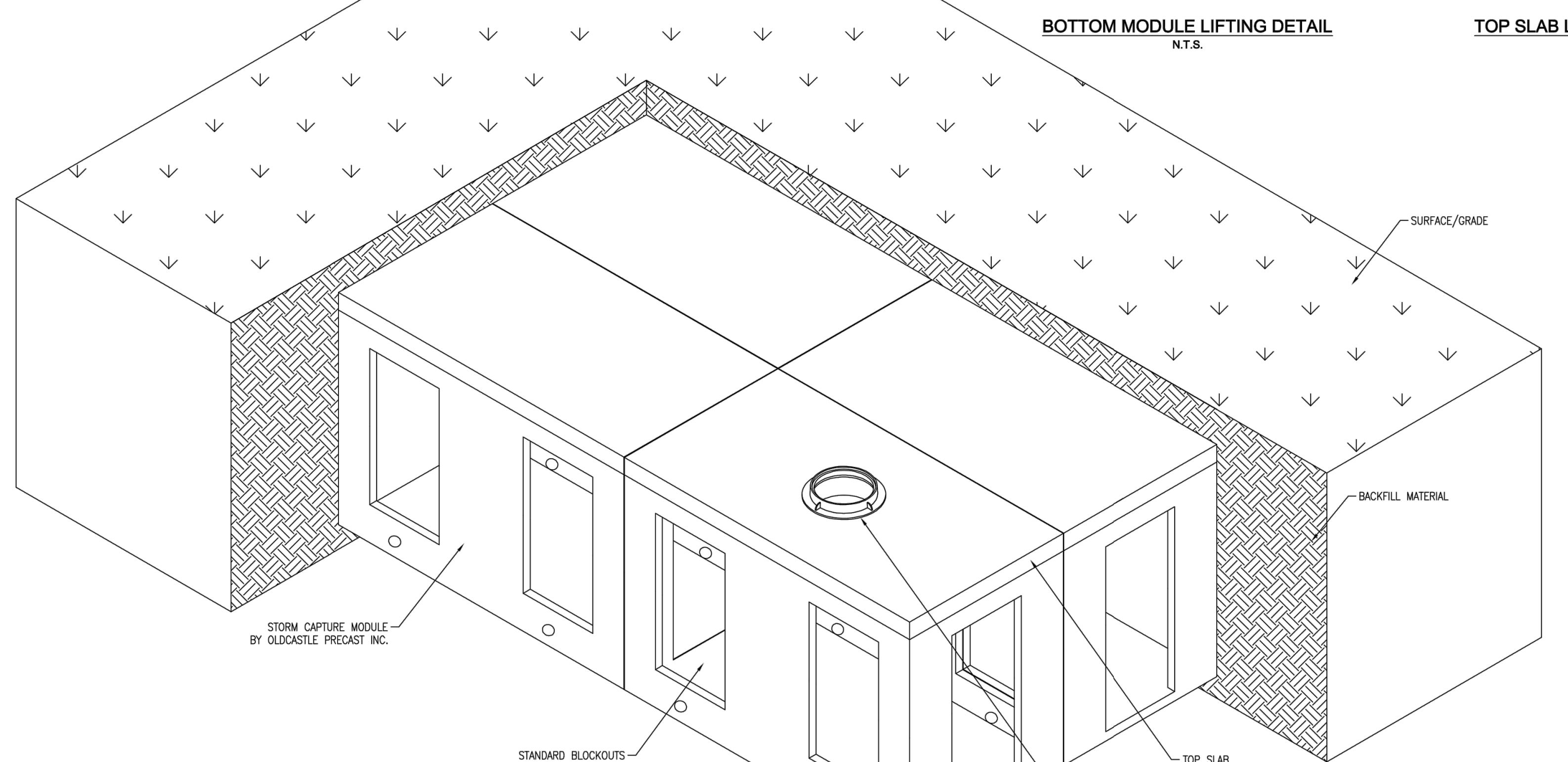
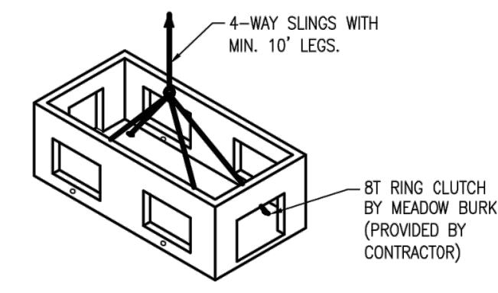
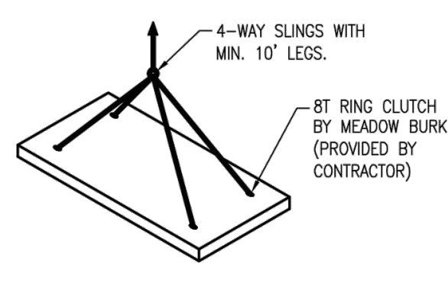


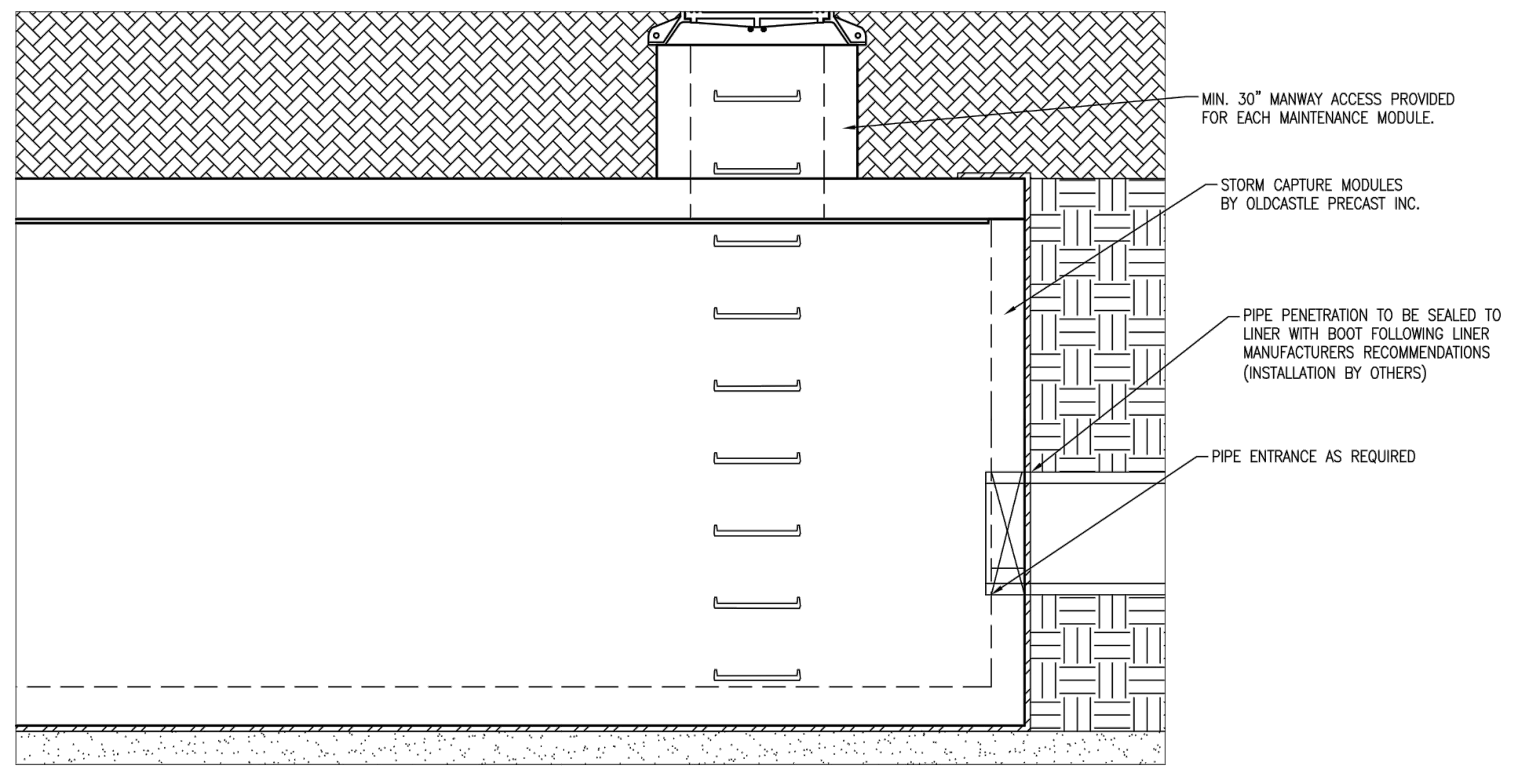
BOTTOM MODULE WITH TOP SLAB ISO VIEW
N.T.S.



BOTTOM MODULE LIFTING DETAIL
N.T.S.

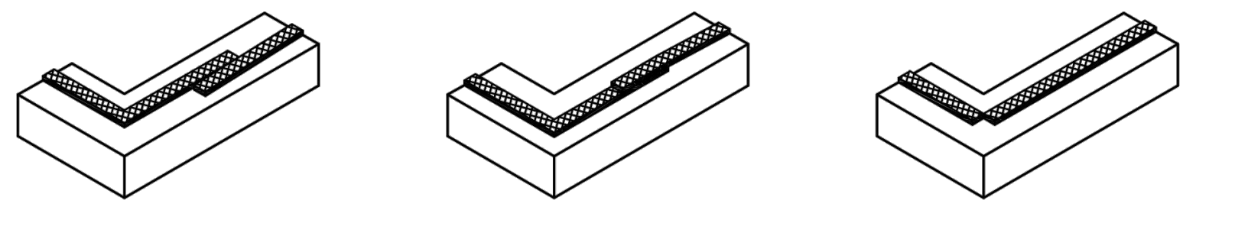


TOP SLAB LIFTING DETAIL
N.T.S.



MANWAY ACCESS DETAIL
SCALE: 3/8" = 1'-0"

KEYWAYS MUST BE FREE OF DIRT, ROCKS, AND WATER. ROCKS AND DIRT PREVENT THE VAULT SECTIONS FROM SEATING AND SEALING PROPERLY. REMOVE ALL PROTECTIVE PAPER FROM RUBBER SEALANT MATERIAL. SPLICE RUBBER SEALANT MATERIAL WITH A "SIDE BY SIDE" JOINT, AWAY FROM CORNERS. CORNER SPLICING WILL NOT SEAL PROPERLY.

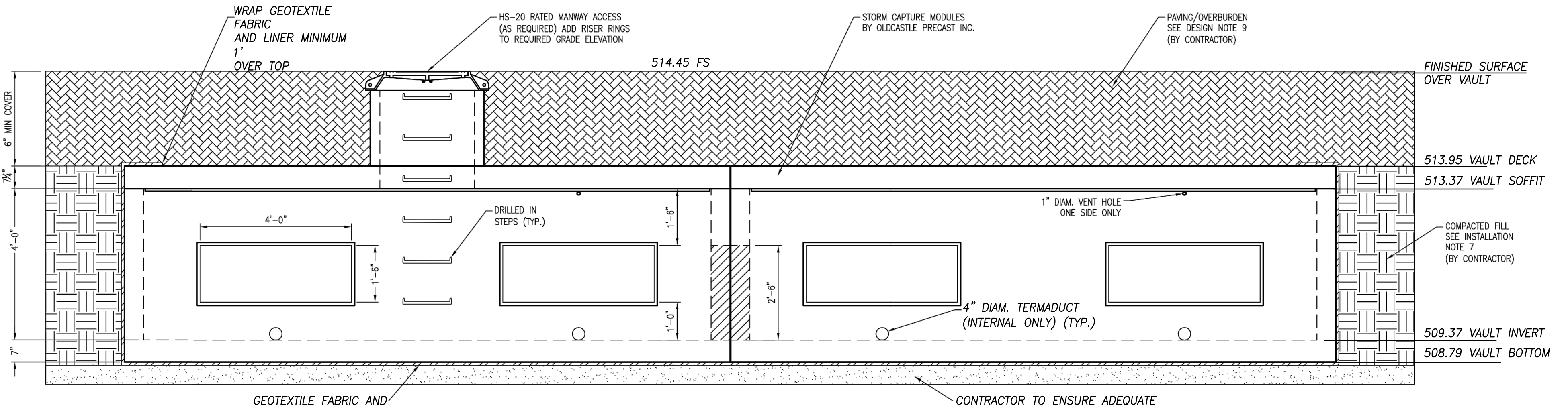


CORRECT – INSTALL RUBBER SEALANT MATERIAL AT THE OUTER EDGE OF THE KEYWAY. RUBBER SEALANT SHOULD BE CONTINUOUS AROUND CORNERS.

INCORRECT – DO NOT OVERLAP THE RUBBER SEALANT MATERIAL AT SPLICE.

INCORRECT – DO NOT SPLICE RUBBER SEALANT MATERIAL AT A CORNER. RUBBER SEALANT SHOULD BE CONTINUOUS AROUND CORNERS.

CONSEAL CS-102 BUTYL RUBBER SEALANT PLACEMENT DETAIL
NTS



TYPICAL ELEVATION
N.T.S.

STORM CAPTURE SC1 VAULT DETAILS - 4' INSIDE DEPTH

N.T.S.

GREGORY W.
No. RCE 68075
EXP. 06–30–17
Civil

PREPARED BY:

PASCO LARET SUITER & ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING
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REVISION 10:	08/30/16
REVISION 9:	06/10/16
REVISION 8:	10/05/15
REVISION 7:	02/18/15
REVISION 6:	07/29/13
REVISION 5:	05/28/13
REVISION 4:	05/02/13
REVISION 3:	04/0713
REVISION 2:	12/20/12
REVISION 1:	07/30/12
ORIGINAL DATE:	11/24/14

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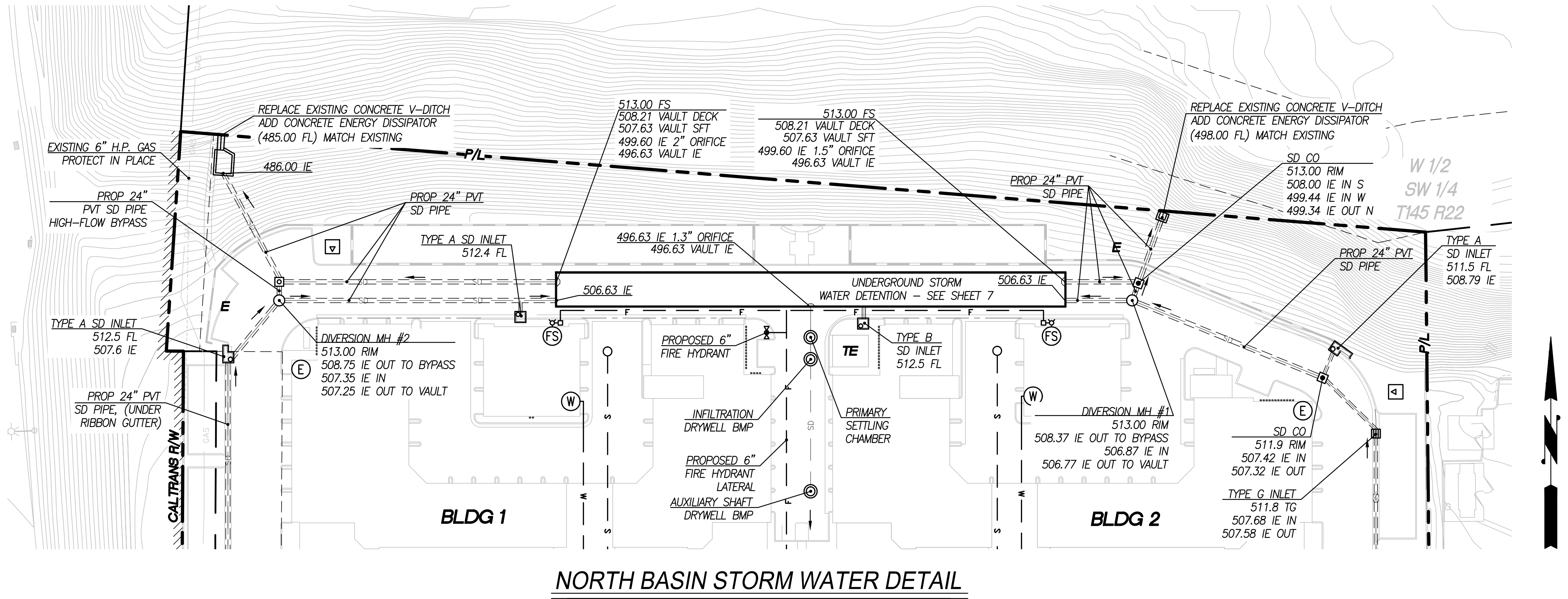
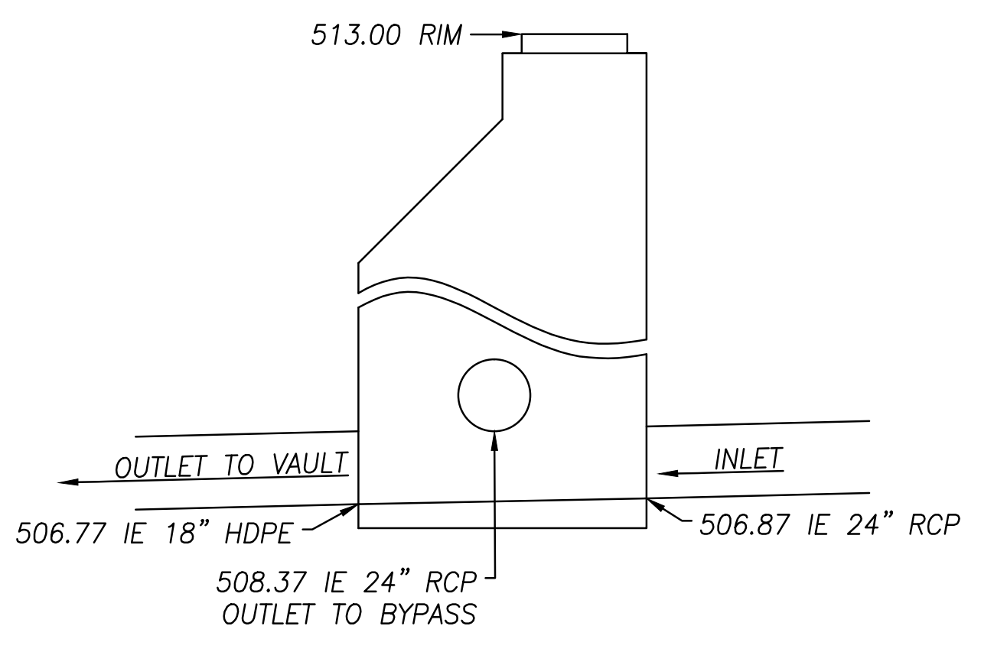
SHEET No. / TITLE:
SOUTH BASIN
STORMWATER DETAIL
SHEET 6 OF 8

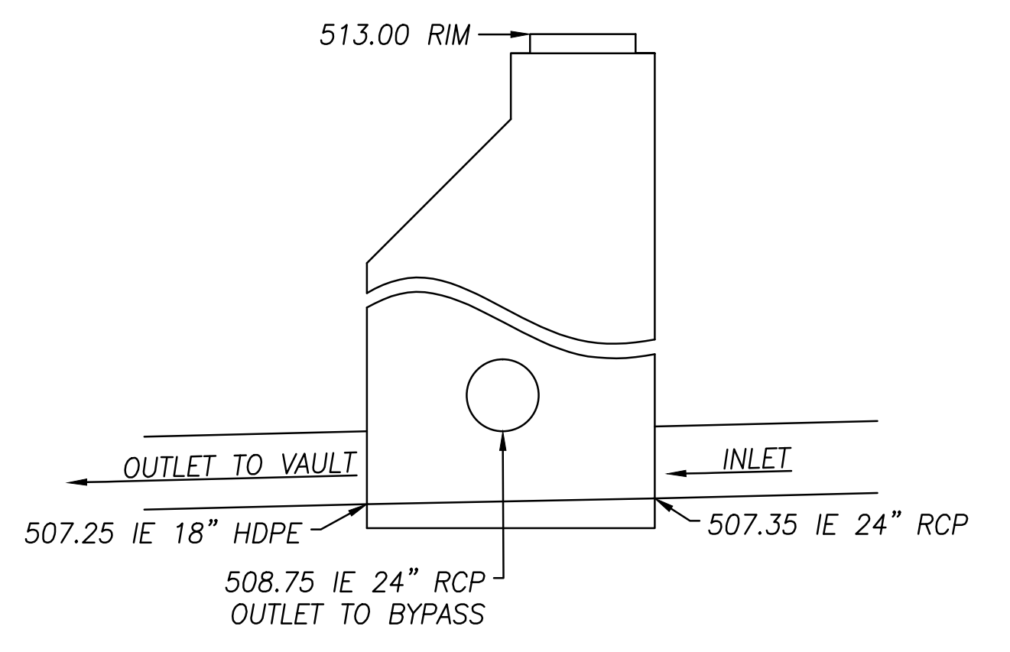


NORTH BASIN STORM WATER DETAIL

40' 20' 0 40' 80' 120'
GRAPHIC SCALE IN FEET



DIVERSION MANHOLE #1 DETAIL



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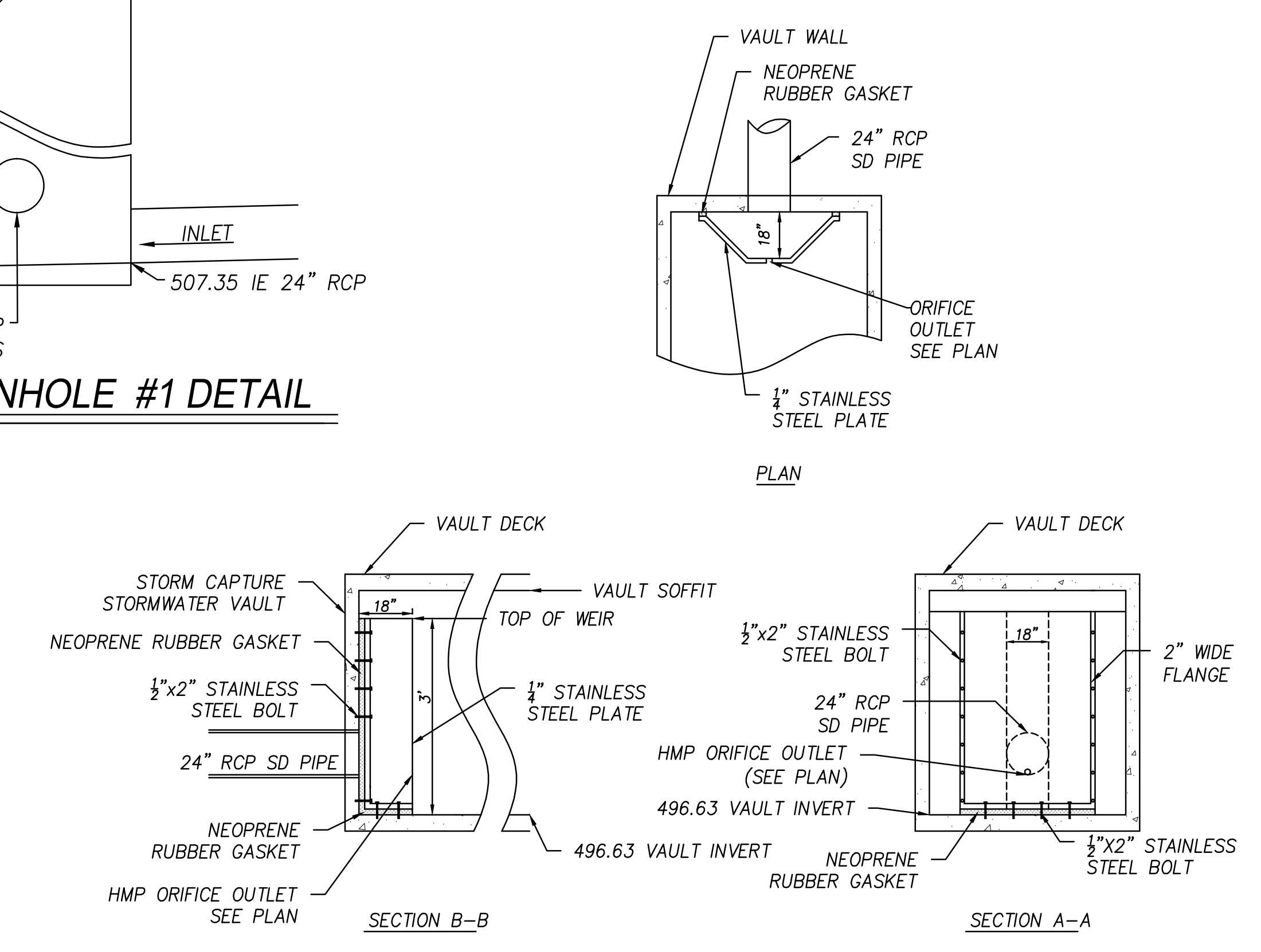
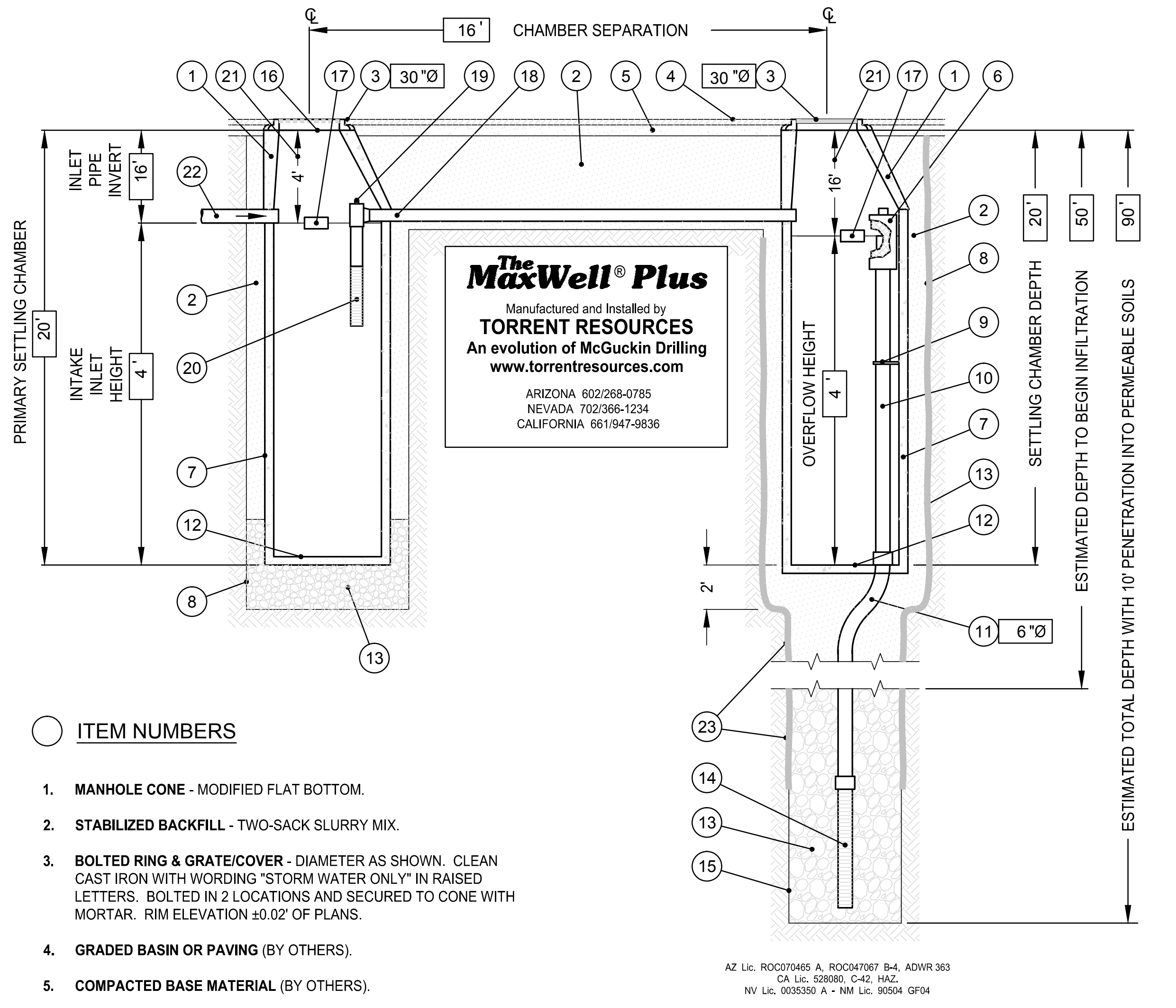


TYP. WEIR DETAIL (INSIDE VAULT)

N.T.S.

Modified MaxWell® Plus Drainage System Detail And Specifications



AZ Lic. ROC070465 A, ROC047067 B-4, ADWR 363
CA Lic. 528080, C-42, HAZ,
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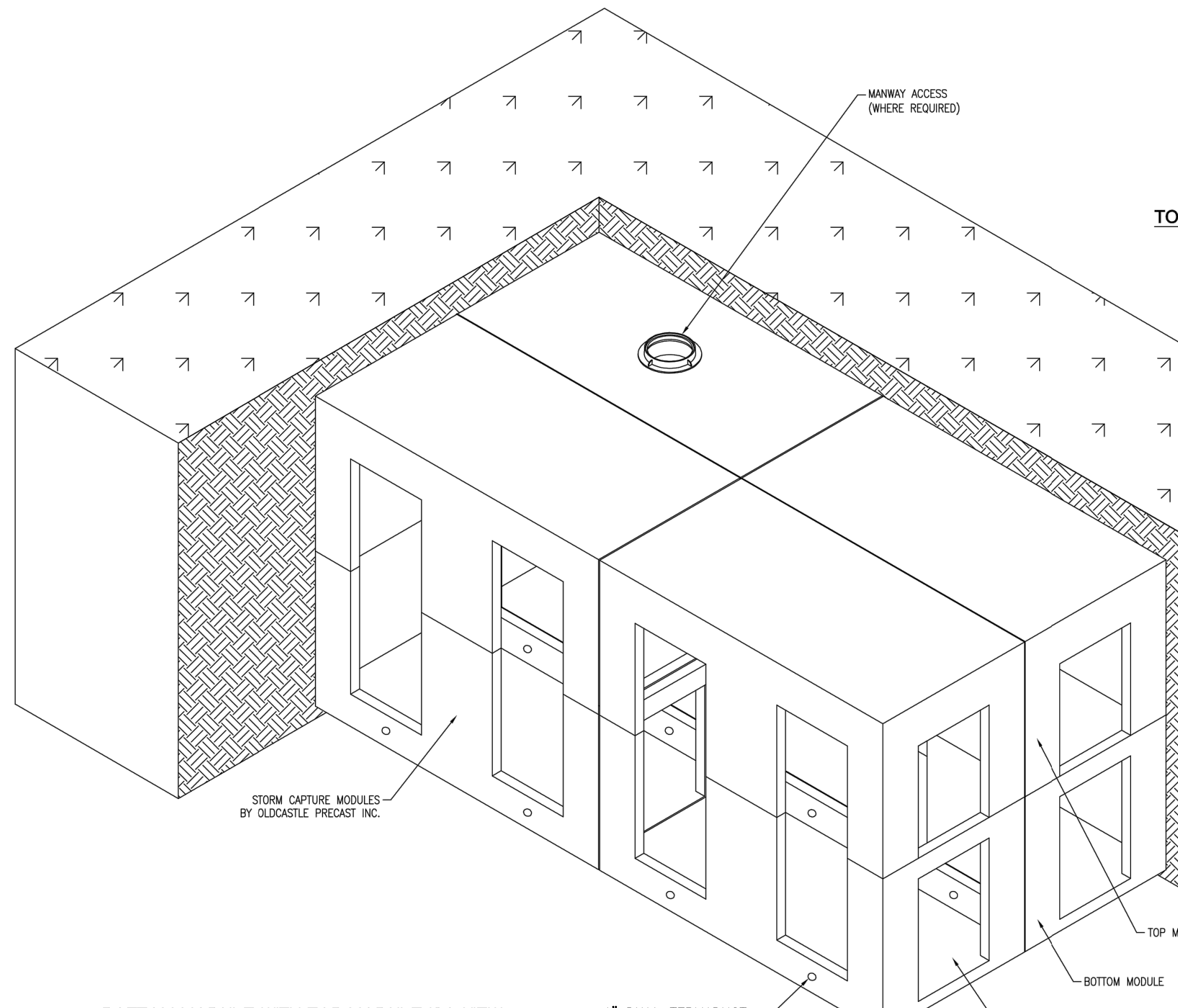
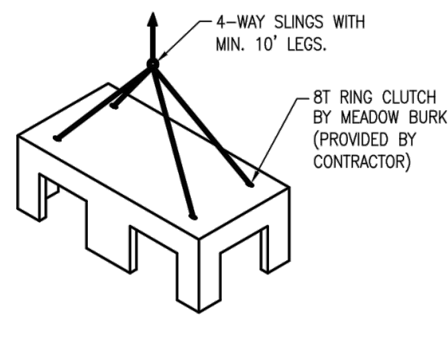


BOTTOM MODULE WITH TOP MODULE ISO VIEW
N.T.S.



TOP MODULE LIFTING DETAIL
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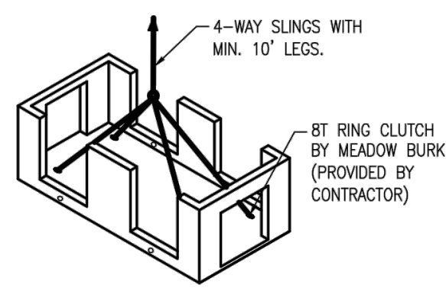

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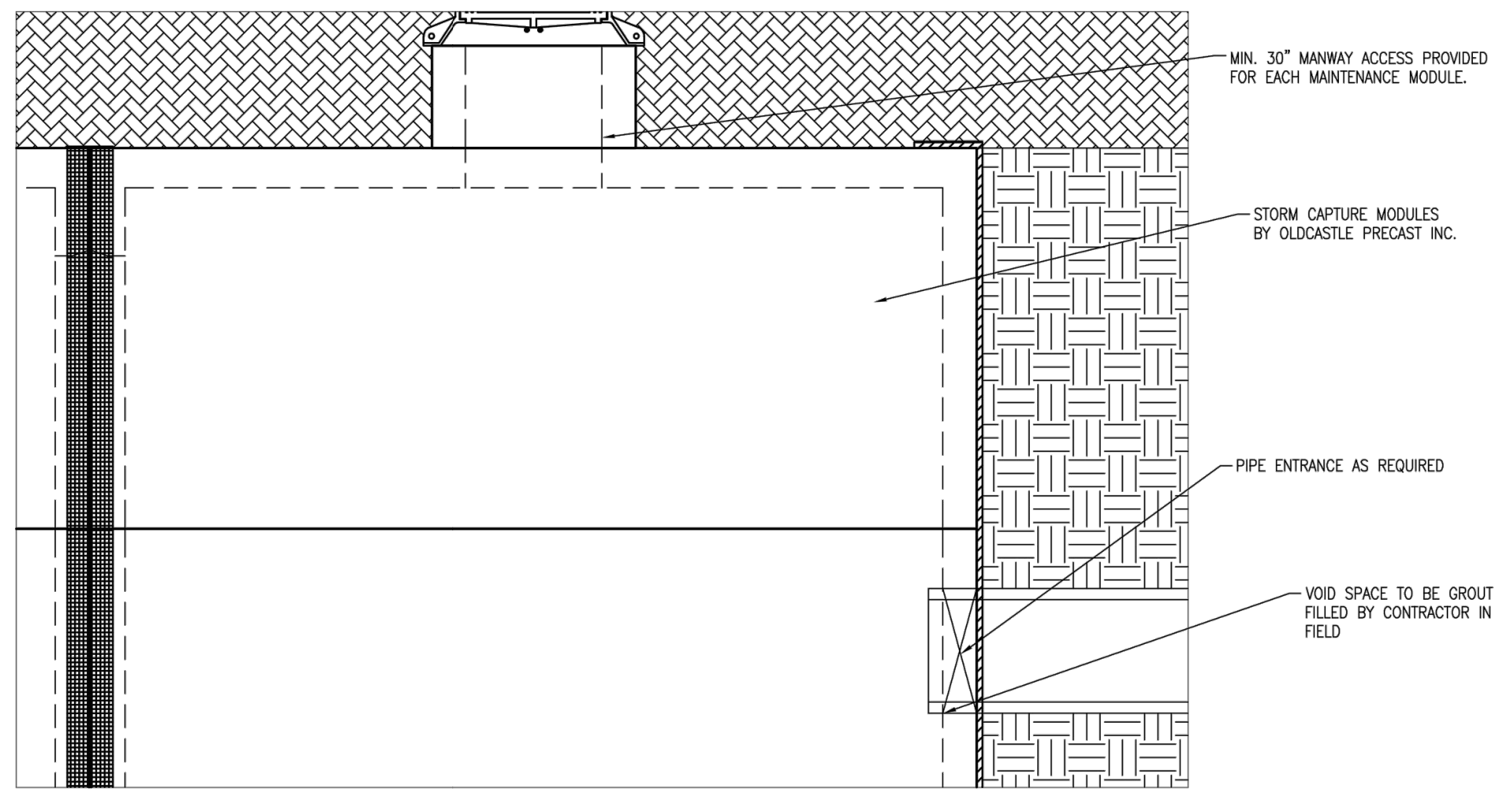
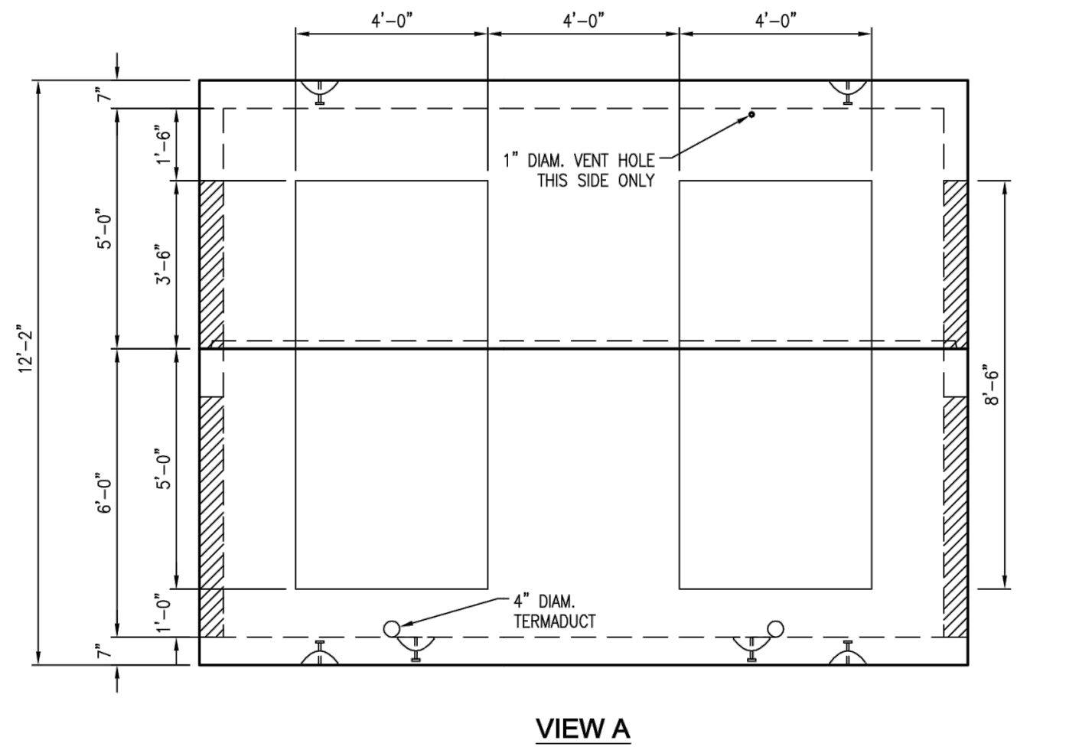
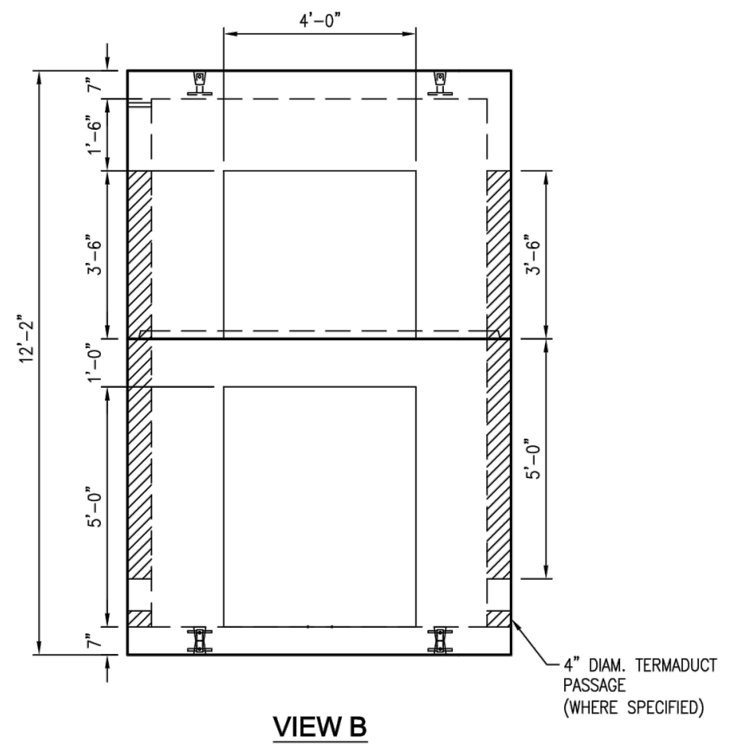


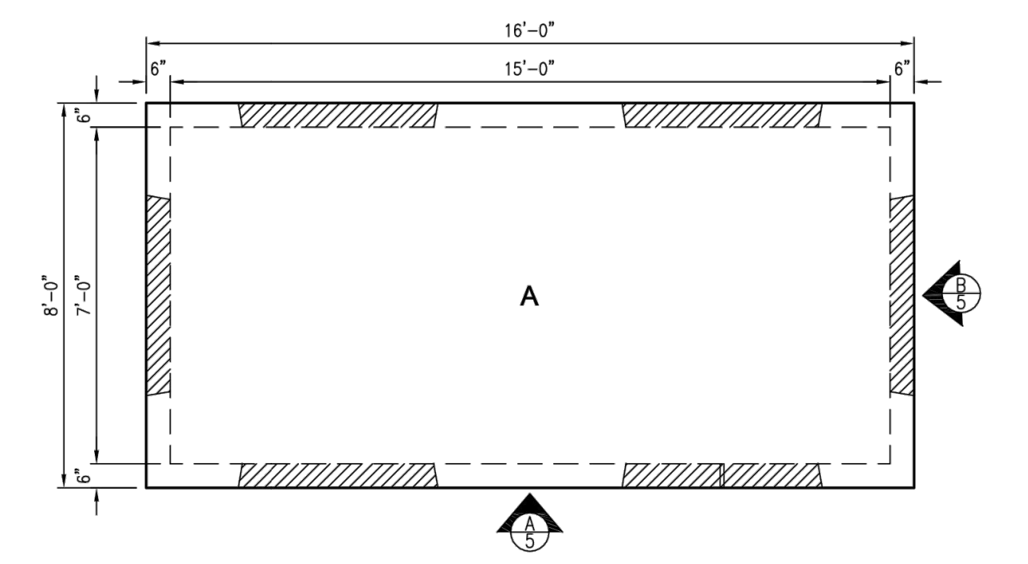
MANWAY ACCESS DETAIL
SCALE: 3/8" = 1'-0"



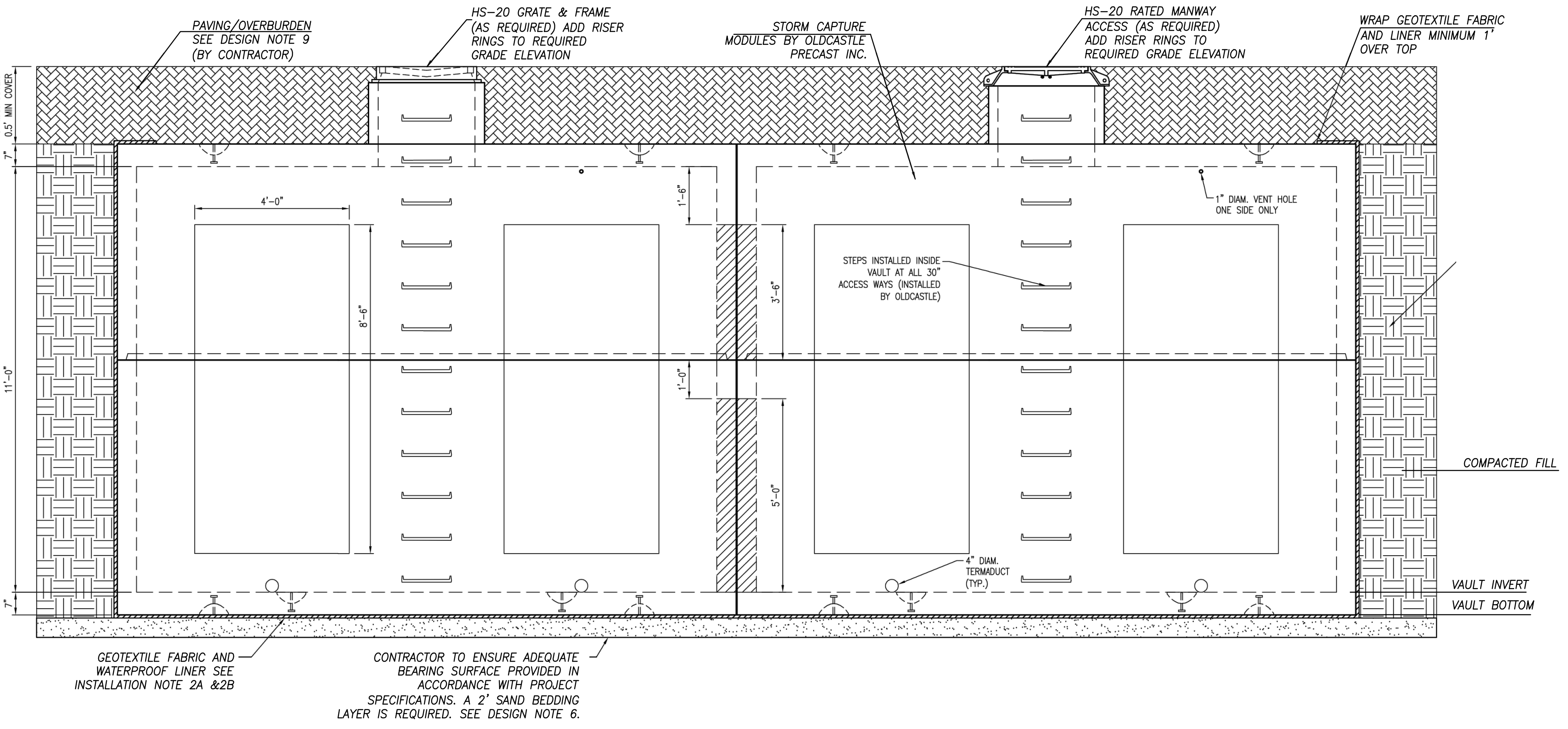
VIEW A
SCALE: 1/4" = 1'-0"



VIEW B
SCALE: 1/4" = 1'-0"



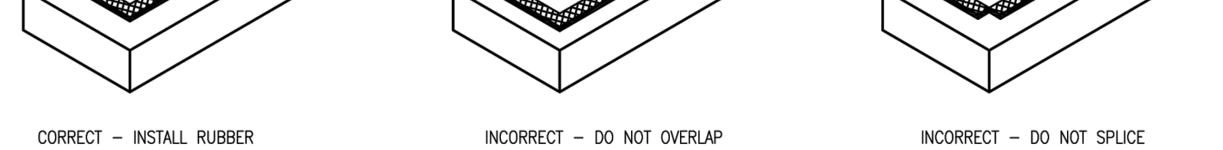
STORM CAPTURE PLAN VIEW
SCALE: 1/4" = 1'-0"



STORM CAPTURE SC2 VAULT DETAILS - 11' INSIDE DEPTH

N.T.S.

KEYWAYS MUST BE FREE OF DIRT, ROCKS, AND WATER. ROCKS AND DIRT PREVENT THE VAULT SECTIONS FROM SEATING AND SEALING PROPERLY. REMOVE ALL PROTECTIVE PAPER FROM RUBBER SEALANT MATERIAL. SPLICE RUBBER SEALANT MATERIAL WITH A "SIDE BY SIDE" JOINT, AWAY FROM CORNERS. CORNER SPLICING WILL NOT SEAL PROPERLY.



CORRECT - INSTALL RUBBER SEALANT MATERIAL AT THE OUTER EDGE OF THE KEYWAY. RUBBER SEALANT SHOULD BE CONTINUOUS AROUND CORNERS.

INCORRECT - DO NOT OVERLAP THE RUBBER SEALANT MATERIAL AT SPLICE.

INCORRECT - DO NOT SPLICE RUBBER SEALANT MATERIAL AT A CORNER. RUBBER SEALANT SHOULD BE CONTINUOUS AROUND CORNERS.

CONSEAL CS-102 BUTYL RUBBER SEALANT PLACEMENT DETAIL
NTS

GENERAL NOTES:

THE STORM CAPTURE™ SYSTEM BY OLDCASTLE PRECAST IS PART OF THE STORMWATER MANAGEMENT SYSTEM FOR THE RESPECTIVE SITE, AS PREPARED BY THE PROJECT DESIGN ENGINEER. IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO DETERMINE DESIGN FLOW RATES, PRE-TREATMENT AND POST-TREATMENT REQUIREMENTS, STORAGE VOLUME, AND ENSURE THE FINAL DESIGN MEETS ALL CONVEYANCE AND STORAGE REQUIREMENTS. SYSTEM DESIGN AND TYPE, SOIL ANALYSIS, LOADING REQUIREMENTS, COVER HEIGHT AND MODULE SIZE DETERMINE THE FOUNDATION TYPE AND REQUIREMENTS AS STATED HEREIN. ANY VARIATIONS FOUND DURING CONSTRUCTION FROM THE SITE AND SYSTEM ANALYSIS MUST BE REPORTED TO THE PROJECT DESIGN ENGINEER. THE PROJECT DESIGN ENGINEER IS RESPONSIBLE FOR OBTAINING A GEOTECHNICAL ENGINEERING REPORT VERIFYING THE BEARING CAPACITY STATED IN DESIGN NOTES.

DESIGN NOTES:

1. DESIGN LOADINGS:
   - A. AASHTO HS-20-44 W/ IMPACT.
   - B. DEPTH OF COVER = 6" - 5'-0".
   - C. ASSUMED WATER TABLE = BELOW BOTTOM.
   - D. EQUIVALENT FLUID PRESSURE = 45 PCF.
   - E. LATERAL LIVE LOAD SURCHARGE = 80 PSF.
   - F. NO LATERAL SURCHARGE FROM ADJACENT STRUCTURES.
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 6,000 PSI.
3. STEEL REINFORCEMENT: REBAR, ASTM A-615, GRADE 60.
4. CEMENT: ASTM C-150 SPECIFICATION.
5. STORM CAPTURE MODULE TYPE = DETENTION.
6. REQUIRED BASE LAYER DEPTH = 2" SAND BEDDING LAYER.
7. REQUIRED NATIVE ALLOWABLE SOIL BEARING PRESSURE = 3,000 PSF.
8. REFERENCE STANDARDS:

A. ASTM C 890
B. ASTM C 891
C. ASTM C 913

9. LESS THAN 6" OR GREATER THAN 5' OF COVER REQUIRES CUSTOM STRUCTURAL DESIGN AND MAY REQUIRE THICKER SUBGRADE.

INSTALLATION NOTES:

THE STORM CAPTURE™ MODULE SYSTEM IS TO BE INSTALLED IN ACCORDANCE WITH ASTM C891, INSTALLATION OF UNDERGROUND PRECAST UTILITY STRUCTURES. PROJECT PLAN AND SPECIFICATIONS MUST BE FOLLOWED ALONG WITH ANY APPLICABLE REGULATIONS.

1. PLAN LINE, GRADE AND ELEVATIONS MUST BE FOLLOWED.

2. A. WHERE SPECIFIED, AN 8 OZ. NON-WOVEN GEOTEXTILE FABRIC AND WATERPROOF LINER MUST BE USED AS A SEPARATION LAYER AROUND THE STORM CAPTURE SYSTEM.

   B. WHERE SPECIFIED, A CONTAINMENT MEMBRANE LINER WITH THE FOLLOWING REQUIREMENTS MUST BE USED: MIN. THICKNESS = 40 MILS, MIN.
   TENSILE STRENGTH = 600 LBS WORST DIRECTION (ASTM D5034), MIN. MULLEN BURSTING STRENGTH = 1000 PSI (ASTM D3786), AND MIN. MANUFACTURER'S WARRANTY OF 20 YEARS. WHERE THE MEMBRANE IS USED AN 8 OZ. NON-WOVEN GEOTEXTILE MUST BE PLACED ON BOTH THE INSIDE AND OUTSIDE OF THE ACTUAL CONTAINMENT MEMBRANE TO PREVENT PUNCTURES.

3. PENETRATIONS IN THE CONTAINMENT MEMBRANE MAY ONLY BE MADE WITH SMOOTH WALL PIPES. MAKE PENETRATIONS FOR ALL OUTLETS BEFORE MAKING PENETRATIONS FOR ANY INLETS.

4. ALL SUBGRADE MATERIALS IF SPECIFIED, MUST BE CLEAN, DURABLE CRUSHED AGGREGATE COMPACTED OR ROLLED TO ACHIEVE 95% STANDARD PROCTOR DENSITY. OLDCASTLE RECOMMENDS SIZE 5,56,OR 57 (PER ASTM C33).

5. DESIGNATED EMBEDDED LIFTERS MUST BE USED. USE PROPER RIGGING TO ASSURE ALL LIFTERS ARE EQUALLY ENGAGED WITH A MINIMUM 60 DEGREE ANGLE ON SLINGS AS NOTED AND IN ACCORDANCE WITH OLDCASTLE LIFTING PROCEDURES.

6. MODULES MUST BE PLACED AS CLOSE TOGETHER AS POSSIBLE, AND GAPS SHALL NOT BE GREATER THAN 3/4". ALL EXTERIOR SYSTEM JOINTS SHALL BE COVERED WITH A MIN. 8" JOINT WRAP ON SIDES AND TOP (CS-212 CONSEAL OR EQUIVALENT). IN A CLAMSHELL DESIGN INSTALL ONE ROW CS-102 CONSEAL (OR EQUIVALENT) BETWEEN PRECAST PIECES.

7. AUTHORIZATION SHOULD BE GIVEN BY THE PROJECT ENGINEER OR DESIGNATED PERSON PRIOR TO PLACEMENT ON BACKFILL FOR THE SYSTEM. CARE SHOULD BE TAKEN DURING PLACEMENT OF BACKFILL NOT TO DISPLACE MODULES OR JOINT WRAP. BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY OR AS SPECIFIED, AND SHOULD NOT BE COMPACTED WITHIN 6" OF MODULE.

8. CONSTRUCTION EQUIPMENT EXCEEDING DESIGN LOADING SHALL NOT BE ALLOWED ON STRUCTURE.

9. TERMADUCTS TO BE KNOCKED OUT AT SPECIFIED LOCATIONS IN FIELD BY OTHERS. SEE SITE LAYOUT FOR LOCATIONS.

INLETS AND RISERS:

ALL PIPE INLETS SHALL EXTEND INSIDE MODULE A MINIMUM OF 4". PLACE A NON-SHRINK, NON-METALIC GROUT, MIN. 3,000 PSI IN ANNULAR SPACE TO ELIMINATE ALL VOIDS.

STORM CAPTURE MAINTENANCE:

STORM CAPTURE MODULE - SYSTEM INSPECTION AND MAINTENANCE THE STORM CAPTURE SYSTEM EXCELS WHERE MOST OTHER SYSTEMS FAIL, INCORPORATING FEATURES PROVIDING FOR MAXIMUM SYSTEM PERFORMANCE AND LIFE CYCLE. THE STORM CAPTURE SYSTEM IS A MAJOR COMPONENT OF THE STORMWATER MANAGEMENT SYSTEM. DESIGN AND FUNCTION OF THE SYSTEM IS THE RESPONSIBILITY OF THE PROJECT ENGINEER. MAINTENANCE OF THE STORM CAPTURE IS VITAL FOR SATISFACTORY PERFORMANCE AND LIFE CYCLE OF THE STORMWATER MANAGEMENT SYSTEM. PERMIT REQUIREMENTS, LOCAL, STATE AND FEDERAL REGULATIONS, ALONG WITH OLDCASTLE AND ANY INCORPORATED DEVICE MANUFACTURER RECOMMENDATIONS MUST BE FOLLOWED FOR SYSTEM COMPLIANCE. STORM CAPTURE DESIGN PROVIDES MANWAY ACCESS FOR EASE OF INSPECTION AND DEBRIS REMOVAL IF REQUIRED. FLUSHING, WHICH CAN CAUSE PARTICLE DISPLACEMENT, UNDERMINING, AND INTERNAL DISTURBANCE, IS NOT RECOMMENDED FOR GRAVEL FOUNDATION, OPEN BOTTOM SYSTEMS. FLUSHING IS ACCEPTABLE IN SYSTEMS WITH CONCRETE BASES. INLET CONTROLS, INTERNAL OR EXTERNAL, ARE RECOMMENDED FOR CONTROLLING, MONITORING, AND MAINTAINING THE STORM CAPTURE SYSTEM.

EXTERNAL INLETS ARE TYPICALLY DEVICES THAT ARE SEPARATE FROM THE STORM CAPTURE MODULES. THESE EXTERNAL DEVICES RECEIVE SITE STORMWATER AND ARE DESIGNED WITH MANWAY ACCESS FOR MAINTENANCE AND TYPICALLY INCLUDE AN INTERNAL SUMP FOR SEDIMENT CAPTURE. EXTERNAL INLETS MAY RECEIVE SINGLE OR MULTIPLE PIPES AND INCORPORATE AN OPEN GRATED TOP WITH AN OUTFALL PIPE TO THE STORM CAPTURE SYSTEM. GRATED INLETS MAY INCORPORATE PROTECTION DEVICES OR BAFFLES TO CAPTURE FLOATABLES OR THE "FIRST FLUSH." SCHEDULED INSPECTIONS AND MAINTENANCE SHOULD INCLUDE THE REMOVAL OF ANY SEDIMENTATION BUILD-UP. DEBRIS OR SEDIMENTATION BUILD-UP SHOULD NOT EXCEED 3" BELOW AN OUTFALL ELEVATION. INTERNAL COMPONENTS CAN BE INCORPORATED FOR PRE-TREATMENT. MANUFACTURER RECOMMENDATIONS SHOULD BE FOLLOWED. SCHEDULED MAINTENANCE AND INSPECTION WILL INCLUDE REMOVAL OF DEBRIS BY MANUAL OR MECHANICAL MEANS.

MAINTENANCE MODULES (MM'S) ARE OPTIONAL INTERNAL CONTROL MODULES BASED ON DESIGN PREFERENCE. MM'S ARE MODULES WITH ROOF MANWAY ACCESS OPENINGS AND PROVIDE THE PRIMARY MEANS OF ACCESS TO THE STORM CAPTURE SYSTEM FOR SCHEDULED INSPECTION AND MAINTENANCE. IN ADDITION, MM'S CAN INCORPORATE WEIRS OR BAFFLES TO ENHANCE REDUCTION OR REMOVAL OF TOTAL SUSPENDED SOLIDS (TSS) FROM THE STORMWATER. PLACEMENT OF INTERNAL COMPONENTS MUST BE PART OF THE SYSTEM ENGINEERING AND DESIGN. GRATED INLETS CAN BE INCORPORATED TO ACCOMMODATE SURFACE STORMWATER FLOWS INTO THE STORM CAPTURE AND MAY INCLUDE AN INLET PROTECTION DEVICE. SCHEDULED INSPECTION AND MANUFACTURER RECOMMENDATIONS FOR MAINTENANCE SHOULD BE FOLLOWED.

STANDARD STORM CAPTURE MODULE DESIGN INCORPORATES"WINDOWS" TO ACCOMMODATE INTERNAL STORMWATER CONVEYANCE BETWEEN MODULES. STANDARD PLACEMENT IS 12" ABOVE THE INTERNAL MODULE INVERT. ANY SEDIMENT AND DEBRIS BUILD-UP OVER 6" INSIDE A MODULE SHOULD BE REMOVED BY MANUAL OR MECHANICAL MEANS. REMOVAL BY VACUUM IS RECOMMENDED.

GREGORY W. LANG
No. RCE 68075
EXP. 06-30-17
Civil

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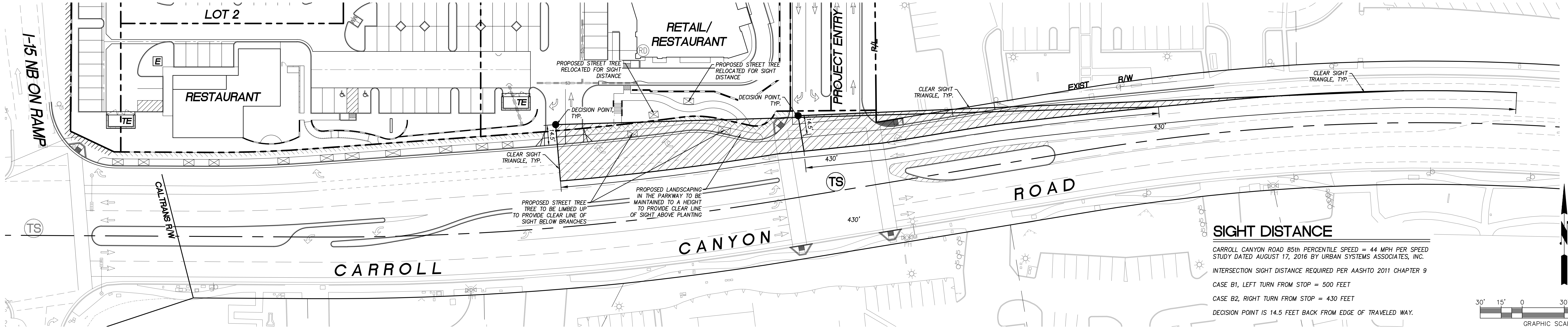
ORIGINAL DATE:	11/24/14

VESTING TENTATIVE MAP 979190 FOR:
CARROLL CANYON MIXED USE
CITY OF SAN DIEGO, CA
THIS IS A PLANNED COMMERCIAL & RESIDENTIAL DEVELOPMENT PROJECT AS DEFINED IN THE SAN DIEGO LAND DEVELOPMENT CODE

PROJECT ADDRESS:
9850 CARROLL CANYON ROAD
SAN DIEGO, CA 92177

SHEET No. / TITLE:
NORTH BASIN
STORMWATER DETAIL
SHEET 7 OF 8



SIGHT DISTANCE

CARROLL CANYON ROAD 85th PERCENTILE SPEED = 44 MPH PER SPEED STUDY DATED AUGUST 17, 2016 BY URBAN SYSTEMS ASSOCIATES, INC.

INTERSECTION SIGHT DISTANCE REQUIRED PER AASHTO 2011 CHAPTER 9

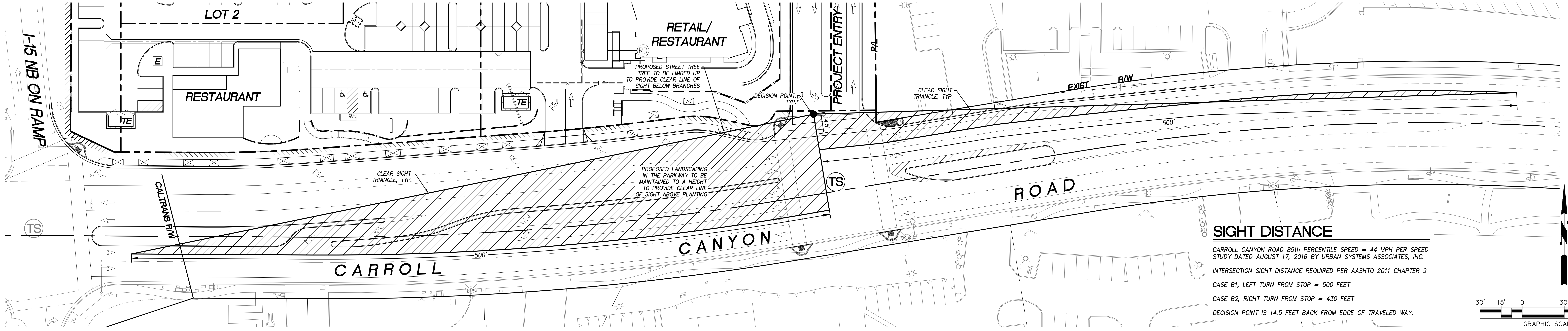
CASE B1, LEFT TURN FROM STOP = 500 FEET

CASE B2, RIGHT TURN FROM STOP = 430 FEET

DECISION POINT IS 14.5 FEET BACK FROM EDGE OF TRAVELED WAY.

CARROLL CANYON ROAD - PROPOSED RIGHT TURN MOVEMENT SIGHT DISTANCE

SCALE: 1" = 30'



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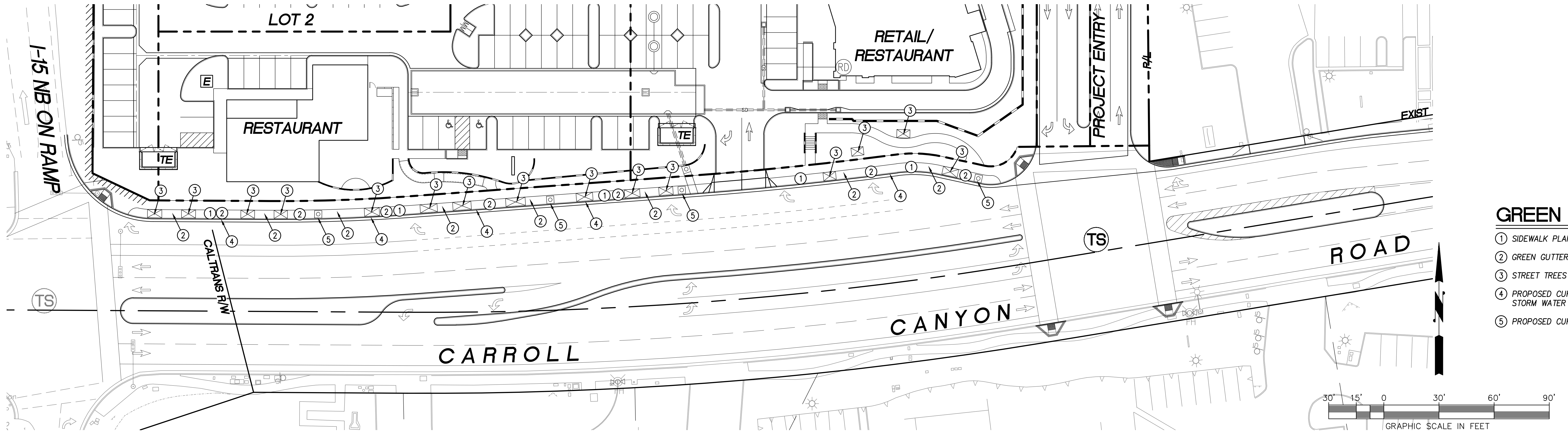
CARROLL CANYON ROAD - PROPOSED LEFT TURN MOVEMENT SIGHT DISTANCE

SCALE: 1" = 30'



GREEN STREET ELEMENTS

① SIDEWALK PLANTERS

② GREEN GUTTERS

③ STREET TREES

④ PROPOSED CURB & GUTTER WITH PERIODIC CURB BREAKS FOR STORM WATER TO FLOW INTO GREEN GUTTER

⑤ PROPOSED CURB OUTLET LOCATION FOR GREEN GUTTER FLOW

CARROLL CANYON ROAD - PROPOSED GREEN STREETS BMP PLAN

SCALE: 1" = 30'

GREGORY W. LANG
No. RCE 68075
EXP. 06-30-17
Civil

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SAN DIEGO, CA 92177

SHEET No. / TITLE:
SIGHT DISTANCE &
GREEN STREETS BMP PLAN
SHEET 8 OF 8

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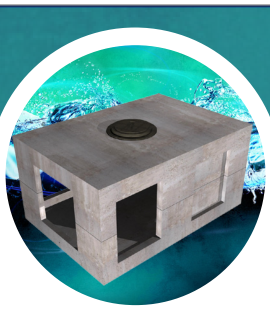
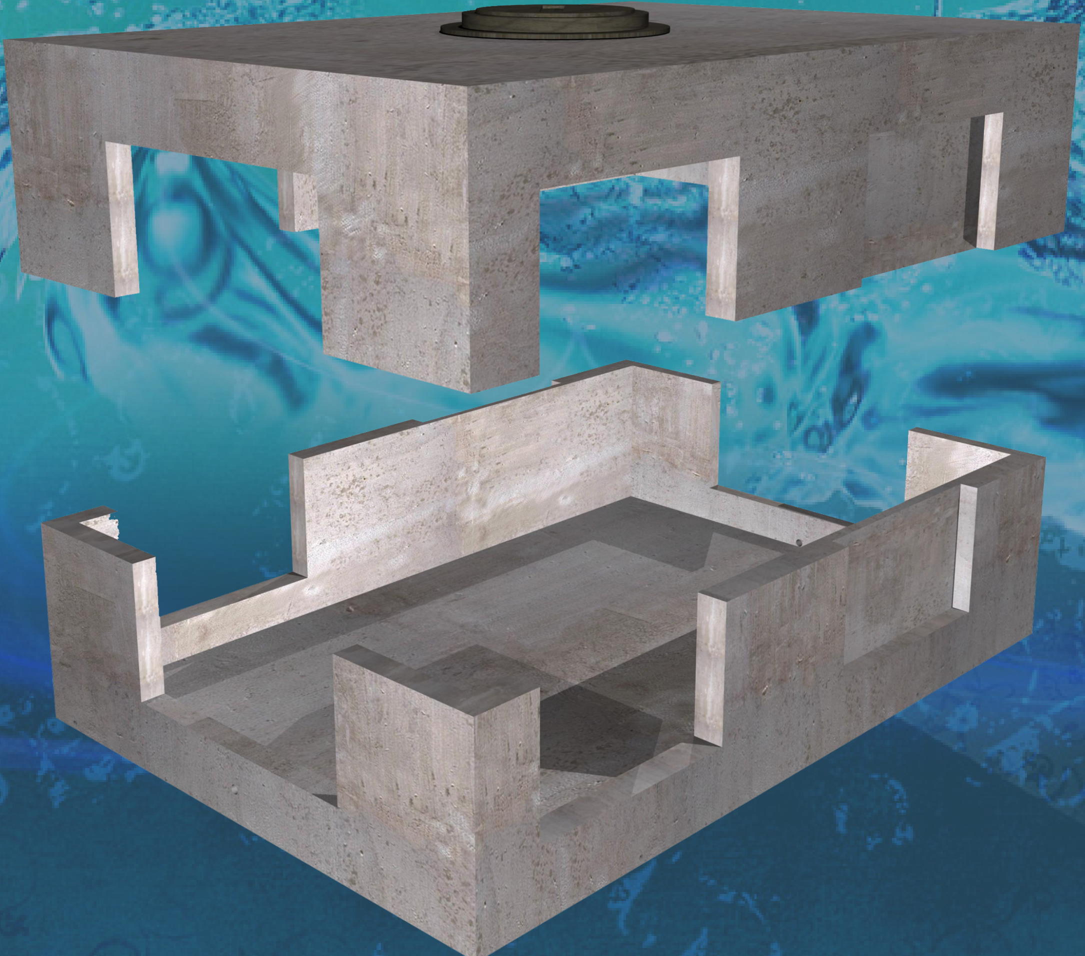


Storm Capture™

Low Impact • High Return

INSTALLATION MANUAL



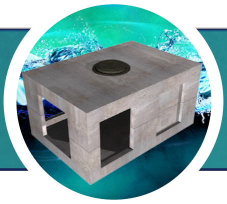
Detention • Retention • Recharge • Reuse

Oldcastle Precast®

Patent Pending

Storm Capture™

Low Impact • High Return



INSTALLATION MANUAL

Introduction

The Storm Capture™ system by Oldcastle Precast (shown in Figure 1) is part of the storm water management system for the respective site, as prepared by the project design engineer. Configurations can be arranged to accommodate a retention, detention (Figure 2), or infiltration system based on construction documents for specific site requirements.

It is the responsibility of the design engineer to determine design flow rates, pre-treatment requirements and storage volume required for the system and ensure the final design meets all conveyance and storage requirements. System design and type, soil analysis, loading requirements, cover height and module size determine the foundation type and requirements as stated herein. Any variations found during construction from the site and system analysis must be reported to the project design engineer.

The precast modules facilitate a rapid speed of installation. The Storm Capture modules provide low initial and life cycle costs and are designed for maintainability and longevity.

This manual is not intended to be all inclusive and is a reference guide only.

FIGURE 1 **Oldcastle Precast Storm Capture™**

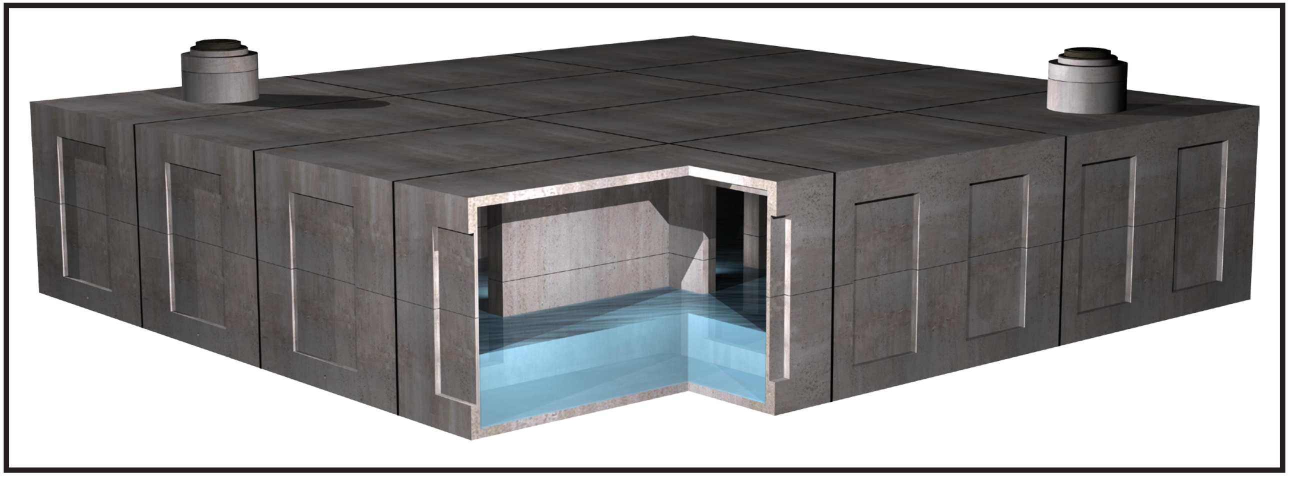


FIGURE 2 **Storm Capture system during installation process**

Patent Pending

Site Preparation

Timing

- Excavation and subgrade should be completed prior to Storm Capture delivery.

Excavation

- Depth - See Figures 3 & 4
    - *1-Piece*: Fill + Height* + 7” Minimum
    - *2-Piece*: Fill + Height* Minimum
    - *Outside Height of Storm Capture
- Excavation size should be large enough to allow access around the structure after it is installed.
- Trench sloping shall follow OSHA requirements.
- To prevent excessive water pressure build up on the outside of the modules, the site must be prepared and graded for proper drainage around the Storm Capture system.
- Dewatering is required when water level is above bottom of subgrade.

Subgrade

1. Native soil shall be level and compacted adequately to allow for 2500 psf bearing capacity. 1”-2” of sand may be used for leveling purposes.
2. Liner/geotextile
    - *1-Piece (See Figure 3):* Where specified, a non-woven geotextile must be used below crushed aggregate subgrade or where shown on the construction documents.
    - *2-Piece (See Figure 4):* Where specified, a non-woven geotextile must be used below module or where shown on the construction documents. If a waterproofing liner is used, geotextile shall be used on both the inside and outside face of the liner.
3. Aggregate Subgrade
    - *1-Piece Only (See Figure 3):* Aggregate subgrade materials must be clean, granular (size 5, 56, or 57) compacted or rolled to achieve 95% standard proctor density. The 1-Piece modules are required to be placed on a minimum of 7” of crushed aggregate subgrade.
4. Extend compacted subgrade a minimum of 2’ around expected system perimeter.
5. Subgrade must be level & compacted prior to module placement.

FIGURE 3 ***1-Piece Storm Capture Module - With Liner***

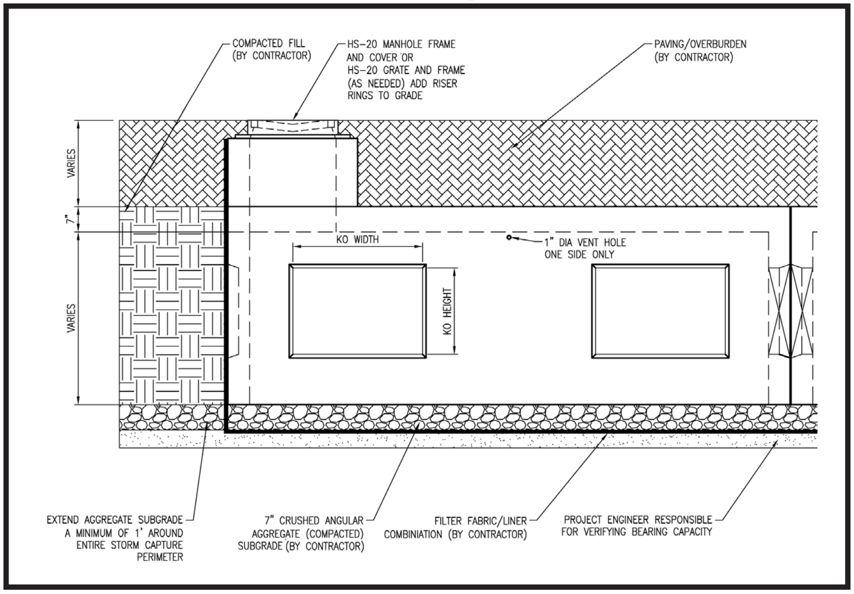
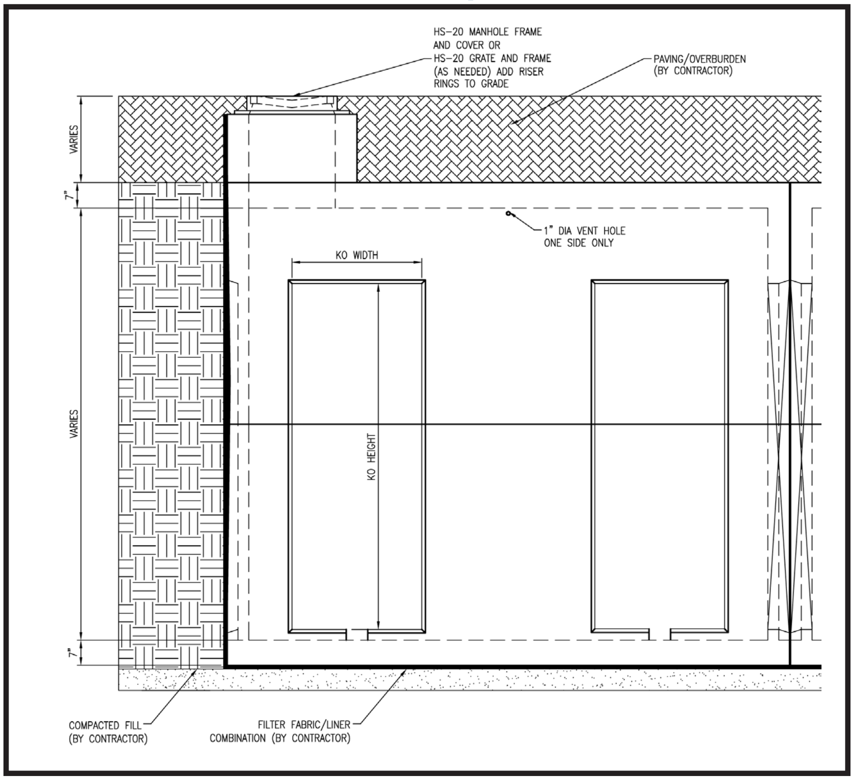


FIGURE 4 ***2-Piece Storm Capture Module - With Liner***



Note: Further investigation by a geotechnical engineer may be required where there are concerns with poor soil conditions such as low allowable bearing pressures, permafrost and freeze thaw issues.

Delivery & Installation

The Storm Capture™ module system is to be installed in accordance with ASTM C891-90, Installation of Underground Precast Utility Structures. Project plan and specifications must be followed along with any applicable regulations.

Timing

- Plan for first delivery of Storm Capture modules after site preparation has been completed.
- Placing modules has been done in as little as 10 minutes per piece.

Delivery

- Verify equipment can handle module weights as noted on construction documents prior to delivery.
- The Storm Capture Modules will be delivered on flatbed trucks.

Handling

- The Storm Capture modules are lifted by the designed embedded lifters at points provided by the precast concrete producer (Figure 5).
- Designed embedded lifters must be used. Use proper rigging to assure all lifters are equally engaged with a minimum of 60° angle on slings (Figure 6).
- Always follow safety protocols for handling Storm Capture modules during installation as illustrated below.
- Never stand under load (Figure 7).
- Never place hands in the lift gear (Figure 8).
- Never place hands under load (Figure 9).

FIGURE 5 *Embedded Lifters*

FIGURE 6 *Lifting System*

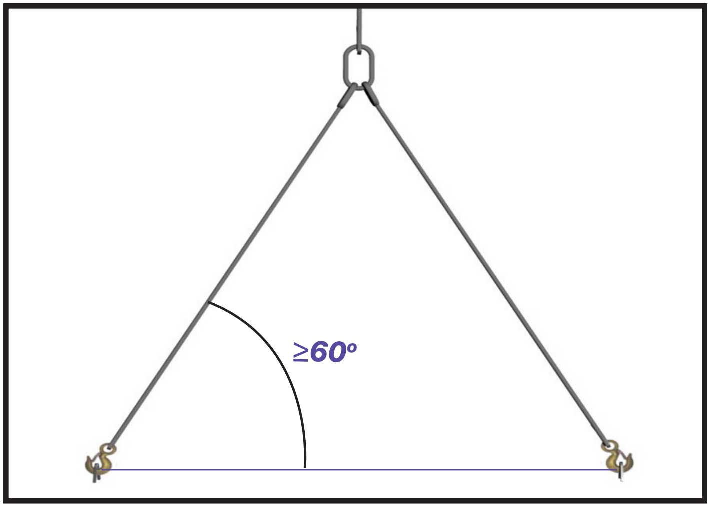
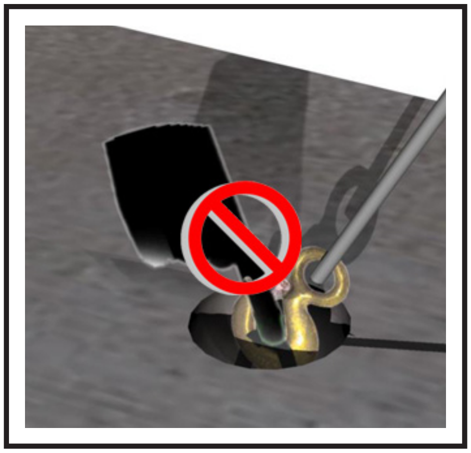


FIGURE 7

Never Under Load

FIGURE 8



No Hand In Lift Gear

FIGURE 9

No Hand Under Load

Delivery & Installation (Continued)

Placing

- Using the plan line, grade and elevations shown on the construction documents to install the modules. The subgrade must be level.
- Modules must be placed as close together as possible, but gaps shall not be greater than 3/4”.
- All exterior system joints shall be covered with a 6” joint wrap as shown in Figure 10, per approval of engineer or Oldcastle Precast.

FIGURE 10 **Sealed joints between modules**

Backfill

Once all modules are in place, backfilling can begin. Authorization should be given by the project engineer or designated person prior to placement of backfill for the system.

- Care should be taken during placement of backfill not to displace modules or joint wrap.
- Backfilling shall be in 1’ lifts with proper compaction between lifts.
- Backfill shall be typically compacted to 95% standard proctor density or as specified.
- Expansive soil material shall not be used as backfill around the structure.
- Compaction shall be adequate to support expected loads on top of system & surrounding areas. Consult the geotechnical engineer for the project.
- Storm Capture modules are ready for paving or overburden material as noted on construction documents (Figure 11). Finished grade/paving/landscaping shall be per construction documents.
- Construction equipment exceeding design loading shall not be allowed on structure.

FIGURE 11 **Backfill**

Installation is now complete.

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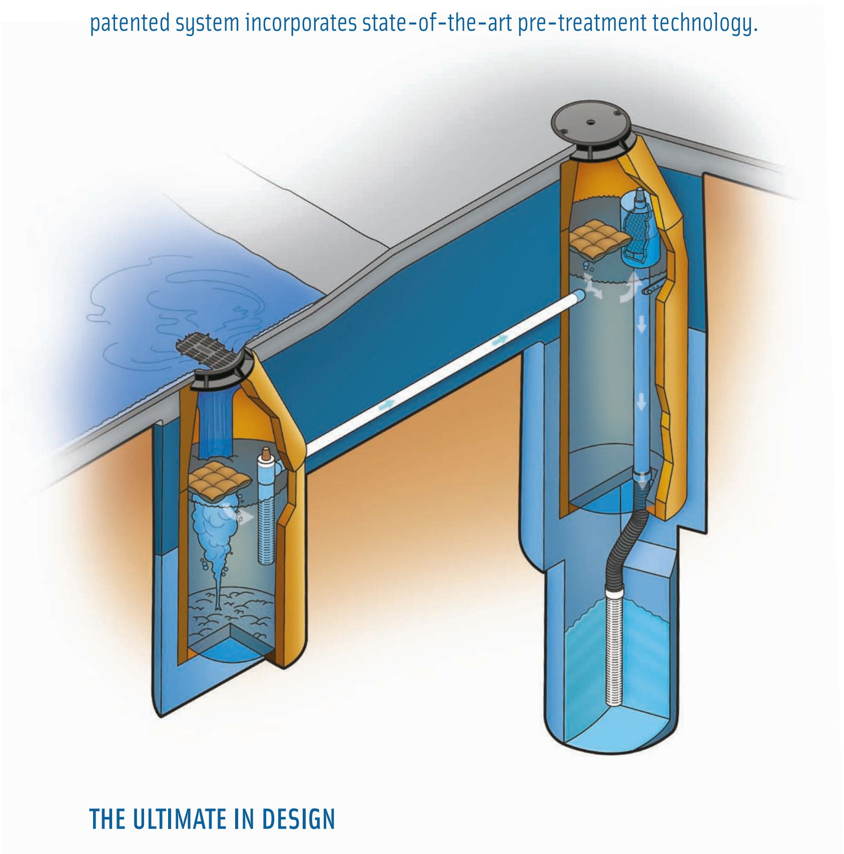


THE ULTIMATE IN DESIGN

Since 1974, nearly 65,000 MaxWell® Systems have proven their value as a cost-effective solution in a wide variety of drainage applications. They are accepted by state and municipal agencies and are a standard detail in numerous drainage manuals. Many municipalities have recognized the inherent benefits of the MaxWell Plus and now require it for drainage of all paved surfaces.

SUPERIOR PRE-TREATMENT

Industry research, together with Torrent Resources' own experience, have shown that initial storm drainage flows have the greatest impact on system performance. This "first flush" occurs during the first few minutes of runoff, and carries the majority of sediment and debris. Larger paved surfaces or connecting pipes from catch basins, underground storage, etc. can also generate high peak flows which may strain system function. In addition, nuisance water flows require controlled processing separate from normal storm runoff demands.

Manufactured and Installed Exclusively by Torrent Resources Incorporated
Please see reverse side for additional information
U.S. Patent No. 4,923,330

In the ***MaxWell® Plus,*** preliminary treatment is provided through collection and separation in deep large-volume settling chambers. The standard MaxWell Plus System has over 2,500 gallons of capacity to contain sediment and debris carried by incoming water. Floating trash, paper, pavement oil, etc. are effectively stopped by the **PureFlo®** Debris Shields in each chamber. These shielding devices are equipped with an effective screen to filter suspended material and are vented to prevent siphoning of floating surface debris as the system drains.

EFFECTIVE PROCESSING

Incoming water from the surface grated inlets or connecting pipes is received in the Primary Settling Chamber where silt and other heavy particles settle to the bottom. A PureFlo Debris Shield ensures containment by trapping floating debris and pavement oil. The pre-treated flow is then regulated to a design rate of up to 0.25cfs and directed to a Secondary Settling Chamber. The settling and containment process is repeated, thereby effectively achieving controlled, uniform treatment. The system is drained as water rises under the PureFlo Debris Shield and spills into the top of the overflow pipe. The drainage assembly returns the cleaned water into the surrounding soil through the **FloFast®** Drainage Screen.

ABSORBENT TECHNOLOGY

Both MaxWell Plus settling chambers are equipped with absorbent sponges to provide prompt removal of pavement oils. These floating pillow-like devices are 100% water repellent and literally wick petrochemical compounds from the water. Each sponge has a capacity of up to 128 ounces to accommodate effective, long-term treatment. The absorbent is completely inert and will safely remove runoff constituents down to rainbow sheens that are typically no more than one molecule thick.

SECURITY FEATURES

MaxWell Plus Systems include bolted, theft-deterrent, cast iron gratings and covers as standard security features. Special inset castings which are resistant to loosening from accidental impact are available for use in landscaped applications. Machined mating surfaces and "Storm Water Only" wording are standard.

THE MAXWELL FIVE-YEAR WARRANTY

Innovative engineering, quality materials and exacting construction are standard with every MaxWell System designed, manufactured and installed by Torrent Resources Incorporated. The MaxWell Drainage Systems Warranty is the best in the industry and guarantees against failures due to workmanship or materials for a period of five years from date of completion.

MAXWELL® PLUS DRAINAGE SYSTEM DETAIL AND SPECIFICATIONS

CALCULATING MAXWELL PLUS REQUIREMENTS:

The type of property, soil permeability, rainfall intensity and local drainage ordinances determine the number and design of MaxWell Systems. For general applications draining retained stormwater, use one standard ***MaxWell® Plus*** per the instructions below for up to 5 acres of landscaped contributory area, and up to 2 acres of paved surface. To drain nuisance water flows in storm runoff systems, add a remote inlet to the system. For smaller drainage needs, refer to our ***MaxWell® IV***. For industrial drainage, our ***Envibro® System*** may be recommended. For additional considerations, please refer to **"Design Suggestions For Retention And Drainage Systems"** or consult our Design Staff.

COMPLETING THE MAXWELL PLUS DRAWING

To apply the MaxWell Plus drawing to your specific project, simply fill in the blue boxes per the following instructions. For assistance, please consult our Design Staff.

PRIMARY SETTLING CHAMBER DEPTH

The overall depth of the Primary Settling Chamber is determined by the amount of surface area being drained. Use a standard depth of **15 feet** for the initial acre of contributory drainage area, **plus 2 feet** for each additional acre, up to the design limits of the property type noted in "Calculating MaxWell Plus Requirements" noted above. Other conditions that would require increased chamber depths are property usage, maintenance scheduling, and severe or unusual service conditions. Connecting pipe depth may dictate deeper chambers so as to maintain the effectiveness of the settling process. Maximum chamber depth is 25 feet. A pump and lift station is recommended for systems with deeper requirements.

ESTIMATED TOTAL DEPTH

The Estimated Total Depth is the approximate total system depth required to achieve 10 continuous feet of penetration into permeable soils, based upon known soil information. Torrent utilizes specialized **"crowd"** equipped rigs to get through the difficult cemented soil and to reach clean drainage soils at depths up to **180 feet.** An extensive drilling log database is available to use as a reference.

SETTLING CHAMBER DEPTH

On MaxWell Plus Systems of over 30 feet overall depth and up to 0.25cfs design rate, the standard Settling Chamber Depth is **18 feet.** Maximum chamber depth is 25 feet.

OVERFLOW HEIGHT

The Overflow Height and Secondary Settling Chamber Depth determine the effectiveness of the settling process. The higher the overflow pipe, the deeper the chamber, the greater the settling capacity. An overflow height of **13 feet** is used with the standard settling chamber depth of **18 feet.**

DRAINAGE PIPE

This dimension also applies to the **PureFlo®** Debris Shields, the **FloFast®** Drainage Screen, and fittings. The size is based upon system design rates, multiple primary settling chambers, soil conditions, and need for adequate venting. Choices are 6", 8", or 12" diameter. Refer to our company's **"Design Suggestions for Retention and Drainage Systems"** for recommendations on which size best matches your application.

BOLTED RING & GRATE/COVER

Standard models are quality cast iron and available to fit 24" Ø or 30" Ø manhole openings. All units are bolted in two locations with wording "Storm Water Only" in raised letters. For other surface treatments, please refer to "Design Suggestions for Retention and Drainage Systems."

INLET PIPE INVERT

Pipes up to 12" in diameter from catch basins, underground storage, etc. may be connected into the primary settling chamber. Larger pipe diameters dictate the use of manhole material for the primary setting chamber with 48" grates on the cone. Inverts deeper than 5 feet will require additional depth in both system settling chambers to maintain respective effective settling capacities.

INTAKE INLET HEIGHT

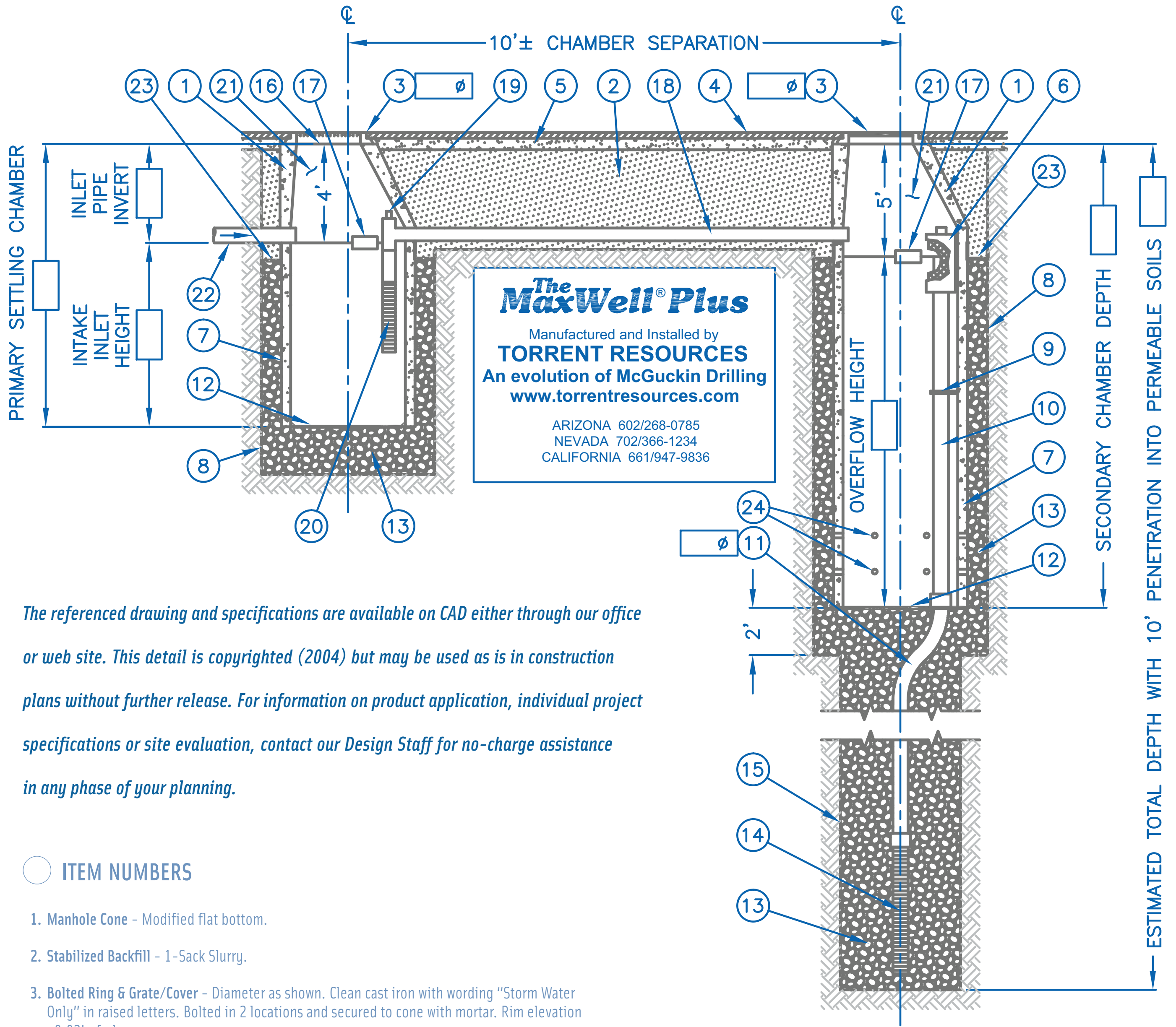
The Intake Inlet Height determines the effectiveness of the settling process in the Primary Settling Chamber. A minimum inlet height of **11 feet** is used with the standard primary settling chamber depth of 15 feet. Greater inlet heights would be required with increased system demands as noted in Primary Settling Chamber Depth. Freeboard Depth Varies with inlet pipe elevation. Increase primary/secondary settling chamber depths as needed to maintain all inlet pipe elevations above connector pipe overflow.

CHAMBER SEPARATION

The standard separation between chambers is **10 feet** from center to center.

Soil conditions and deeper inverts may dictate required variations in chamber separation.

The MaxWell® Plus Drainage System Detail And Specifications



The referenced drawing and specifications are available on CAD either through our office or web site. This detail is copyrighted (2004) but may be used as is in construction plans without further release. For information on product application, individual project specifications or site evaluation, contact our Design Staff for no-charge assistance in any phase of your planning.

AZ Lic. ROC070465 A, ROC047067 B-4, ADWR 363
CA Lic. 528080, C-42, HAZ.
NV Lic. 0035350 A - NM Lic. 90504 GF04

ITEM NUMBERS

1. **Manhole Cone** - Modified flat bottom.
2. **Stabilized Backfill** - 1-Sack Slurry.
3. **Bolted Ring & Grate/Cover** - Diameter as shown. Clean cast iron with wording "Storm Water Only" in raised letters. Bolted in 2 locations and secured to cone with mortar. Rim elevation ±0.02' of plans.
4. **Graded Basin or Paving** (by Others).
5. **Compacted Base Material** (by Others).
6. **PureFlo® Debris Shield** - Rolled 16 Ga. steel X 24" length with vented anti-siphon and internal .265" Max. SWO flattened expanded steel screen X 12" length. **Fusion bonded epoxy coated.**
7. **Pre-cast Liner** - 4000 PSI concrete 48" ID. X 54" OD. **Center in hole** and align sections to **maximize bearing surface.**
8. **Min. 6' Ø Drilled Shaft.**
9. **Support Bracket** - Formed 12 Ga. steel. **Fusion bonded epoxy coated.**
10. **Overflow Pipe** - Sch. 40 PVC mated to drainage pipe at base seal.
11. **Drainage Pipe** - ADS highway grade with TRI-A coupler. **Suspend pipe** during backfill operations to prevent buckling or breakage. Diameter as noted.
12. **Base Seal** - Geotextile or concrete slurry.
13. **Rock** - Washed, sized between 3/8" and 1-1/2" to **best complement soil conditions.**
14. **FloFast® Drainage Screen** - Sch. 40 PVC 0.120" slotted well screen with 32 slots per row/ft. Diameter varies 120" overall length with TRI-B coupler.
15. **Min. 4' Ø Shaft** - Drilled to **maintain permeability** of drainage soils.
16. **Fabric Seal** - U.V. Resistant Geotextile - **To be removed by customer** at project completion.
17. **Absorbent** – Hydrophobic Petrochemical Sponge. Min 128 oz. capacity.
18. **Connector Pipe** – 4" Ø Sch. 40 PVC.
19. **Anti-Siphon Vent** with flow regulator.
20. **Intake Screen** – Sch. 40 PVC 0.120" modified slotted well screen with 32 slots per row/ft. 48" overall length with TRI-C end cap.
21. **Freeboard Depth Varies** with inlet pipe elevation. Increase primary/secondary settling chamber depths as needed to maintain all inlet pipe elevations above connector pipe overflow.
22. **Optional Inlet Pipe** (by Others).
23. **Moisture Membrane** – 6 mil. Plastic. Place securely against eccentric cone and hole sidewall. Used in lieu of slurry in landscaped areas.
24. **Eight** – (8) **perforations per foot,** 2 row minimum.

Appendix 5

Drainage Report

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

PRELIMINARY DRAINAGE STUDY

Carroll Canyon Mixed Use Project

Tentative Map 979190

PTS#: 240716

APN 363-360-28
Parcel 1 Parcel Map 4337
9850 Carroll Canyon Road
San Diego, CA 92177

Prepared By:

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October 2015
Updated June 2016

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APPENDICES

A. Existing Hydrology Map and Calculations

B. Proposed Hydrology Map and Calculations

C. Detention Basin Calculations

REFERENCES

City of San Diego Drainage Design Manual, 1984
City of San Diego Stormwater Standards,
August 2015

INTRODUCTION

This report presents the preliminary drainage study for the Carroll Canyon Mixed Use Project, Vesting Tentative Parcel Map. This report will present the preliminary drainage design for the project and compare peak runoff rates for existing and proposed conditions.

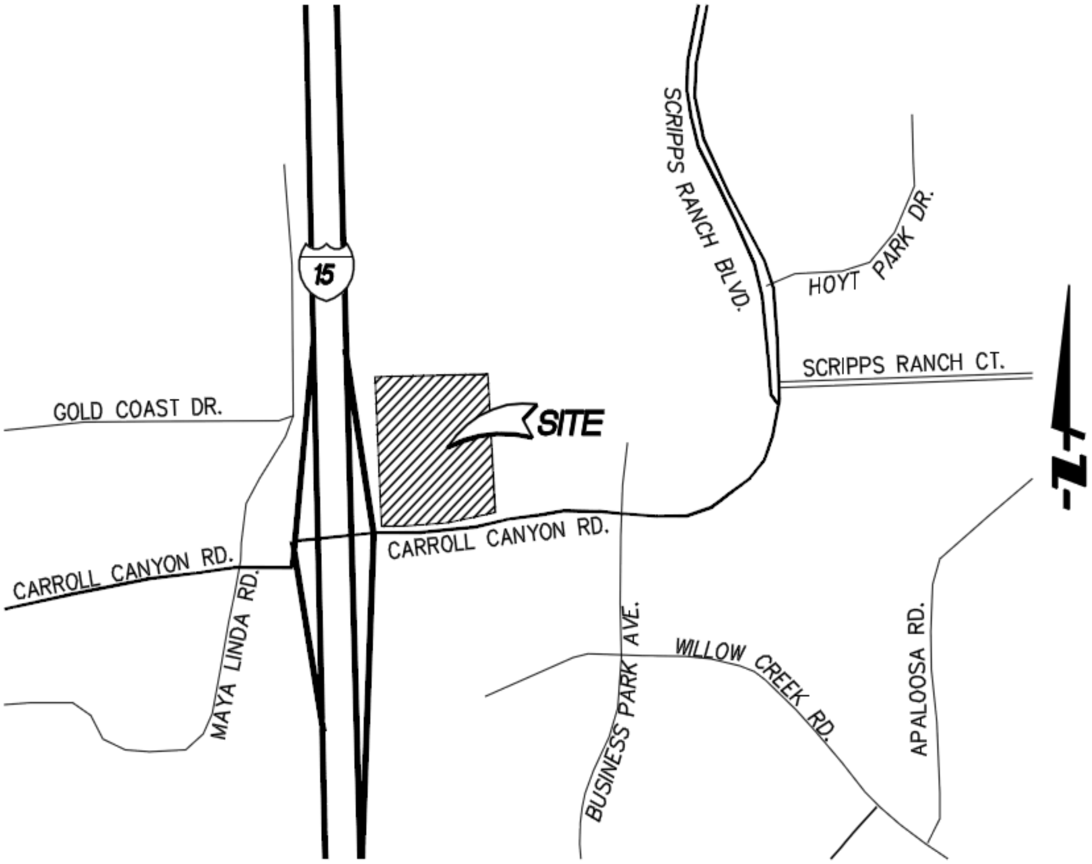
PROJECT DESCRIPTION

The project site is located within the Scripps Ranch Business Park in San Diego, California. The site is located east of the Interstate I-15, north of Carroll Canyon Road, east of an adjacent commercial development, and south of an existing Canyon and Scripps Ranch High School.

The project area consists of 9.5 acres of developed land which is zoned IP-2-1. The existing site is currently developed with two buildings, parking areas, landscaping, and miscellaneous improvements. The project proposes to demolish and scrape the existing surface improvements in preparation for a new development. The new development will include three commercial/ retail buildings and 5 4 story residential building including a large amenities area, pool and fitness center. The project will also include new parking areas, drive aisles and landscaping areas onsite. The offsite improvements for Carroll Canyon Road include the road widening, meandering sidewalk, a median, and a traffic signal at the main driveway entrance.

PROJECT VICINITY MAP

Project Name: Carroll Canyon Mixed Use Project
Permit Application Number: PTS 240716



WATERSHED DESCRIPTIONS

This project site is located within the Miramar Reservoir Hydrologic Area (HA 906.10) within the Penasquitos Hydrologic Unit. The site is tributary to Carroll Canyon Creek, Soledad Canyon, and the Los Penasquitos Lagoon. The site is not located within a FEMA flood hazard zone.

EXISTING CONDITION

The existing site topography is mostly flat with grades between 1% and 5%, except for a two-to-one slope near the northerly property line which slopes down to an existing canyon to the north. The southern portion of the site slopes south toward Carroll Canyon Road. The site is developed with approximately 60% impervious areas including two buildings, parking areas, and hardscape. It is assumed that the native soil is Type D in accordance with the Drainage Design Manual. Please see the Existing Hydrology exhibit in the appendix for reference.

The project site was divided into two major drainage basins based on downstream confluence points. Basin A (inclusive of A1, A2, and A3) consists of 6.97 acres of the northern and western areas of the project site. These areas drain north and west and confluence near the existing Caltrans box culvert northwest of the project site. This box culvert conveys runoff from the canyon and surrounding areas west under the Interstate I-15. Basin B consists of 2.55 acres of the south east portion of the site which drains south toward Carroll Canyon Road. Carroll Canyon road drains east via curb and gutter flow. For the purposes of this study, no offsite and downstream basin analysis was performed.

Existing Basin A

Basin A includes three sub-basins denoted as Basins A1, A2, and A3 which confluence at the Caltrans box culvert to the northwest of the project site. These three sub-basins were delineated based upon the discharge location from the project site. Basin A1 slopes to the north and drains into the canyon via a concrete ditch. Basin A2 drains west toward an existing graded ditch, and north toward the canyon. Discharge from Basin A2 is conveyed into the canyon via a concrete ditch. Basin A3 includes a portion of landscaped area near the southwest corner of the site. Runoff from this area drains to a sump prior to overtopping into the Caltrans right-of-way. Discharge from Basin A3 is conveyed north along the Interstate I-15 onramp where it is captured via a Caltrans catch basin and conveyed toward the box culvert.

Existing Basin B

Basin B includes the southeastern portions of the site which discharge to the curb and gutter of Carroll Canyon Road. A series of catch basins capture and convey runoff via underground storm drain toward two curb outlets which discharge to Carroll Canyon Road. The southerly portions of Basin B slope south and drain over the curb into Carroll Canyon Road. The confluence point for Basin B is in the curb and gutter of Carroll Canyon Road near the southeast corner of the property.

PROPOSED CONDITION

In proposed conditions, the site topography will be mostly flat with grades between 1% and 5%. The impervious areas will be increased due to the new buildings, hardscape, and parking areas. Pervious pavements will be utilized in lieu of standard pavement where feasible to mitigate a portion of the increased impervious areas. The impervious area will be increased to approximately 74% after accounting for pervious pavements in select parking areas. The onsite drainage design was governed by honoring the existing drainage basin boundary acreage of Basins A and B. Water Quality retention and infiltration is proposed for the DCV and Hydro modification Management Plan (HMP) facilities will be implemented to mitigate retention requirements and the potential increase in storm water runoff rates due to the proposed increase in impervious areas. Please see the Storm water retention / Hydro modification Management section of this report for more details.

Proposed Basin A

The proposed total acreage of Basin A will match the existing acreage. However, the sub-basin areas will be modified from existing conditions. The acreage of Basin A1will be increased from existing conditions. The proposed acreage of Basin A2 will be decreased from existing conditions. The existing Basin A3 which previously discharged into the Caltrans right of way will be eliminated, and this area will be re-routed into Basin A1 and B. Any increases in peak flow discharge from A1 will be mitigated through the implementation of onsite detention. The net effect on downstream drainage facilities of trading sub-basin areas will be negligible since these sub-basins confluence near the Caltrans box culvert.

Basin A1 will consist of the northeast portion of the site and discharge to Control Point 1. Runoff from this basin will be captured by a storm drain system and routed through a vault system below grade. The vault system outlets will discharge the DCV into the Drywell for infiltration and discharge the HMP volume into the existing easterly concrete ditch which drains north into the canyon. Basin A2 will consist of the north and western portions of the site and discharge to Control Point 2. Runoff from Basin A2 will be captured and conveyed via an underground storm drain system to the same vault system at the north center of the site. The vault system outlets will discharge the DCV into the Drywell for infiltration and discharge the HMP volume into the existing westerly concrete ditch which discharges north into the canyon.

Proposed Basin B

The proposed acreage of Basin B will match the existing acreage. Basin B will consist of the south portion of the site and include the retail buildings, and parking areas. Runoff from Basin B area will be captured by a series of storm drain inlets and conveyed via surface and underground storm drains to the underground retention vault. The detention system will discharge the DCV volume the Infiltration Drywell and the HMP discharge to Carroll Canyon Road via a curb outlet. The DCV and HMP storage volumes forhe southerly portions of Basin B, including some landscaping areas and driveway entrances which are not feasible for capture will have been included in the vault volume sizing. Otherwise these landscape frontage areas and main driveway entrance will discharge into Carroll Canyon Road gutter system.

HYDROLOGY RESULTS

EXISTING CONDITION

Calculations were performed to determine the existing condition discharge during a storm event. The 50-year design storm was selected in accordance with the City of San Diego Drainage Design Manual, Section 1-102.2.3.B. See the Methodology section in this report for more details. The following table summarizes the peak discharge at the major points of concentration. Please refer to the Existing Hydrology exhibit in the appendix.

Table 1: Existing Hydrology Summary

Basin	Point of Concentration	Area (ac)	Average Runoff Coefficient	Time of Concentration (min)	Q_{50} (cfs)
A1	CP 1	1.43	0.63	10.13	2.97
A2	CP 2	4.81	0.69	14.71	8.96
A3	CP 3	0.73	0.50	13.62	1.02
A (Total)		6.97	-	-	-
B	CP B	2.55	0.59	21.39	3.46

For detailed hydrology calculations please see Appendix A.

PROPOSED CONDITION

Calculations were performed to determine the proposed condition discharge during a storm event. The 50-year design storm was selected in accordance with the City of San Diego Drainage Design Manual, Section 1-102.2.3.B. See the Methodology section in this report for more details. The following table summarizes the peak discharge at the major points of concentration. Please refer to the Proposed Hydrology exhibit in Appendix B.

Table 2: Proposed Hydrology Summary

Basin	Point of Concentration	Area (ac)	Average Runoff Coefficient	Time of Concentration (min)	Q_{50} (cfs) (undetained)	Q_{50} (cfs) (detained)
A1	CP 1	2.61	0.70	16.48	4.75	2
A2	CP 2	4.32	0.70	9.58	9.83	1
A (Total)		6.93	-	-	-	-
B	CP 3	2.59	0.77	17.37	5.98	2.5

As shown above, the proposed project would result in an undetained increase in peak runoff rates for all Basins if not properly mitigated. Therefore, a detention system will be implemented to provide hydromodification management and reduce the peak runoff rates for the design storm to match the existing conditions. For information on the detention system please see the Detention / Hydromodification section in this report. For detailed hydrology calculations please see Appendix B.

DETENTION / HYDROMODIFICATION

The proposed project will result in an increase in impervious surfaces from existing conditions. This would potentially result in an increase in storm water runoff rate and volume if left unmitigated. The project will be required to detain the increase in runoff to minimize the impacts to public drainage facilities. In addition, the project will be required to comply with the Hydro modification Management Plan (HMP) requirements as described in the Storm water Standards Manual.

To fulfill the HMP requirements, the project has been designed so that runoff rates and durations are controlled to maintain or reduce pre-project downstream erosion conditions and protect stream habitat. The project will mitigate the increase in runoff by implementing a series of storm water Best Management Practices (BMPs) and detention facilities which have been specifically designed for Hydro modification Management.

In addition to hydro modification mitigation, the proposed detention facilities will provide mitigation for increases in peak flow where necessary. As shown in Tables 1 and 2, the 50-year peak flow rate will increase from existing to proposed conditions in all basins. Therefore, the detention facilities in these basins have also been sized to provide peak detention to match the existing 50-year flow rates. The detention facilities have been designed for the 6-hour 50-year storm. The detention facilities will have a multi-stage outlet structure, with a combination of a low-flow orifice sized for hydro modification mitigation, a weir and/or an outlet orifice. The following table lists the flow rates and outlet configuration for each detention basin. Please refer to the Methodology section for information on how these values were calculated, and to Appendix C for detailed calculations.

Basin	Node	Q50 (Undetained)	Q50 (Detained)	Hydromod. Orifice	Peak Detention Outlet
A1	CP 1	4.75 cfs	2 cfs	2 in.	6-inch and 4-inch
A2	CP 2	9.83 cfs	1 cfs	2 In.	12-inch and 4-inch
B	CP B	5.98cfs	2.5cfs	2 in.	2-8 inch and one 2-inch

In both cases, the proposed detention facility will be located on the private storm drain system prior to discharge from the site, as shown on the Proposed Hydrology exhibit in Appendix B. The detention facility for Basin B will also be located upstream of the proposed curb outlet to Carroll Canyon Road, and will reduce the proposed discharge through this curb outlet to 2.5 cfs.

Due to the preliminary nature of this study, the detention facilities have been assumed to be underground vaults which are fully lined with concrete or an impermeable liner, and are 4 to 12 feet deep. During final engineering, other types of detention facilities may be selected, and detailed final design of the detention systems will be performed at that time. Types of detention facilities which may be selected during final design include cast-in-place concrete vaults; precast concrete vaults; large-diameter HDPE, PVC or RCP pipes; arched detention chambers; or any of a number of proprietary products designed to facilitate underground detention. The outlet structures, including low-flow orifice opening and high-flow by-pass, will also undergo detailed design at the time of final engineering.

CONCLUSION

The proposed project will be designed to honor existing basin boundaries and minimize the effects of the development to downstream drainage facilities and drainage channels. The total area of Basin A which drains north to the Caltrans box culvert will not be altered from existing conditions. The total area of Basin B which drains to Carroll Canyon Road will not be altered from existing conditions.

The proposed project will increase the impervious areas from existing conditions due to the proposed buildings, parking, and hardscape areas. Permeable pavements will be implemented in parking areas where feasible to mitigate a portion of this increase and infiltration is proposed as the BMP for full DCV retention. The increase in impervious areas would potentially result in an increase in storm water runoff rates if left unmitigated as shown in Table 2 of the Hydrology Results section. Therefore detention and HMP facilities will be implemented to reduce runoff rates to match existing conditions for the HMP and 50-year design storm requirements. The calculations and conclusions prove compliance to Hydro modification Management Plan Controls.

The final design of HMP, Water Quality BMPs, and onsite storm drain facilities will be presented in subsequent reports during final engineering.

METHODOLOGY

RUNOFF CALCULATIONS

The design criteria, as found in the City of San Diego Drainage Design Manual Section 1-102.2, specifies the design runoff conditions be based on the 50-year storm frequency. Runoff was calculated using the Modified Rational Method as described in pages 80-89 of the Drainage Design Manual. The rational method equation is as follows:

$$Q = C \times I \times A$$

Where:
Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr)
A = Drainage basin area in acres, (ac)

Runoff Coefficient

An average runoff coefficient was used over each entire basin unless the sub-basin area differed significantly from the average. Soil Type D was assumed for the entire study per the City of San Diego Drainage Design Manual page 82. Average runoff coefficients were calculated in accordance with the Drainage Design Manual, page 82, by adjusting the tabulated impervious ratios to match the actual impervious ratios of the site as shown in the following sample calculation:

Sample Runoff Coefficient Calculation:
Actual Impervious Percentage = 87%
Tabulated Impervious Percentage= 90% (C=0.95)
Revised C = 87/90 x 0.95 = 0.92

The calculated runoff coefficients for each basin are summarized in the Appendix.

Time of Concentration

Time of concentration was calculated per page 81 of the drainage design manual as follows:

$$Tc = Ti + Tf,$$

Where Ti is the inlet time, Tf is the travel time, and Tc is the time of concentration. The inlet time (Ti) was calculated according the Drainage Design Manual page 86, “Urban Areas Overland Time of Flow Curves”. Additional travel time (Tf) was calculated by estimating velocity using Manning’s formula for open channel flow. The travel time was calculated by dividing the flow length by the flow velocity as described on page 81 of the Drainage Design Manual.

Rainfall Intensity

Rainfall intensity was calculated in accordance with the City of San Diego Drainage Design Manual. The intensity – duration chart on page 83 of the Drainage Design Manual was used to calculate corresponding intensities for each time of concentration. This data was input into the I-D-F Curve Table for the 2-year, 10-year and 50-year design storm events. The time of concentration – intensity data pairs can be seen in the Appendix.

DETENTION CALCULATIONS

To design the proposed detention facilities, the 50-year 6-hour storm was routed through the detention facility, and the detention volume and outlet configuration were iteratively sized until the proposed peak flow rate was equal to or below the existing peak flow rate. This was done using the following procedures.

Runoff Hydrographs

Based on the proposed hydrology calculations, a runoff hydrograph was generated for the 50-year 6-hour storm event. This was done using the Rational Method Hydrograph Program developed by Rick Engineering for use in San Diego County. Based on inputs including the time of concentration, 6-hour rainfall, basin area, runoff coefficient, and peak discharge, this program developed a runoff hydrograph with time steps corresponding to the time of concentration. Output from this program can be found in Appendix C.

Orifice Calculations

In sizing the outlet structures, the orifice equation was used to calculate the discharge through an orifice. The orifice equation is given below:

$$Qo = Co \times Ao \times (2 \times g \times Ho)^{1/2}$$

Where:
Qo = Flow rate through the orifice in cfs
Co = Coefficient accounting for entrance loss to the orifice (0.6 assumed)
Ao = Area of the orifice in square feet
g = Gravitational acceleration equal to 32.2 feet per second per second
Ho = Head acting on the orifice in feet

Weir Calculations

Where the outlet structures incorporated a weir, the weir equation was used to calculate the discharge over the weir. The weir equation is given below:

$$Qw = Cw \times Pe \times Hw^{3/2}$$

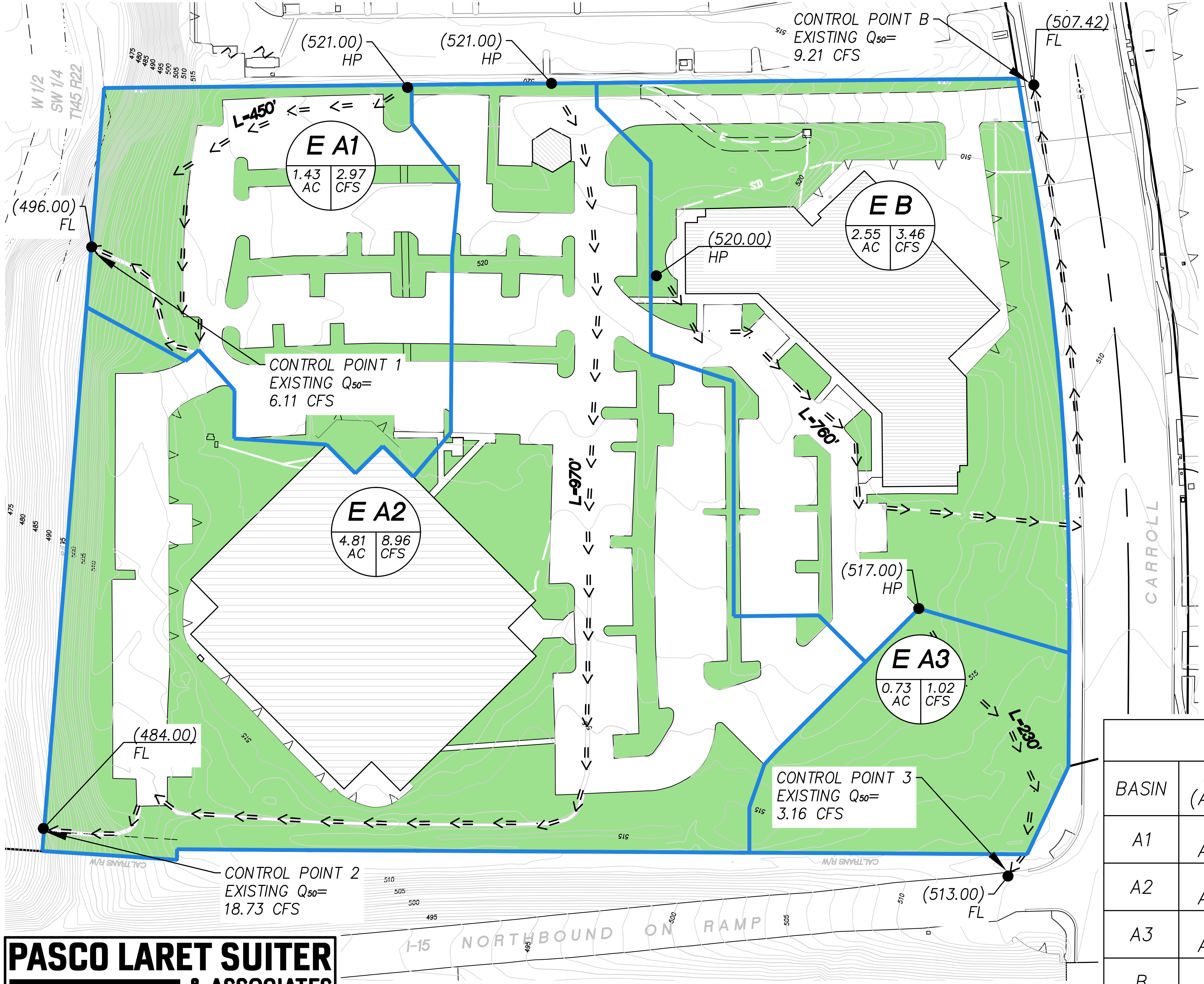
Qw = Flow rate over the weir in cfs
Cw = Weir coefficient = 3.0
Pe = Effective grate perimeter length
Dw = Depth of flow approaching inlet

Detention Basin Routing

Detention basin routing calculations were performed using Hydraflow Hydrographs, Version 9. The runoff hydrographs described above were input into the program, along with stage-storage information for the proposed detention vaults. The outlet structure information was either entered using the orifice feature of the program (in the case of Basin B), or calculated manually and entered into the program as user-defined outflow data (in the case of Basin A2, due to the non-standard nature of the outlet structure). The program then routes the flows through the detention facility, and generates an outflow hydrograph. Additional output information includes the peak discharge from the detention facility, the maximum depth of storage in the detention facility, and the maximum volume stored. Detailed output from Hydraflow Hydrographs can be found in Appendix C.

APPENDIX A

Existing Hydrology Map and Calculations



LEGEND

DESCRIPTION	SYMBOL
LOT LINE	— — —
BASIN BOUNDARY	—
FLOW DIRECTION	→
FLOW PATH	—
EXISTING PERVIOUS AREA	🟩
BASIN SUMMARY Q_{50}	E 1 X.X AC X.X CFS

HYDROLOGY EXHIBIT
EXISTING CONDITION

CARROLL CANYON MIXED USE
9850 CARROLL CANYON RD, SAN DIEGO, CA 92131
PROJECT NUMBER: PE 2314
SCALE: 1" = 80'
DATE: OCTOBER 2015
SHEET 1 OF 1

EXISTING CONDITION

BASIN	AREA (ACRES)	EXISTING PERVIOUS AREA (ACRES)	% IMPERVIOUS	C FACTOR (MOD)
A1	1.43 ACRES	0.57 ACRES	60.1%	0.63
A2	4.81 ACRES	1.70 ACRES	64.7%	0.69
A3	0.73 ACRES	0.73 ACRES	0%	0.50
B	2.55 ACRES	1.12 ACRES	56.1%	0.59
TOTAL	9.52 ACRES	4.12 ACRES	56.7%	0.60

PASCO LARET SUITER
& ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING
535 North Highway 101, Ste A, Solana Beach, CA 92075
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Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: Oct 2015
Checked:MDW Date: Oct 2015
Sheet: 1 of 1

Time of Concentration Calculations

Using the "Urban Areas Overland Time of Flow Curves" from the City of San Diego Drainage Design Manual:
Where:

Tc = Time of Concentration (Minutes)
C =Runoff Coefficient
S = Effective slope
D = Distance

Tc =1.8 (1.1 - C) (D)^.5 / (s^1/3)

Basin	D (Feet)	C	S (Slope)	Tc (Minutes)	Pipe Tc (Minutes)	Total Tc (Min)
EX A1	450	0.6300	5.56	10.13	0.00	10.13
EX A2	970	0.6900	3.81	14.71	0.00	14.71
EX A3	230	0.5000	1.74	13.62	0.00	13.62
EX B	760	0.5900	1.66	21.39	0.00	21.39

PASCO LARET SUITER
& ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: October 2015
Checked: MDW Date: October 2015
Sheet: 1 of 2

Existing Condition

Q = C x I x A

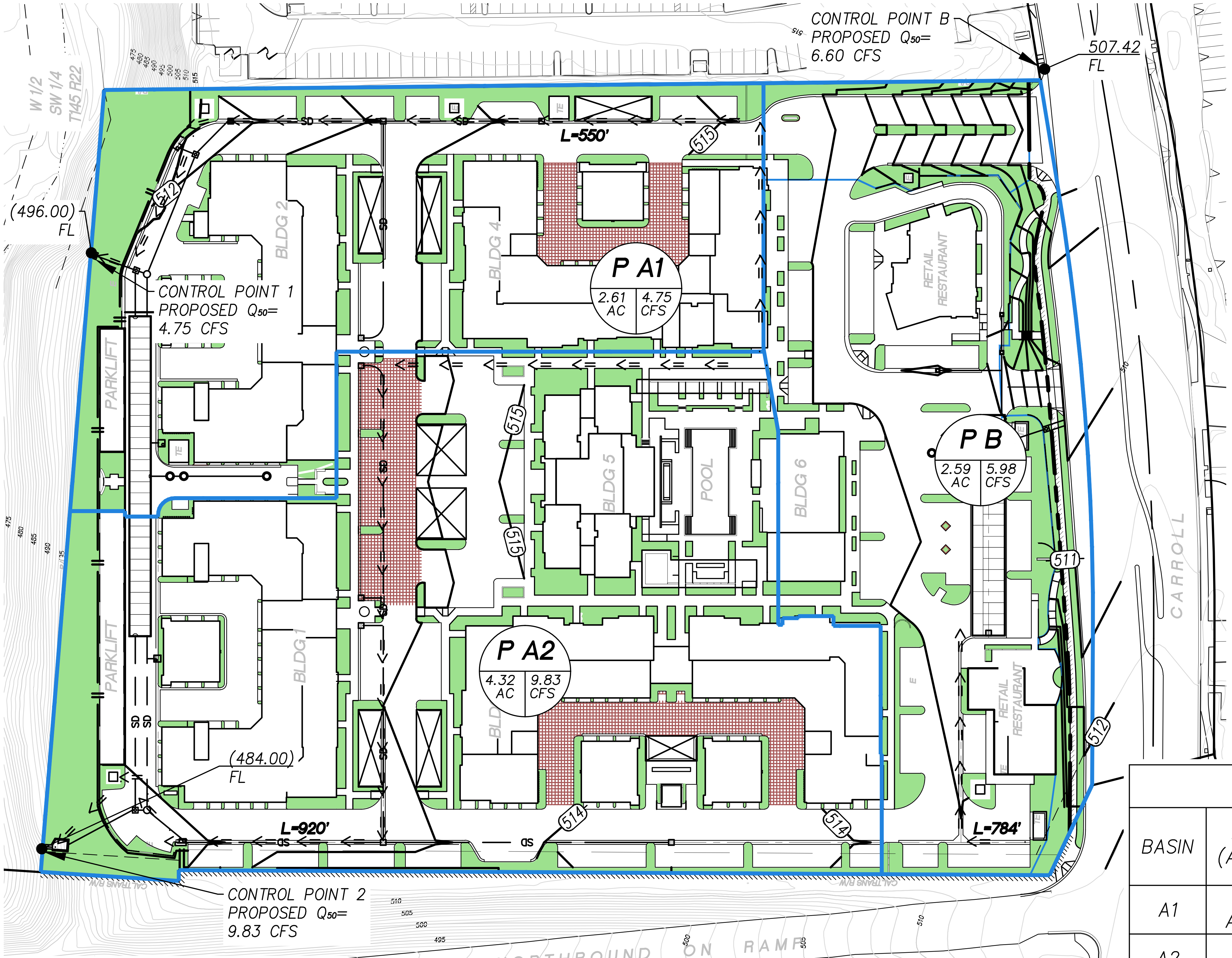
Where:

Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr) (Tc Calcualtions in Appendix 3)
A = Drainage basin area in acres, (ac)
Rational Method calculations were performed using the City of San Diego Drainage Design Manual (Section 1-102.3)

Drainage Area	Year	C	I (in/hr)	A (ac.)	Q (cfs)
Ex A1	2	0.63	1.80	1.43	1.62
	10	0.63	2.60	1.43	2.34
	50	0.63	3.30	1.43	2.97
	100	0.63	3.50	1.43	3.15
Ex A2	2	0.69	1.45	4.81	4.81
	10	0.69	2.15	4.81	7.14
	50	0.69	2.70	4.81	8.96
	100	0.69	3.00	4.81	9.96
Ex A3	2	0.50	1.50	0.73	0.55
	10	0.50	2.20	0.73	0.80
	50	0.50	2.80	0.73	1.02
	100	0.50	3.00	0.73	1.10
Ex B	2	0.59	1.20	2.55	1.81
	10	0.59	1.80	2.55	2.71
	50	0.59	2.30	2.55	3.46
	100	0.59	2.40	2.55	3.61

APPENDIX B

Proposed Hydrology Map and Calculations



LEGEND

DESCRIPTION	SYMBOL
LOT LINE	— — —
BASIN BOUNDARY	──
FLOW DIRECTION	→
FLOW PATH	──
PROPOSED PERVIOUS AREA	🟩
BASIN SUMMARY Q_{50}	P 1 X.X AC X.X CFS

HYDROLOGY EXHIBIT
PROPOSED CONDITION

CARROLL CANYON MIXED USE

9850 CARROLL CANYON RD, SAN DIEGO, CA 92131

PROJECT NUMBER: PE 2314

SCALE: 1" = 80'

DATE: JUNE 2016

SHEET 1 OF 1

PROPOSED CONDITION

BASIN	AREA (ACRES)	PROPOSED PERVIOUS AREA (ACRES)	% IMPERVIOUS	C FACTOR
A1	2.61 ACRES	0.66 ACRES	74.7%	0.70
A2	4.32 ACRES	1.08 ACRES	75.0%	0.70
B	2.59 ACRES	0.72 ACRES	72.2%	0.77
TOTAL	9.52 ACRES	2.46 ACRES	74.2%	0.77 (R)

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Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: October 2015
Checked: MDW Date: October 2015
Sheet: 1 of 1

Time of Concentration Calculations

Using the "Urban Areas Overland Time of Flow Curves" from the City of San Diego Drainage Design Manual:
Where:

Tc = Time of Concentration (Minutes)
C =Runoff Coefficient
S = Effective slope
D = Distance

Tc =1.8 (1.1 - C) (D)^.5 / (s^1/3)

Basin	D (Feet)	C	S (Slope)	Tc (Minutes)	Pipe Tc (Minutes)	Total Tc (Min)
PR A1	324	0.7000	0.59	15.48	1.00	16.48
PR A2	293	0.7000	4.29	7.58	2.00	9.58
PR B	784	0.7700	0.88	17.37	0.00	17.37

Proposed Condition

Q = C x I x A

Where:

Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr) (Tc Calculations in Appendix 3)
A = Drainage basin area in acres, (ac)
Rational Method calculations were performed using the City of San Diego Drainage Design Manual (Section 1-102.3)

Drainage Area	Year	C	I (in/hr)	A (ac.)	Q (cfs)
PR A1	2	0.70	1.40	2.61	2.56
	10	0.70	2.00	2.61	3.65
	50	0.70	2.60	2.61	4.75
	100	0.70	2.80	2.61	5.12
PR A2	2	0.70	1.80	4.32	5.44
	10	0.70	2.60	4.32	7.86
	50	0.70	3.25	4.32	9.83
	100	0.70	3.45	4.32	10.43
PR B	2	0.77	1.60	2.59	3.19
	10	0.77	2.40	2.59	4.79
	50	0.77	3.00	2.59	5.98
	100	0.77	3.20	2.59	6.38

APPENDIX C

Detention Basin Calculations

Hydrograph Report

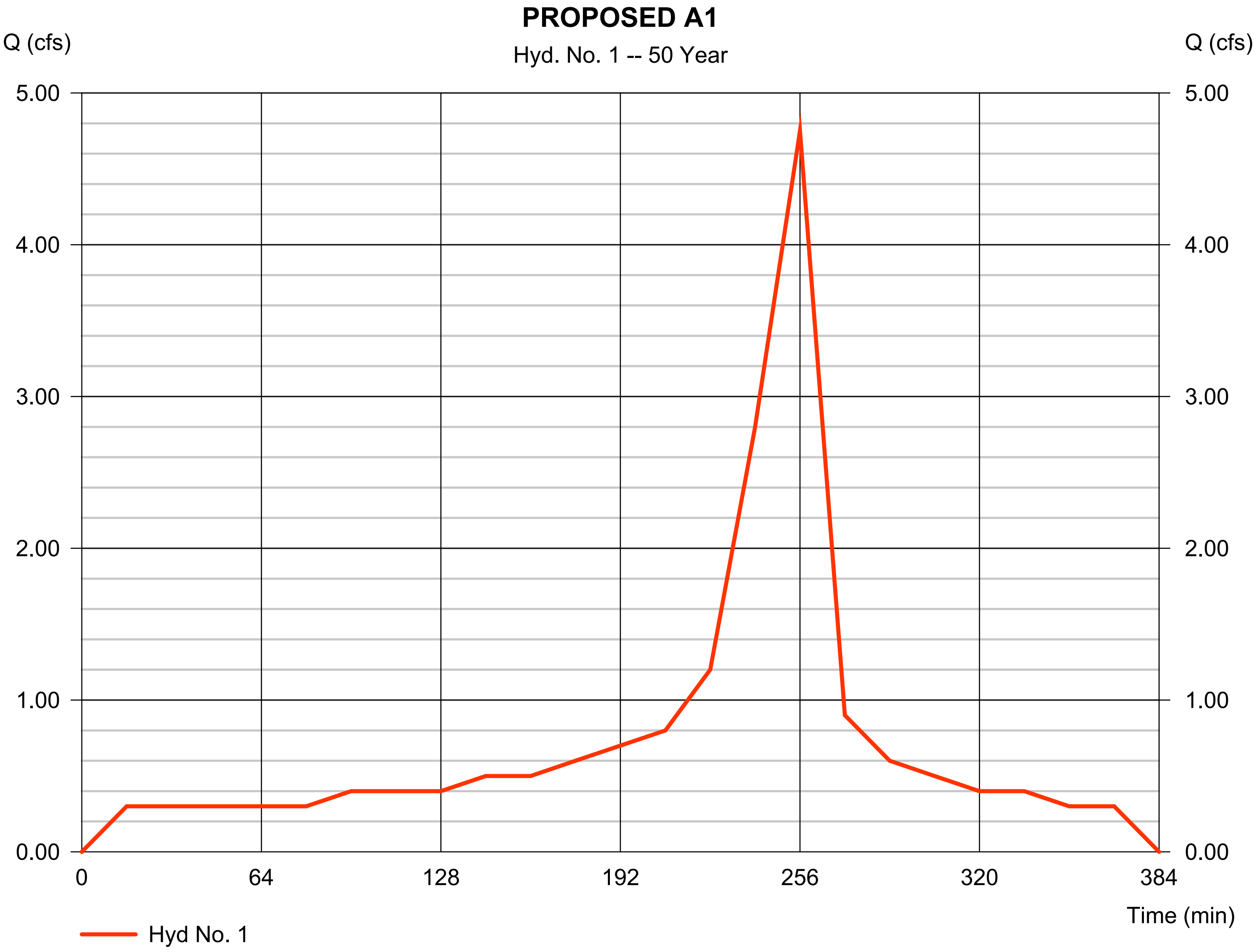
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10 Tuesday, 02 / 17 / 2015

Hyd. No. 1

PROPOSED A1

Hydrograph type = Manual
Storm frequency = 50 yrs
Time interval = 16 min

Peak discharge = 4.750 cfs
Time to peak = 256 min
Hyd. volume = 17,232 cuft



Hydrograph Report

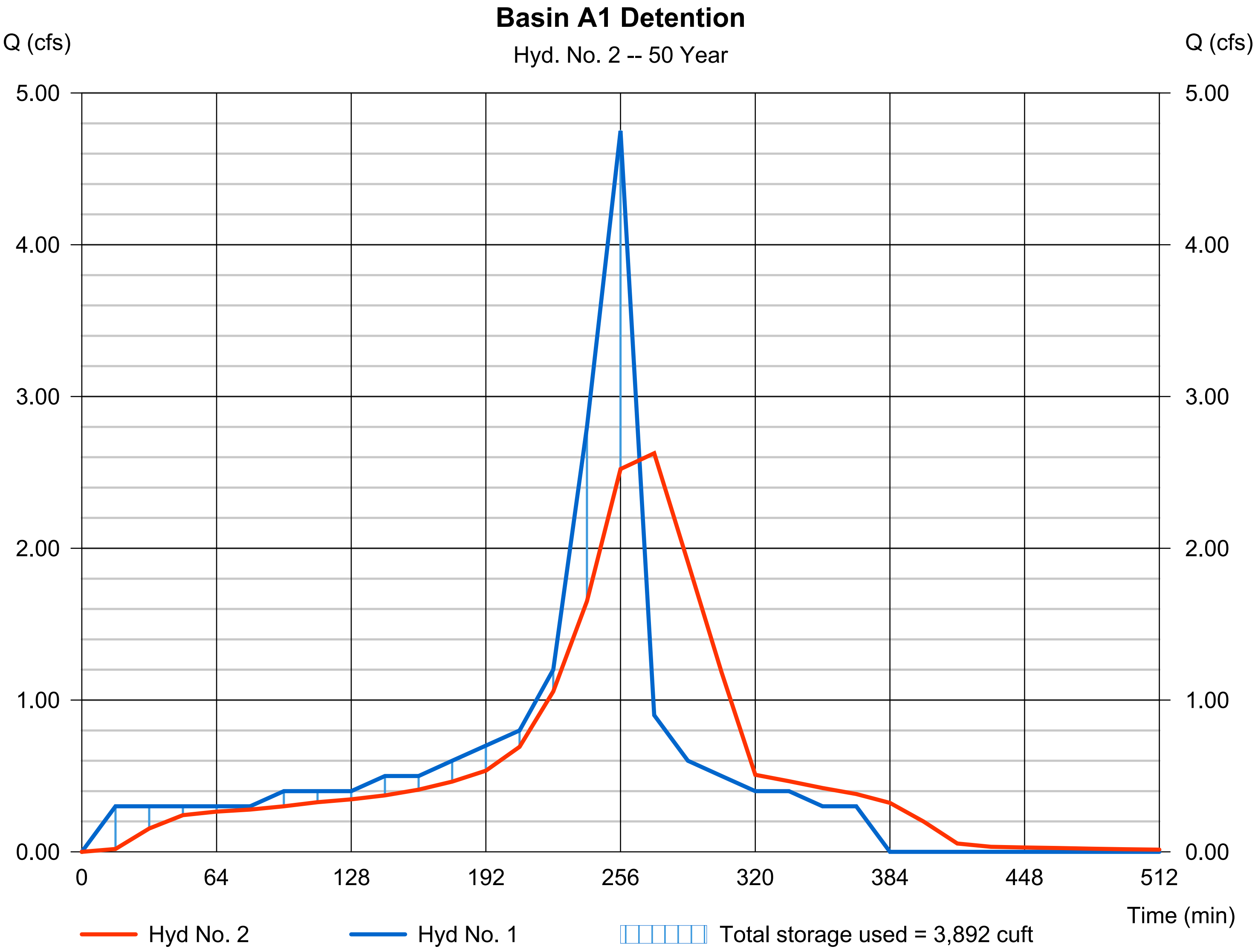
Hyd. No. 2

Basin A1 Detention

Hydrograph type = Reservoir
Storm frequency = 50 yrs
Time interval = 16 min
Inflow hyd. No. = 1 - PROPOSED A1
Reservoir name = BASIN A1 DETENTION

Peak discharge = 2.626 cfs
Time to peak = 272 min
Hyd. volume = 17,223 cuft
Max. Elevation = 510.62 ft
Max. Storage = 3,892 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BASIN A1 DETENTION

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 505.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	505.00	840	0	0
1.00	506.00	840	840	840
2.00	507.00	840	840	1,680
3.00	508.00	840	840	2,520
4.00	509.00	840	840	3,360
5.00	510.00	840	840	4,200
6.00	511.00	840	840	5,040

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	Inactive	Inactive
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 505.00	506.00	0.00	0.00
Length (ft)	= 0.50	0.50	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

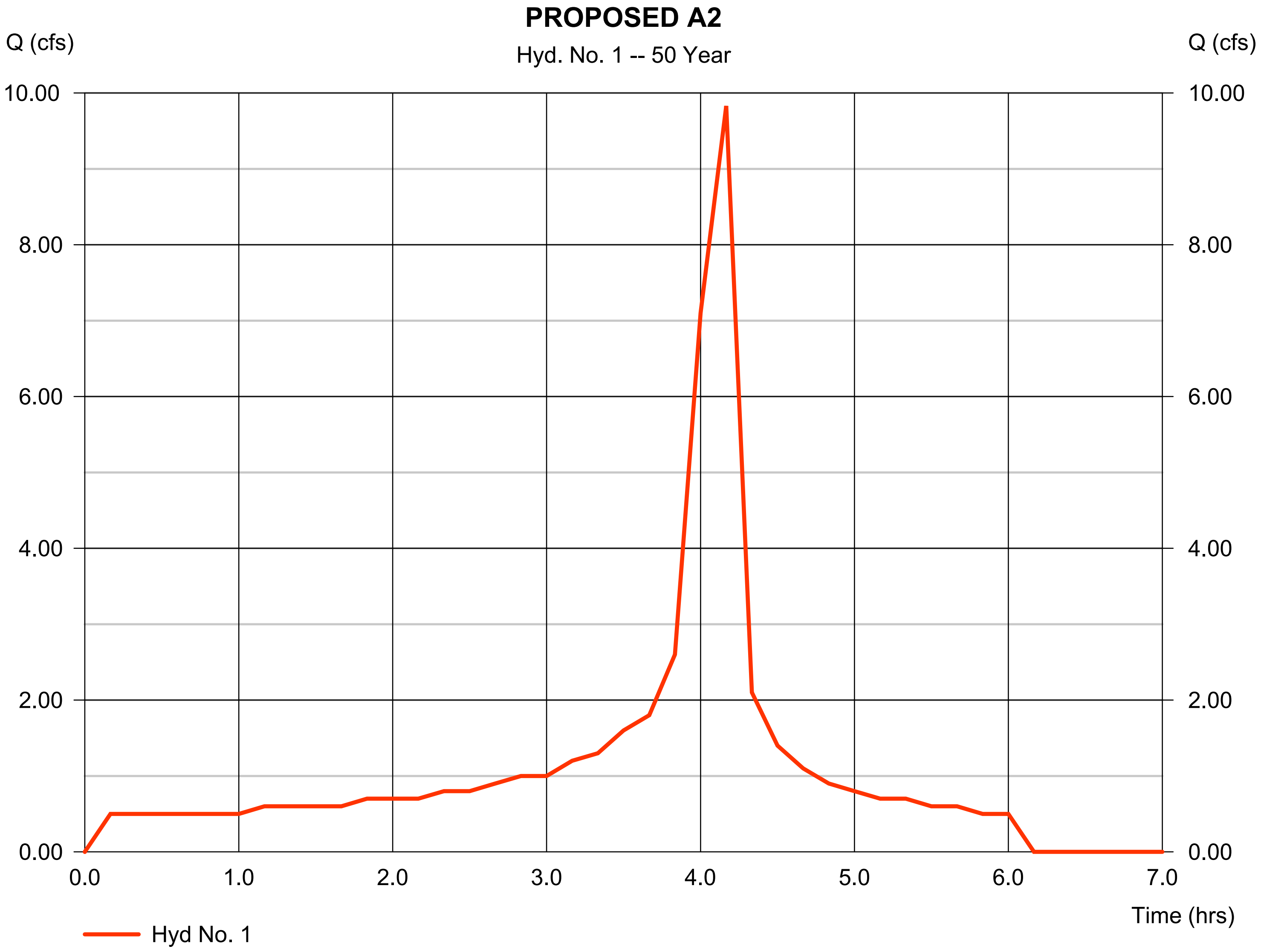
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	505.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.00	840	506.00	0.38 ic	0.00	---	---	---	---	---	---	---	---	0.384
2.00	1,680	507.00	0.57 ic	0.82 ic	---	---	---	---	---	---	---	---	1.388
3.00	2,520	508.00	0.71 ic	1.25 ic	---	---	---	---	---	---	---	---	1.958
4.00	3,360	509.00	0.82 ic	1.57 ic	---	---	---	---	---	---	---	---	2.390
5.00	4,200	510.00	0.92 ic	1.83 ic	---	---	---	---	---	---	---	---	2.754
6.00	5,040	511.00	1.01 ic	2.06 ic	---	---	---	---	---	---	---	---	3.075

Hydrograph Report

Hyd. No. 1

PROPOSED A2

Hydrograph type	= Manual	Peak discharge	= 9.830 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.17 hrs
Time interval	= 10 min	Hyd. volume	= 28,398 cuft



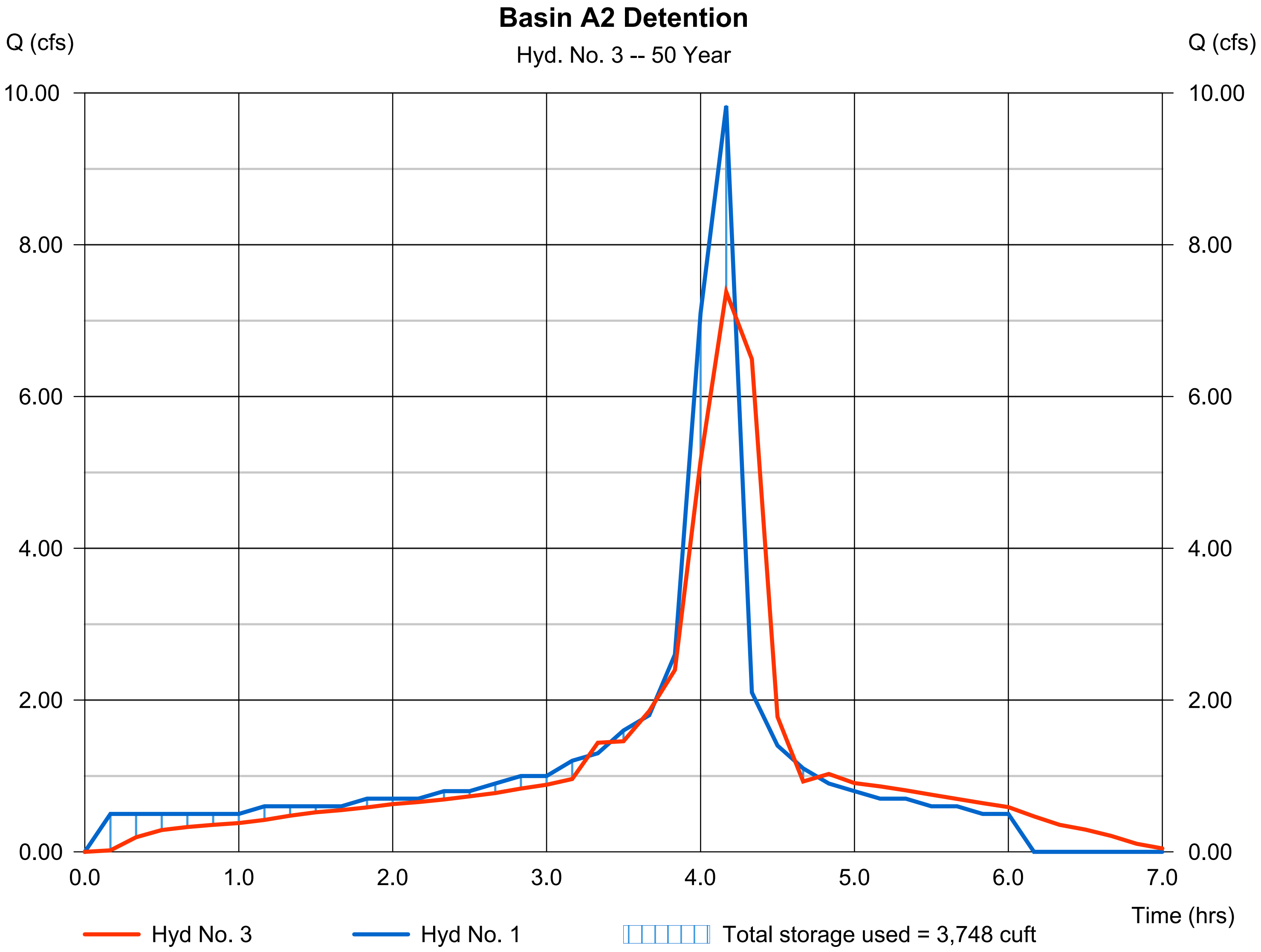
Hydrograph Report

Hyd. No. 3

Basin A2 Detention

Hydrograph type	= Reservoir	Peak discharge	= 7.378 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.17 hrs
Time interval	= 10 min	Hyd. volume	= 28,389 cuft
Inflow hyd. No.	= 1 - PROPOSED A2	Max. Elevation	= 510.34 ft
Reservoir name	= BASIN A2 DETENTION	Max. Storage	= 3,748 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BASIN A2 DETENTION

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 505.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	505.00	840	0	0
1.00	506.00	840	840	840
2.00	507.00	840	840	1,680
3.00	508.00	840	840	2,520
4.00	509.00	840	840	3,360
5.00	510.00	840	840	4,200
6.00	511.00	840	840	5,040

Culvert / Orifice Structures

		[A]	[B]	[C]	[PrfRsr]
Rise (in)	=	4.00	12.00	Inactive	Inactive
Span (in)	=	4.00	12.00	0.00	0.00
No. Barrels	=	1	1	0	0
Invert El. (ft)	=	505.00	506.00	0.00	0.00
Length (ft)	=	0.50	0.50	0.00	0.00
Slope (%)	=	1.00	1.00	0.00	n/a
N-Value	=	.013	.013	.013	n/a
Orifice Coeff.	=	0.60	0.60	0.60	0.60
Multi-Stage	=	n/a	No	No	No

Weir Structures

		[A]	[B]	[C]	[D]
Crest Len (ft)	=	0.00	0.00	0.00	0.00
Crest El. (ft)	=	0.00	0.00	0.00	0.00
Weir Coeff.	=	3.33	3.33	3.33	3.33
Weir Type	=	---	---	---	---
Multi-Stage	=	No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

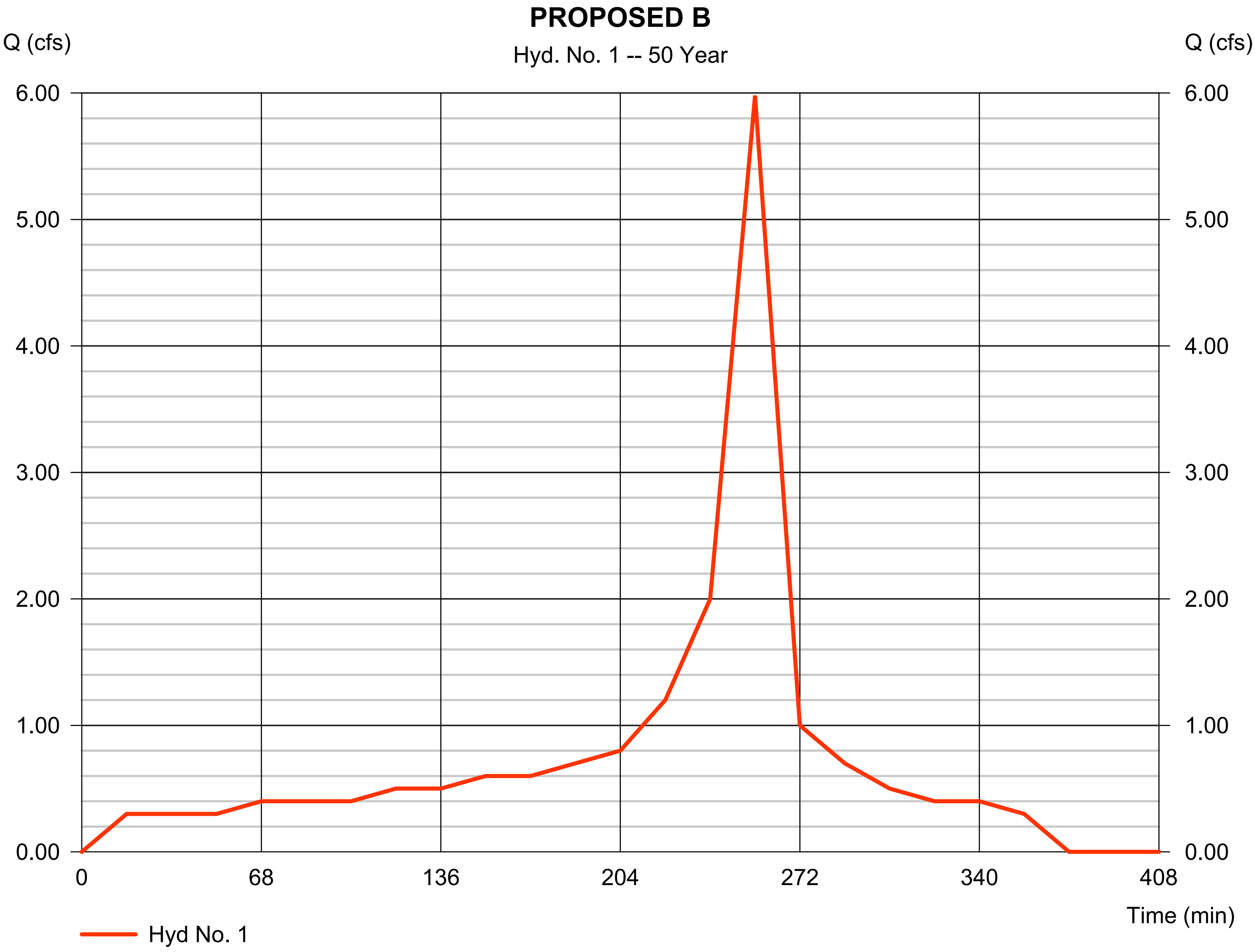
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	505.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.00	840	506.00	0.38 ic	0.00	---	---	---	---	---	---	---	---	0.384
2.00	1,680	507.00	0.57 ic	0.36 oc	---	---	---	---	---	---	---	---	0.931
3.00	2,520	508.00	0.71 ic	4.63 ic	---	---	---	---	---	---	---	---	5.338
4.00	3,360	509.00	0.82 ic	5.98 ic	---	---	---	---	---	---	---	---	6.801
5.00	4,200	510.00	0.92 ic	7.07 ic	---	---	---	---	---	---	---	---	7.998
6.00	5,040	511.00	1.01 ic	8.02 ic	---	---	---	---	---	---	---	---	9.036

Hydrograph Report

Hyd. No. 1

PROPOSED B

Hydrograph type	= Manual	Peak discharge	= 5.980 cfs
Storm frequency	= 50 yrs	Time to peak	= 255 min
Time interval	= 17 min	Hyd. volume	= 18,646 cuft



Hydrograph Report

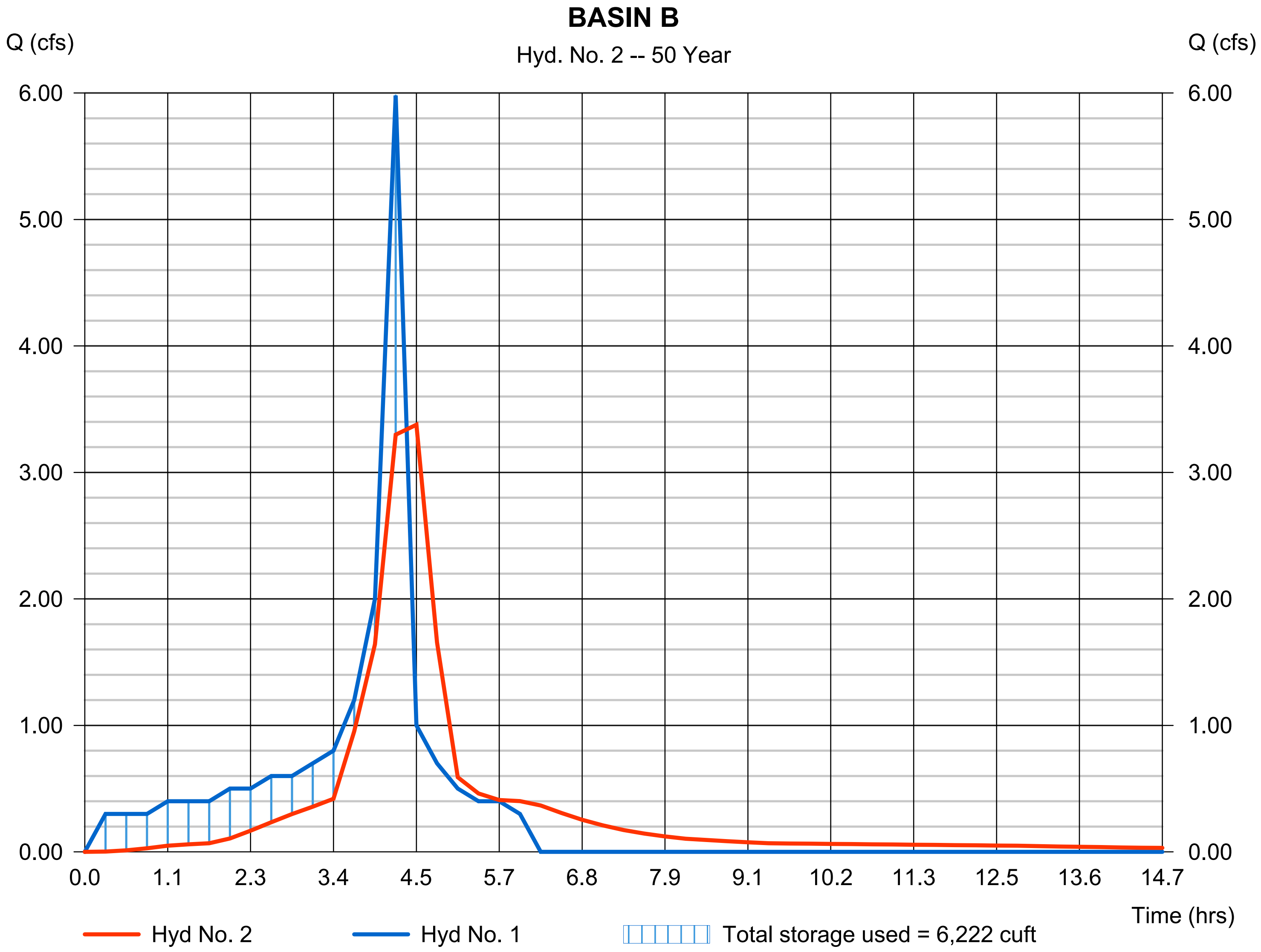
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10 Tuesday, 02 / 17 / 2015

Hyd. No. 2

BASIN B

Hydrograph type	= Reservoir	Peak discharge	= 3.377 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.53 hrs
Time interval	= 17 min	Hyd. volume	= 18,588 cuft
Inflow hyd. No.	= 1 - PROPOSED B	Max. Elevation	= 512.00 ft
Reservoir name	= BASIN B DETENTION	Max. Storage	= 6,222 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BASIN B DETENTION

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 510.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	510.00	3,528	0	0
1.00	511.00	3,528	3,528	3,528
2.00	512.00	3,528	3,528	7,056

Culvert / Orifice Structures

		[A]	[B]	[C]	[PrfRsr]
Rise (in)	=	2.00	8.00	8.00	Inactive
Span (in)	=	2.00	8.00	8.00	0.00
No. Barrels	=	1	1	1	0
Invert El. (ft)	=	510.00	510.50	510.50	0.00
Length (ft)	=	0.50	0.50	0.50	0.00
Slope (%)	=	1.00	1.00	1.00	n/a
N-Value	=	.013	.013	.013	n/a
Orifice Coeff.	=	0.60	0.60	0.60	0.60
Multi-Stage	=	n/a	No	No	No

Weir Structures

		[A]	[B]	[C]	[D]
Crest Len (ft)	=	0.00	0.00	0.00	0.00
Crest El. (ft)	=	0.00	0.00	0.00	0.00
Weir Coeff.	=	3.33	3.33	3.33	3.33
Weir Type	=	---	---	---	---
Multi-Stage	=	No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

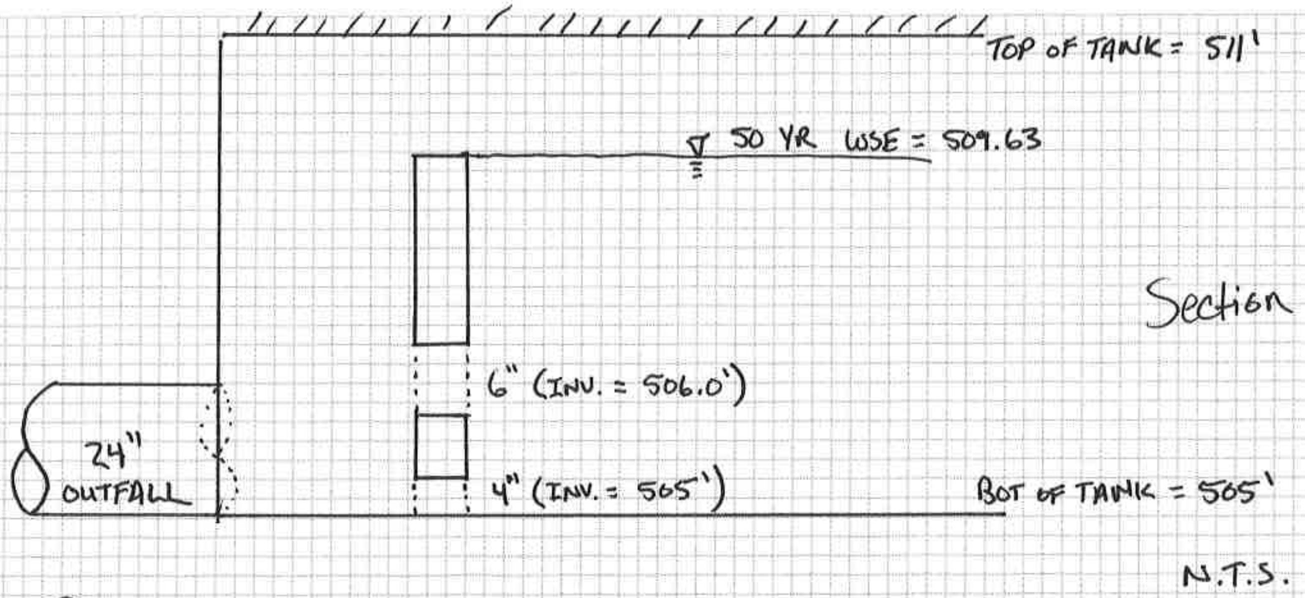
Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	510.00	0.00	0.00	0.00	---	---	---	---	---	---	---	0.000
1.00	3,528	511.00	0.10 ic	0.13 oc	0.13 oc	---	---	---	---	---	---	---	0.359
2.00	7,056	512.00	0.15 ic	1.82 ic	1.82 ic	---	---	---	---	---	---	---	3.776

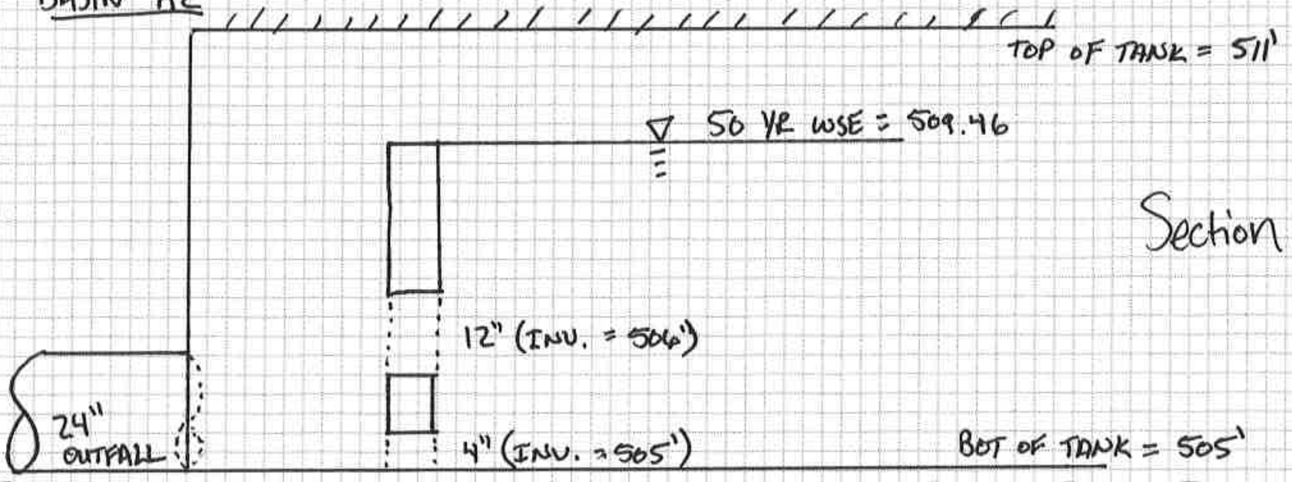
Date 2/17/15

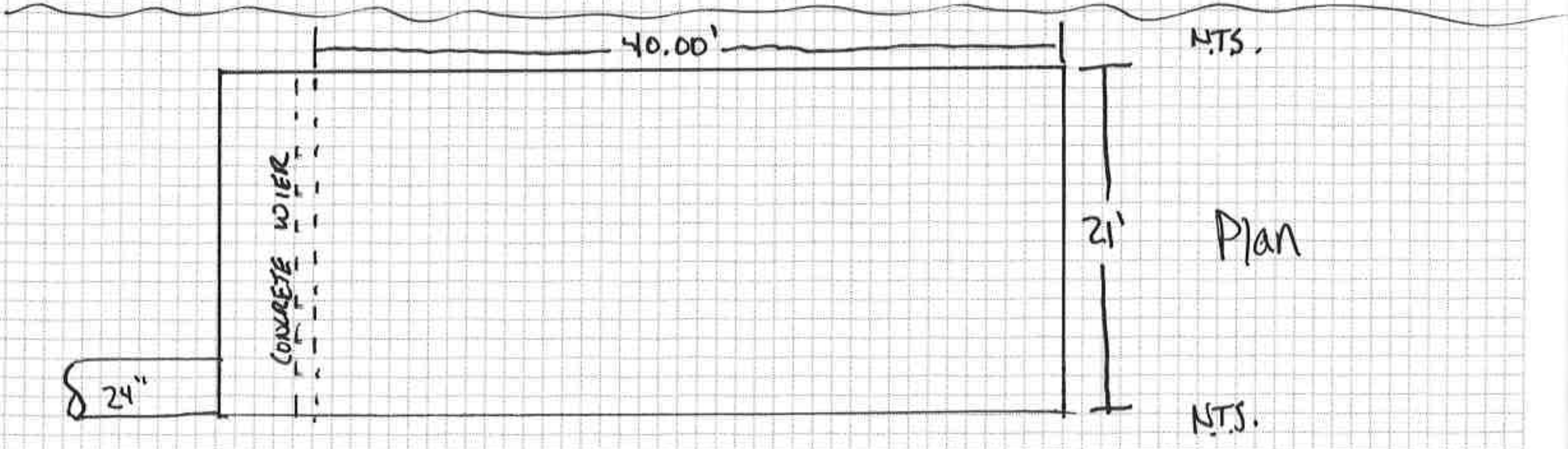
Job#

Basin A1



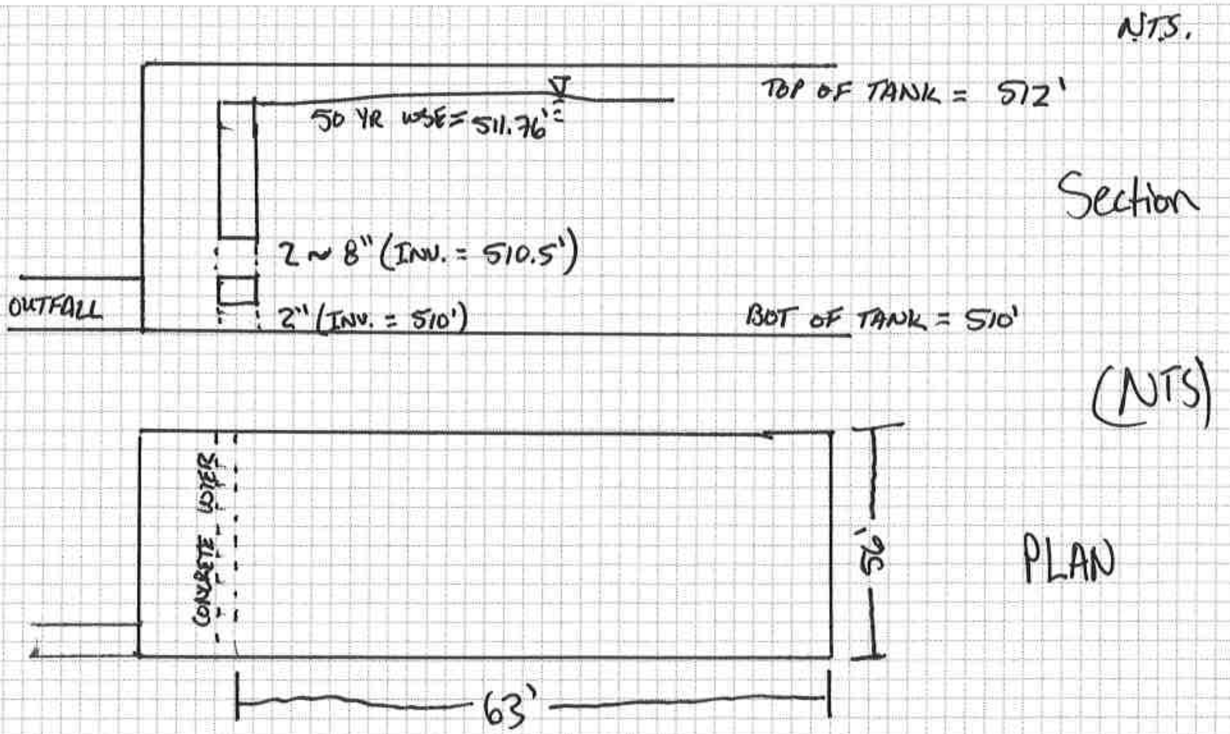
~~BAS~~
BASIN A2





Date 2/17/15 Job#

BASIN B



Appendix 6

Geotechnical and Groundwater Investigation Report

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G1488-42-03
August 9, 2016

Sudberry Properties, Inc.
5465 Morehouse Drive, Suite 260
San Diego, California 92121

Attention: Mr. Jeff Rogers

Subject: STORM WATER MANAGEMENT RECOMMENDATIONS
CARROLL CANYON MIXED USE
SAN DIEGO, CALIFORNIA

References:
1. *Geotechnical Analysis for Dry-Well Design, Carroll Canyon Mixed Use, San Diego, California,* prepared by Geocon Incorporated, dated January 21, 2016 (Project No. G1488-42-03).
2. *Preliminary Geotechnical Investigation, Carroll Canyon Mixed Use, San Diego, California*, prepared by Geocon Incorporated, dated October 12, 2015 (Project No. G1488-42-03).

Dear Mr. Rogers:

In accordance with your authorization, we have prepared this letter to provide recommendations regarding storm water management for the subject project. The field investigation included drilling 2 small diameter borings to depths between 80 and 100 feet and installing wells to perform borehole infiltration testing. Logs of the borings are provided in References 1 and 2. The approximate boring locations are shown on Figure 2 of References 1 and 2. For your convenience, we have attached Figure 2 and the boring logs (P-1 and P-2) from Reference 1. The results of the infiltration testing and information relating to geotechnical aspects of storm water management are provided herein.

STORM WATER MANAGEMENT

If storm water management devices are not properly designed and constructed, there is a risk for distress to improvements and properties located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water being detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeological study at the site. If infiltration of storm water runoff into the subsurface occurs, downstream improvements may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of water infiltration.

Hydrologic Soil Group

The United States Department of Agriculture (USDA), Natural Resources Conservation Services, provides general information regarding soil conditions for areas within the United States. The USDA website also provides the Hydrologic Soil Group. Table 1 presents the descriptions of the hydrologic soil groups. If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

TABLE 1
HYDROLOGIC SOIL GROUP DEFINITIONS

Soil Group	Soil Group Definition
A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
B	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
C	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The subject property is underlain by: undocumented fill, Very Old Paralic Deposits, and Stadium Conglomerate. The subject site falls within Hydraulic Soil Group D, which has a very slow infiltration rating. Table 2 presents the information from the USDA website for the property.

TABLE 2
USDA WEB SOIL SURVEY – HYDROLOGIC SOIL GROUP

Map Unit Name	Map Unit Symbol	Approximate Percentage of Property	Hydrologic Soil Group
Redding gravelly loam 2 to 9 percent slopes	RdC	90	D
Redding cobbly loam, 9 to 30 percent slopes	ReE	10	D

Infiltration Testing and Estimated Peak Well Flow Rate

The test method employed in this study to estimate infiltration rate consisted of drilling borings, P1 and P2, to an approximate depth of 80 to 100 feet below existing ground surface using a six-inch-diameter, air-percussion drill. No samples were retrieved during drilling due to the rocky nature of the geologic formation (Stadium Conglomerate). Boring logs are attached.

At each well location a 2-inch-diameter, PVC well casing was installed in the boreholes with 30-foot-long screened at the bottom. Water was injected into the well and the rate of change in head over time was measured and recorded using an In-Situ Level TROLL 700 transducer coupled with an In-Situ RuggedReader handheld PC.

Data from the borehole testing was provided to Albus-Keefe & Associates to perform a steady-state analysis to develop the estimated peak flow capacity of the dry well. The report from Albus-Keefe & Associates is provided in Appendix B of Reference 1. The following table provides a summary of their calculated hydraulic conductivity, average infiltration rate, and estimated peak flow assuming a 100-foot deep well with a 50-foot upper non-infiltrating chamber. These values are unfactored. The project civil engineer should use an appropriate factor of safety in the design of the well system.

TABLE 5
ESTIMATED UNFACTORED INFILTRATION RATE AND PEAK FLOW

Boring/(Wells)	Depth (feet)	Hydraulic Conductivity (in/hr)	Effective Average Well Infiltration Rate (in/hr)	Well Peak Flow (cfs)
P-1 and P-2	0 – 40	0.2	4.9	0.07
	< 40	0.38		

With respect to infiltration rates for use in establishing full and partial infiltration, Table 1 of Albus-Keefe report (Appendix B of Reference 1) provides the infiltration rate calculated from the field percolation testing utilizing the Porchet equation.

Soil permeability values from in-situ tests can vary significantly from one location to another due to the non-homogeneous characteristics inherent to most soil. However, if a sufficient amount of field and laboratory test data is obtained, a general trend of soil permeability can usually be evaluated. For this project and for storm water purposes, the test results presented herein should be considered approximate values.

STORM WATER MANAGEMENT CONCLUSIONS

1.0 Soil Types

1.1 **Fill** – A minor amount of undocumented fill exists at some locations on the property. The undocumented fill was observed to be less than 2 feet deep at the location encountered. The undocumented fill in structural improvement areas will be removed and replaced as compacted fill during grading. We expect there will be minor thicknesses of compacted fill on the property at the completion of grading. The proposed dry well system will not impact the fill as the infiltration zone will be at a depth of 50 feet or greater below existing ground surface.

1.2 **Very Old Paralic Deposits** – Very Old Paralic Deposits underlies the site. The Very Old Paralic Deposits were found to be approximately 2 to 9 feet thick. Based on boring logs, the Very Old Paralic Deposits are comprised of stiff to very stiff, sandy clay and medium dense to very dense clayey sand. The proposed dry well will be located below the very old paralic deposits.

1.3 **Stadium Conglomerate Formation** – The Stadium Conglomerate Formation underlies the Very Old Paralic Deposits. The Stadium Conglomerate Formation consists of a weakly to well cemented, yellow, fine to medium grained, cobble conglomerate in a silty/clayey sand matrix. Generally, the majority of this formation consists of a cobble conglomerate with beds of sandstone. Based on the in-situ testing, some layers within the formational units have moderately good infiltration characteristics. Other layers have slow infiltration characteristics. The results of the infiltration tests are not high enough to support full infiltration. Partial infiltration at a depth of 50 feet or deeper is considered feasible on the property.

2.0 Infiltration and Hydraulic Conductivity Rates

2.1 The results of the testing show infiltration rates ranging from approximately 0.04 to 0.5 inches per hour. These values are not high enough to support full infiltration. It is our opinion that due to the high probability for lateral water migration because of the variable soil conditions, partial infiltration is considered feasible provided infiltration occurs at depths of at least 50 feet below the existing ground surface.

3.0 Existing and Proposed Foundations and Retaining Walls

3.1 Provided infiltration occurs at a depth of 50 feet or greater below existing grading, there are no existing or proposed foundations or retaining walls that will be impacted from infiltration of storm water using the dry well system.

4.0 Groundwater

4.1 Groundwater was not encountered during our geotechnical investigation to a depth of at least 100 feet. We expect groundwater is at a depth greater than 100 feet below current grades. Groundwater is not a constraint for storm water infiltration.

5.0 Existing and New Utilities

5.1 Provided infiltration occurs at a depth of 50 feet or greater below existing grading, there are no existing or proposed utilities that will be impacted from infiltration of storm water using the dry well system.

6.0 Soil or Groundwater Contamination

6.1 We are unaware of contaminated soil or groundwater on the property. Therefore, infiltration associated with this risk is considered feasible.

7.0 Slopes

7.1 Existing cut slopes are present along the perimeter of the property. Provided infiltration occurs at a depth of 50 feet or greater below existing grading, which is below the toe of the existing cut slope, we do not expect slopes will be impacted from infiltration of storm water using the dry well system.

8.0 Storm Water Management Devices

8.1 We recommend a dry well system be utilized for storm water management. Infiltration should occur at a depth of at least 50 feet below the existing ground surface. The upper 50 feet of the dry well should be sleeved to prevent infiltration from occurring in the upper soils.

9.0 Storm Water Standard Worksheets

9.1 The SWS requests the geotechnical engineer complete the *Categorization of Infiltration Feasibility Condition* (Worksheet C.4-1 or I-8) worksheet information to help evaluate the potential for infiltration on the property. The attached Worksheet C.4-1 presents the completed information for the submittal process.

9.2 The regional storm water standards also have a worksheet (Worksheet D.5-1 or Form I-9) that helps the project civil engineer estimate the factor of safety based on several factors. Table 9.1 describes the suitability assessment input parameters related to the geotechnical engineering aspects for the factor of safety determination.

TABLE 9.1
SUITABILITY ASSESSMENT RELATED CONSIDERATIONS FOR INFILTRATION FACILITY SAFETY FACTORS

Consideration	High Concern – 3 Points	Medium Concern – 2 Points	Low Concern – 1 Point
Assessment Methods	Use of soil survey maps or simple texture analysis to estimate short-term infiltration rates. Use of well permeameter or borehole methods without accompanying continuous boring log. Relatively sparse testing with direct infiltration methods	Use of well permeameter or borehole methods with accompanying continuous boring log. Direct measurement of infiltration area with localized infiltration measurement methods (e.g., infiltrometer). Moderate spatial resolution	Direct measurement with localized (i.e. small-scale) infiltration testing methods at relatively high resolution or use of extensive test pit infiltration measurement methods.
Predominant Soil Texture	Silty and clayey soils with significant fines	Loamy soils	Granular to slightly loamy soils
Site Soil Variability	Highly variable soils indicated from site assessment or unknown variability	Soil boring/test pits indicate moderately homogenous soils	Soil boring/test pits indicate relatively homogenous soils
Depth to Groundwater/ Impervious Layer	<5 feet below facility bottom	5-15 feet below facility bottom	>15 feet below facility bottom

9.3 Table 9.2 presents the estimated factor values for the evaluation of the factor of safety. The factor of safety is determined using the information contained in Table 9.1 and the results of our geotechnical investigation. Table 9.2 only presents the suitability assessment safety factor (Part A) of the worksheet. The project civil engineer should evaluate the safety factor for design (Part B of Worksheet D.5-1) and use the combined safety factor for the design infiltration rate.

TABLE 9.2
FACTOR OF SAFETY WORKSHEET D.5-1 DESIGN VALUES – PART A[1]

Suitability Assessment Factor Category	Assigned Weight (w)	Factor Value (v)	Product (p = w x v)
Assessment Methods	0.25	3	0.75
Predominant Soil Texture	0.25	2	0.5
Site Soil Variability	0.25	2	0.5
Depth to Groundwater/Impervious Layer	0.25	1	0.25
Suitability Assessment Safety Factor, $S_A = \Sigma p$			2

1. The project civil engineer should complete Part B of Worksheet D.5-1 or Form I-9 to determine the overall factor of safety.

CONCLUSIONS AND RECOMMENDATIONS

It is our opinion that partial infiltration is feasible in a dry well system between depths of approximately 50 to 100 feet below existing grade. Our evaluation included the soil and geologic conditions, settlement and volume change of the underlying soil, slope stability, utility considerations, groundwater mounding, retaining walls, foundations and existing groundwater elevations.

Our results indicate the site has variable sub-surface permeability conditions and infiltration characteristics. Because of these site conditions, it is our opinion that there is a probability for lateral water migration. As such, we recommend infiltration occur at a depth of at least 50 feet below grade and that the upper 50 feet of the proposed dry well system be sleeved to prevent infiltration from occurring in the upper soils.

Should you have any questions regarding the letter, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Rodney C. Mikesell
GE 2533

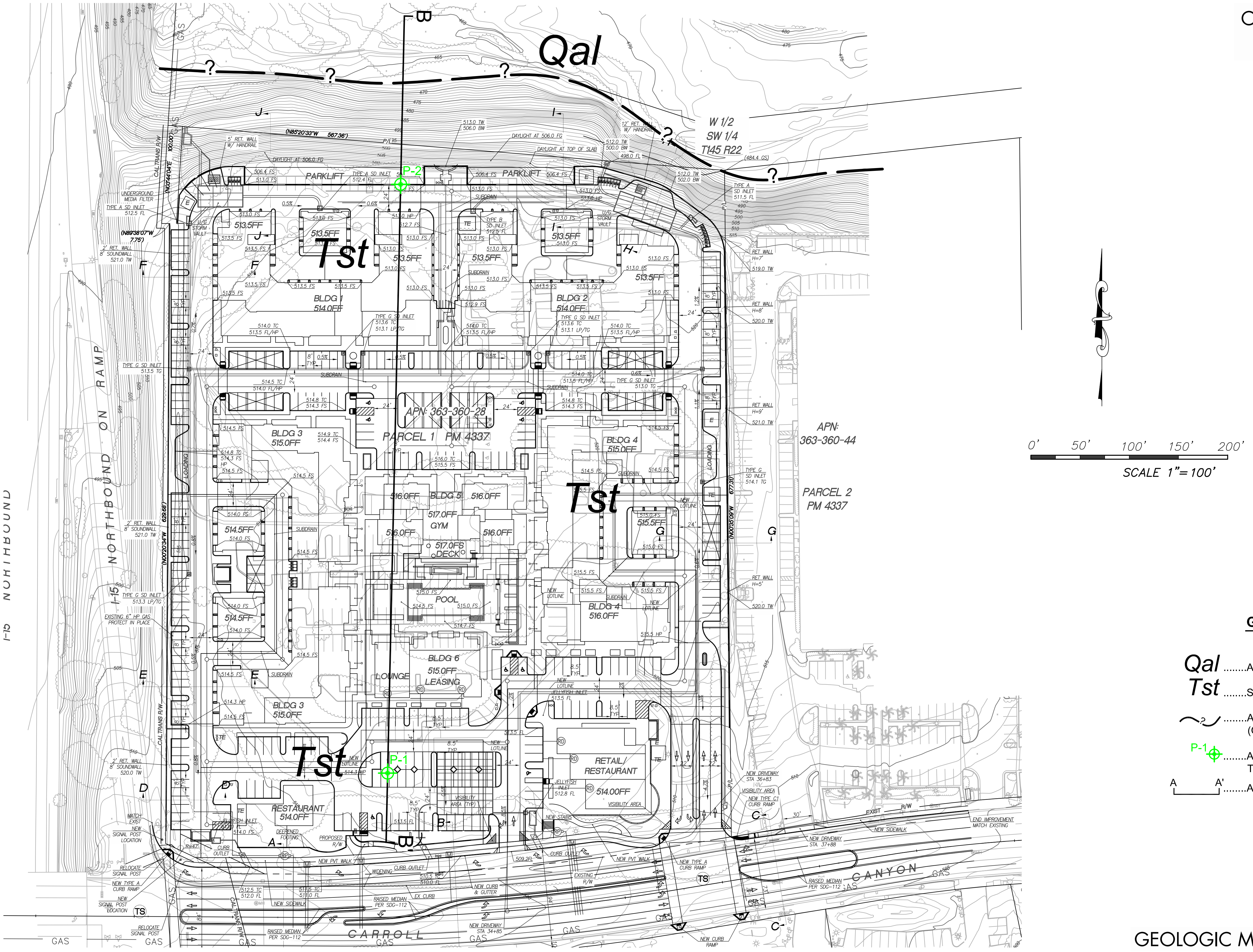
REGISTERED PROFESSIONAL ENGINEER
RODNEY C. MIKESELL
No.2533
GEOTECHNICAL
STATE OF CALIFORNIA

RCM:ejc

Attachments: Worksheet C.4.1
Figure 2 and Borings Logs P-1 and P-2 from Geocon (1/21/16)

(1) Addressee
(e-mail) PLSA
Attention: Mr. Greg Lang

CARROLL CANYON MIXED USE
SAN DIEGO, CALIFORNIA



GEOCON LEGEND

Qal	ALLUVIUM
Tst	STADIUM CONGLOMERATE
~?~	APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
P-1 ⌖	APPROX. LOCATION OF BOREHOLE PERCOLATION TEST BORING
A——A'	APPROX. LOCATION OF GEOLOGIC CROSS SECTION

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GEOLOGIC MAP
PROJECT NO. G1488 - 42 - 03
FIGURE 2
DATE 01 - 21 - 2016

Ladrillono

Plotted:01/21/2016 10:47AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G1488-42-03 (Carroll Canyon)\SHEETS\G1488-42-03 Site Plan.dwg

PROJECT NO. G1488-42-03

PERCOLATION TEST P 1

ELEV. (MSL.) **517'** DATE COMPLETED **08-28-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL/SC	**VERY OLD PARALIC DEPOSITS** Very dense, dry, light reddish brown, Clayey, fine to medium SAND to Sandy CLAY			
2								
4								
6				GP	**STADIUM CONGLOMERATE** Very dense, dry to damp, yellowish brown CONGLOMERATE with cobbles and Clayey, fine to medium SAND and gravel			
8								
10								
12								
14								
16					-Becomes sandy			
18								
20								
22					-Becomes clayey sand with gravel and cobbles			
24								
26								
28								
30								
32								
34								
36								
38								
40					-Becomes silty sand with gravel and cobbles			
42								
44								
46								
48								
50								
52								
54								

Figure A-1,
Log of PERCOLATION TEST P 1, Page 1 of 2

G1488-42-03.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1488-42-03

PERCOLATION TEST P 1

ELEV. (MSL.) **517'** DATE COMPLETED **08-28-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
56					-Gravel and cobbles in silty sand matrix			
58								
60								
62								
64								
66								
68								
70								
72								
74								
76								
78								
80					BORING TEST TERMINATED AT 80 FEET No groundwater encountered			

Figure A-1,
Log of PERCOLATION TEST P 1, Page 2 of 2

G1488-42-03.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1488-42-03

PERCOLATION TEST P 2

ELEV. (MSL.)________ DATE COMPLETED **09-08-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL/SC	**VERY OLD PARALIC DEPOSITS** Dense and very stiff, dry to damp, dark brown to grayish brown, Sandy CLAY to Clayey SAND			
8				GP	**STADIUM CONGLOMERATE** Very dense, dry, light yellowish brown, CONGLOMERATE with cobbles, Clayey SAND, and gravel			
20					-Clayey sand with cobbles and gravel			
50					-Gravel with silt, sand, and cobbles			

Depth scale: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54

Figure A-2,
Log of PERCOLATION TEST P 2, Page 1 of 2

G1488-42-03.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	☒ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1488-42-03

PERCOLATION TEST P 2

ELEV. (MSL.)________ DATE COMPLETED **09-08-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
56								
58								
60								
62					-Gravel and cobbles with silt and sand			
64								
66								
68								
70								
72								
74								
76								
78					-Sand with gravel and cobbles			
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								
100					BORING TERMINATED AT 100 FEET No groundwater encountered			

Figure A-2,
Log of PERCOLATION TEST P 2, Page 2 of 2

G1488-42-03.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
▨ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

Categorization of Infiltration Feasibility Condition

Worksheet C.4-1

Part 1 - Full Infiltration Feasibility Screening Criteria

Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

Calculated hydraulic conductivity values of 0.2 in/hr were calculated for soil between a depth of 0 to 40 feet and 0.38 in/hr for soil at a depth greater than 40 feet (see Appendix B of Geocon's report dated January 21, 2016).

The rates are less than 0.5 inches/hour. Therefore, full infiltration is not feasible.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Criteria	Screening Question	Yes	No
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Provide basis:

The area of infiltration for the proposed dry well will be at a depth of at least 50 feet below the ground surface and below the toe of adjacent slopes. In our opinion the use of dry wells at this depth will not increase the risk of geotechnical hazards (slope stability, groundwater mounding, or impact utilities).

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

<table>
<tr><th colspan="4">Worksheet C.4-1 Page 2 of 4</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>3</td><td>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:
We did not encounter groundwater within 10 feet of the bottom of the boring performed for the infiltration testing. It is our opinion that infiltration from the drywell should not impact groundwater.
Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</td></tr>
<tr><td>4</td><td>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:
It is our opinion that infiltration from the proposed drywells should not impact water balance issues. Response provided by Pasco Laret Suiter & Associates, the project's civil engineer.</td></tr>
<tr><td>Part 1 Result*</td><td colspan="2">If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration
If any answer from row 1-4 is "No", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2</td><td></td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	**Yes**	**No**
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

Calculated hydraulic conductivity values of 0.2 in/hr were calculated for soil between a depth of 0 to 40 feet and 0.38 in/hr for soil at a depth greater than 40 feet (see Appendix B of Geocon's report dated January 21, 2016).

The rates indicate the geologic conditions allow for appreciable rates.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Criteria	Screening Question	**Yes**	**No**
6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Provide basis:

The area of infiltration for the proposed dry well will be at a depth of at least 50 feet below the ground surface and below the toe of adjacent slopes. In our opinion the use of dry wells at this depth will not increase the risk of geotechnical hazards (slope stability, groundwater mounding, or impact utilities).

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

<table>
<tr><th colspan="4">Worksheet C.4-1 Page 4 of 4</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>7</td><td>Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:

We did not encounter groundwater within 10 feet of the bottom of the boring performed for the infiltration testing. It is our opinion that infiltration from the drywell should not impact groundwater.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</td></tr>
<tr><td>8</td><td>Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:

It is our opinion that downstream water rights should not be impacted. Response provided by Pasco Laret Suiter & Associates, the project's civil engineer.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</td></tr>
<tr><td>Part 2 Result*</td><td colspan="2">If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.

If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</td><td></td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

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GEOTECHNICAL ANALYSIS FOR DRY-WELL DESIGN

CARROLL CANYON MIXED USE
SAN DIEGO, CALIFORNIA

PREPARED FOR

SUDBERRY PROPERTIES, INC.
SAN DIEGO, CALIFORNIA

JANUARY 21, 2016
PROJECT NO. G1488-42-03

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GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G1488-42-03
January 21, 2016

Sudberry Properties, Inc.
5465 Morehouse Drive, Suite 260
San Diego, California 92121

Attention: Mr. Jeff Rogers

Subject: GEOTECHNICAL ANALYSIS FOR DRY WELL DESIGN
CARROLL CANYON MIXED USE
SAN DIEGO, CALIFORNIA

Dear Mr. Rogers:

In accordance with your request, we herein submit the results of our geotechnical analysis for the dry well design at the subject site. Our study included exploratory borings, borehole infiltration testing and computer analysis. The accompanying report presents the results of our study and conclusions regarding the use of dry wells for proposed water quality improvements.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Rodney C. Mikesell
GE 2533

REGISTERED PROFESSIONAL ENGINEER
RODNEY C. MIKESELL
No.2533
GEOTECHNICAL
STATE OF CALIFORNIA

Garry W. Cannon
CEG 2201
RCE 5646

REGISTERED PROFESSIONAL ENGINEER
GARRY WELLS CANNON
No. C 056468
CIVIL
STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST
GARRY WELLS CANNON
No. 2201
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

RCM:GCC:dmc

(1) Addressee
(e-mail) Pasco Laret Suiter & Associates
Attention: Mr. Mike Wolfe

6960 Flanders Drive ■ San Diego, California 92121-2974 ■ Telephone 858.558.6900 ■ Fax 858.558.6159

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4. GROUNDWATER 2
5. HYDRAULIC CONDUCTIVITY AND ESTIMATED PEAK WELL FLOW RATE 2
6. CONCLUSIONS AND RECOMMENDATIONS 4

LIMITATIONS AND UNIFORMITY OF CONDITIONS

MAPS AND ILLUSTRATIONS
    Figure 1, Vicinity Map
    Figure 2, Geologic Map

APPENDIX A
    FIELD INVESTIGATION
    Figures A-1 and A-2, Logs of Borings

APPENDIX B
    Albus-Keefe & Associates Dry Well Analysis

GEOTECHNICAL ANALYSIS FOR DRY WELL DESIGN

1. PURPOSE AND SCOPE

This report presents the results of our geotechnical analysis for the proposed water-quality dry-wells planned at the subject project located at 9850 Carroll Canyon Road northeast of the intersection of Interstate 15 and Carroll Canyon Road in San Diego, California (see Vicinity Map, Figure 1). The purpose of this study was to evaluate the hydraulic conductivity of the site soils for use in design of deep dry-wells for storm water management.

The scope of this investigation included reviewing geotechnical reports prepared for the site and adjacent projects, performing exploratory drilling, borehole infiltration testing, and engineering analyses.

The field investigation included drilling 7 small diameter borings to depths between 40 and 100 feet and installing wells to perform borehole infiltration testing. Logs of the borings and well construction are provided in Appendix A. The approximate boring locations are shown on Figure 2.

2. SITE AND PROJECT DESCRIPTION

The site is located northeast of the intersection of Interstate 15 and Carroll Canyon Road in San Diego, California. The site is bound on the north by a natural canyon drainage, east by existing office buildings, south by Carroll Canyon Road, and west by the on-ramp to northbound Interstate 15. Two office buildings occupy the site, a single story office building is situated on the northwest side of the site, and a two-story office building is situated on the southeast side of the site. Paved parking lots and access driveways lie between and to the north of the existing buildings. Numerous eucalyptus trees also occupy the property.

The property slopes gently from southeast to the north/northwest with existing site elevations ranging from near 522 feet Mean Sea Level (MSL) to 510 feet MSL. Natural slopes lie north and west of the property. The slopes are approximately 10 to 45 feet high with inclinations between 1.5:1 and 2:1 (horizontal to vertical).

Development will consist of demolition of existing improvements on the property and constructing multi-family apartment buildings and commercial buildings. Underground storm-water detention vaults are planned with deep dry-wells for storm water infiltration.

We understand that MaxWell Plus Drainage systems will be used for storm water collection and infiltration. Two infiltration areas have been identified; one at the northwest corner of the property, the other on the south side. The wells are expected to consist of 4-foot diameter chambers that extend to depths of 50 to 100 feet. We understand that the upper 50 feet of the well will be sleeved such that infiltration does not occur in the near surface soils.

3. SOIL AND GEOLOGIC CONDITIONS

Based on our exploratory borings, review of the referenced reports, and published geologic literature, the bedrock unit underlying the property is the Stadium Conglomerate. Surficial soils consisting of undocumented fill and very old terrace deposits were encountered in the upper approximately 2 to 5 feet across the site. The surficial soils have not been mapped on Figure 2.

The Tertiary-age Stadium Conglomerate Formation was encountered during previous geotechnical investigations performed on the property and in the infiltration test borings performed for this study. The Stadium Conglomerate consists of a weakly to well cemented, fine to medium grained, cobble conglomerate in a silty/clayey sand matrix. Generally, the majority of this formation consists of a cobble conglomerate with discontinuous beds of sandstone.

4. GROUNDWATER

Groundwater was not encountered during our investigation. Based on our experience in the area, we expect groundwater to be deeper than 100 feet below the existing ground surface.

5. HYDRAULIC CONDUCTIVITY AND ESTIMATED PEAK WELL FLOW RATE

The test method employed in this study to estimate hydraulic conductivity consisted of drilling borings, P1 and P2, to an approximate depth of 80 to 100 feet below existing ground surface using a six-inch-diameter, air-percussion drill. No samples were retrieved during drilling due to the rocky nature of the geologic formation (Stadium Conglomerate). Boring logs are provided in Appendix A.

At each well location a 2-inch-diameter, PVC well casing was installed in the boreholes with 30-foot-long screened at the bottom. Water was injected into the well and the rate of change in head over time was measured and recorded using an In-Situ Level TROLL 700 transducer coupled with an In-Situ RuggedReader handheld PC.

Data from the borehole testing was provided to Albus-Keefe & Associates to perform a steady-state analysis to develop the estimated peak flow capacity of the dry well. The report from Albus-Keefe & Associates is provided in Appendix B. The following table provides a summary of their calculated hydraulic conductivity, average infiltration rate, and estimated peak flow assuming a 100-foot deep well with a 50-foot upper non-infiltrating chamber. These values are unfactored. The project civil engineer should use an appropriate factor of safety in the design of the well system.

TABLE 5
ESTIMATED UNFACTORED INFILTRATION RATE AND PEAK FLOW

Boring/(Wells)	**Depth (feet)**	**Hydraulic Conductivity (in/hr)**	**Effective Average Well Infiltration Rate (in/hr)**	**Well Peak Flow (cfs)**
P-1 and P-2	0 – 40	0.2	4.9	0.07
	< 40	0.38		

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 The values provided in Table 5 can be used to design the water quality improvements. The well peak flow is based on a 100-foot deep well with the upper 50 feet cased. The values are unfactored, therefore, an appropriate factor of safety should be incorporated in the design.

6.2 Based on information provided by the dry-well manufacture (Torrent Resources), the proposed MaxWell Plus Drainage system will have a primary settling chamber that will remove sediment such that siltation in the well should be negligible, therefore, no reduction in the effective infiltration rate as a result of siltation has been recommended.

6.3 Based on analysis prepared by Albus-Keefe & Associates (see Appendix B), it is our opinion the site is suitable for the proposed dry wells provided they are designed appropriately for the estimated well peak flow volume.

6.4 Considering infiltration from the proposed dry wells will not occur in the upper 50 feet below pad grade, it is our opinion that the dry wells will not result in daylight water seepage or impact adjacent properties, utilities, or cause slope instability.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

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N

NO SCALE

VICINITY MAP

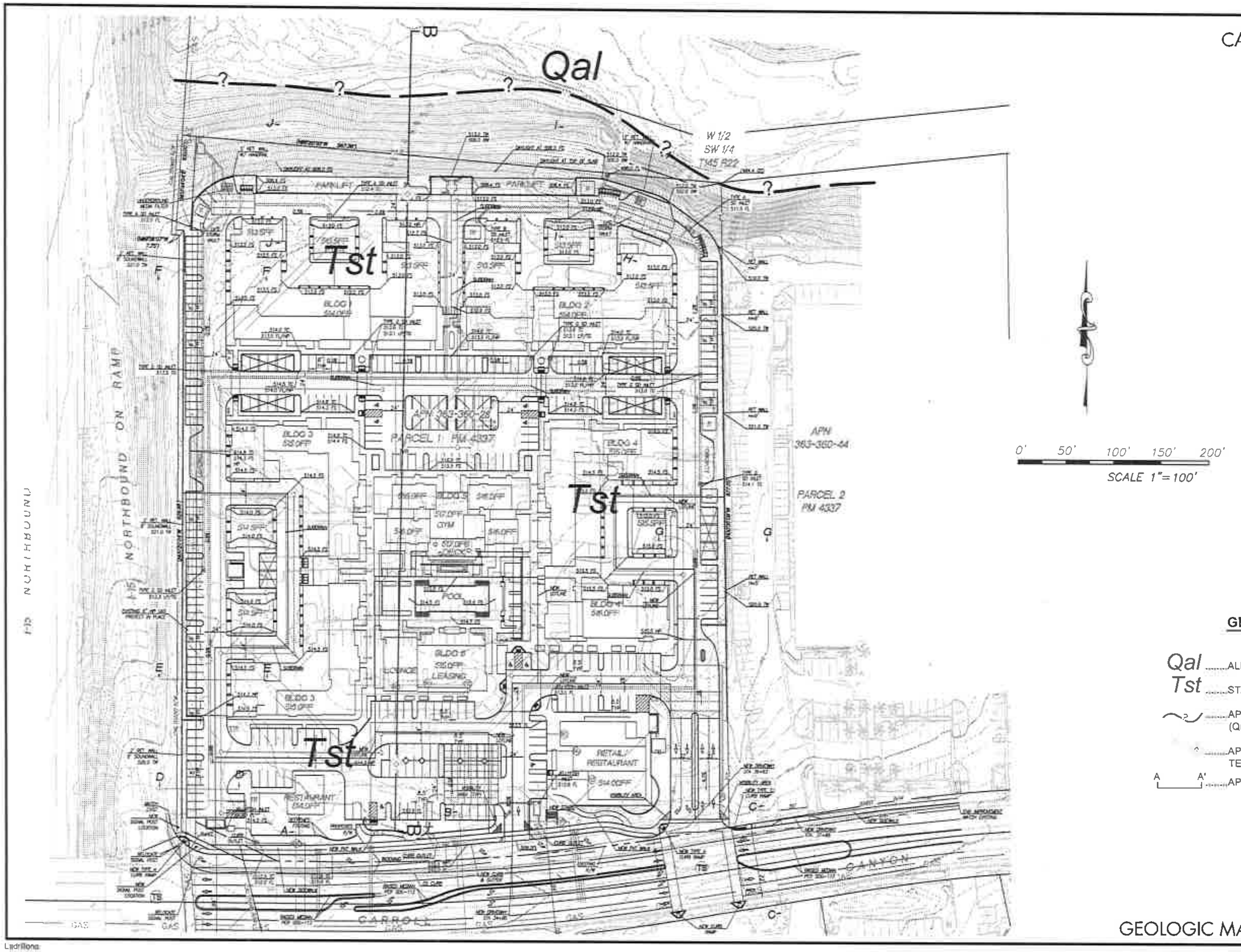
GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

CARROLL CANYON MIXED USE
SAN DIEGO, CALIFORNIA

RM / AML		DSK/GTYPD	DATE 01 - 21 - 2016	PROJECT NO. G1488 - 42 - 03	FIG. 1

Plotted:01/21/2016 9:15AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G1488-42-03 (Carroll Canyon)\DETAILS\G1488-42-03 Vic Map.dwg

CARROLL CANYON MIXED USE
SAN DIEGO, CALIFORNIA



GEOCON LEGEND

Qal ....ALLUVIUM
Tst ....STADIUM CONGLOMERATE
~?~ ....APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
● ....APPROX. LOCATION OF BOREHOLE PERCOLATION TEST BORING
A——A' ....APPROX. LOCATION OF GEOLOGIC CROSS SECTION

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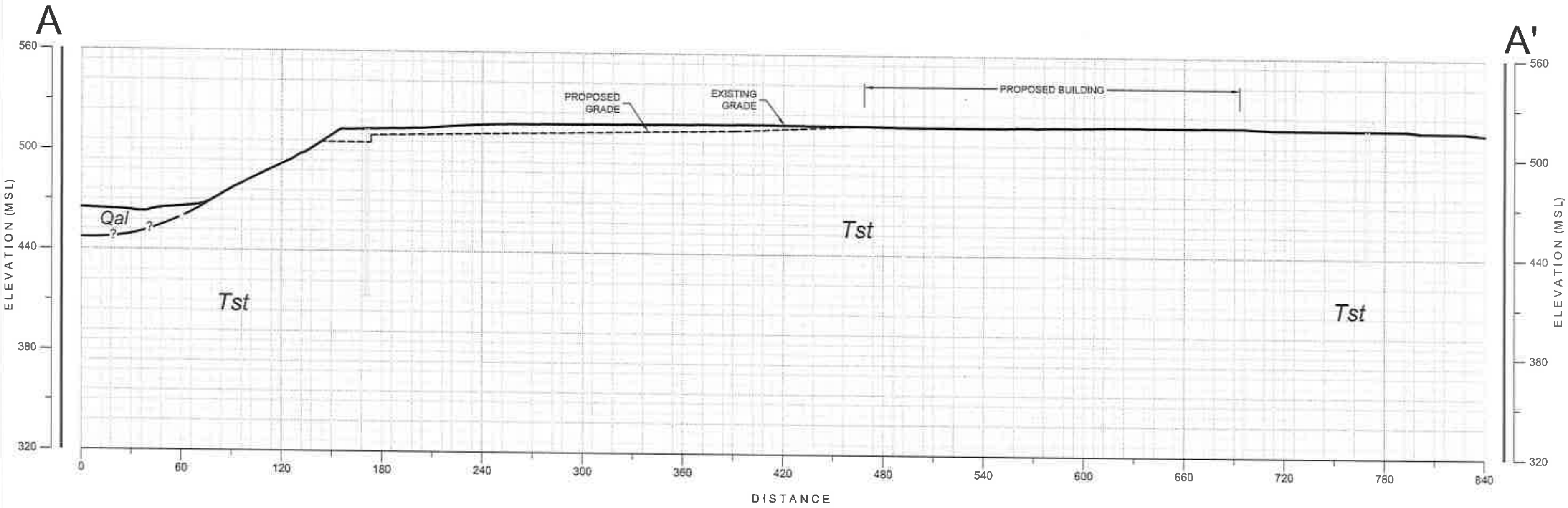
GEOLOGIC MAP
PROJECT NO. G1488 - 42 - 03
FIGURE 2
DATE 01 - 21 - 2016

Ladrillono

Plotted:01/21/2016 10:47AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G1488-42-03 (Carroll Canyon)\SHEETS\G1488-42-03 Site Plan.dwg

CARROLL CANYON MIXED USE
SAN DIEGO, CALIFORNIA



GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 60' (Vert. = Horiz.)

GEOCON LEGEND

Qal........ALLUVIUM

Tst........STADIUM CONGLOMERATE

~?~........APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

........APPROX. LOCATION OF BOREHOLE PERCOLATION TEST BORING

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6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159
PROJECT NO. G1488 - 42 - 03
FIGURE 3
DATE 01 - 21 - 2016

LADRILLONO

Plotted:01/21/2016 9:12AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G1488-42-03 (Carroll Canyon)\SHEETS\G1488-42-03 XSections.dwg

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

We performed the field investigation on August 28, 2015. The field investigation consisted of drilling two exploratory borings for percolation testing. The approximate locations of our exploratory borings are shown on the geologic map, Figure 2. The borings were excavated to depths of 80 feet to100 feet below existing grade using a Canterra 450 air percussion drill rig with 6-inch diameter bit.

Boring logs are presented on Figures A-1 and A-2. The boring logs depict the general soil and geologic conditions encountered.

PROJECT NO. G1488-42-03

PERCOLATION TEST P 1

ELEV. (MSL.) **517'** DATE COMPLETED **08-28-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL/SC	**VERY OLD PARALIC DEPOSITS** Very dense, dry, light reddish brown, Clayey, fine to medium SAND to Sandy CLAY			
2								
4								
6				GP	**STADIUM CONGLOMERATE** Very dense, dry to damp, yellowish brown CONGLOMERATE with cobbles and Clayey, fine to medium SAND and gravel			
8								
10								
12								
14								
16					-Becomes sandy			
18								
20								
22					-Becomes clayey sand with gravel and cobbles			
24								
26								
28								
30								
32								
34								
36								
38								
40					-Becomes silty sand with gravel and cobbles			
42								
44								
46								
48								
50								
52								
54								

Figure A-1,
Log of PERCOLATION TEST P 1, Page 1 of 2

G1488-42-03.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	☒ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1488-42-03

PERCOLATION TEST P 1

ELEV. (MSL.) **517'** DATE COMPLETED **08-28-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
56 58 60 62 64 66 68 70 72 74 76 78					-Gravel and cobbles in silty sand matrix			
80					BORING TEST TERMINATED AT 80 FEET No groundwater encountered			

Figure A-1,
Log of PERCOLATION TEST P 1, Page 2 of 2

G1488-42-03.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL

▨ ... DISTURBED OR BAG SAMPLE

◧ ... STANDARD PENETRATION TEST

◩ ... CHUNK SAMPLE

■ ... DRIVE SAMPLE (UNDISTURBED)

▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1488-42-03

PERCOLATION TEST P 2

ELEV. (MSL.) ________ DATE COMPLETED **09-08-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL/SC	**VERY OLD PARALIC DEPOSITS** Dense and very stiff, dry to damp, dark brown to grayish brown, Sandy CLAY to Clayey SAND			
2								
4								
6								
8				GP	**STADIUM CONGLOMERATE** Very dense, dry, light yellowish brown, CONGLOMERATE with cobbles, Clayey SAND, and gravel			
10								
12								
14								
16								
18								
20					-Clayey sand with cobbles and gravel			
22								
24								
26								
28								
30								
32								
34								
36								
38								
40								
42								
44								
46								
48								
50					-Gravel with silt, sand, and cobbles			
52								
54								

Figure A-2,
Log of PERCOLATION TEST P 2, Page 1 of 2

G1488-42-03.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
▨ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
◪ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1488-42-03

PERCOLATION TEST P 2

ELEV. (MSL.)________ DATE COMPLETED **09-08-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
56		▨						
58		▨						
60		▨						
62		▨			-Gravel and cobbles with silt and sand			
64		▨						
66		▨						
68		▨						
70		▨						
72		▨						
74		▨						
76		▨						
78		▨			-Sand with gravel and cobbles			
80		▨						
82		▨						
84		▨						
86		▨						
88		▨						
90		▨						
92		▨						
94		▨						
96		▨						
98		▨						
100					BORING TERMINATED AT 100 FEET No groundwater encountered			

Figure A-2,
Log of PERCOLATION TEST P 2, Page 2 of 2

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	☒ ... DISTURBED OR BAG SAMPLE	◩ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX B

APPENDIX B

GEOTECHNICAL ANALYSES FOR PROPOSED WATER QUALITY IMPROVEMENTS
PREPARED BY ALBUS-KEEFE & ASSOCIATES, INC.

FOR

CARROLL CANYON MIXED USE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1488-42-03

ALBUS-KEEFE & ASSOCIATES, INC
GEOTECHNICAL CONSULTANTS

January 19, 2016
J.N.: 2459.00

Mr. Rod Mikesell
Geocon Incorporated
6960 Flanders Drive
San Diego, CA 92121

Subject: **Preliminary Geotechnical Analyses for Proposed Water Quality Improvements, Carroll Canyon Road Project, San Diego, California.**

Dear Mr. Mikesell,

Pursuant to your request, ***Albus-Keefe & Associates, Inc.*** has completed the analyses of percolation data you have provided for the subject site. The scope of this investigation consisted of the following:

- Detailed review of the percolation test data and boring logs provided
- Engineering analysis of the data
- Preparation of this report

ANALYSIS OF DATA

Subsurface Conditions

Descriptions of the earth materials encountered during Geocon Incorporated's (Geocon) investigation are presented in detail on the Exploration Logs presented in Appendix A. From these logs, a general lithology profile was developed for well flow modeling. The model consists of two zones having unique infiltration properties. The upper zone is assumed to be 40 feet thick. The second zone was assumed to extend infinitely below the first zone. Both zones are essentially sandy materials with varying amounts of fine contents that affect the permeability characteristics.

Ground Water

Groundwater was not encountered during GEOCON's subsurface exploration to a maximum depth of 100 feet below the existing ground surface. Groundwater was assumed to be present a significant depth such that it does not impact the analyses.

Percolation Data

Analyses were performed to evaluate permeability using the data obtained by Geocon's field percolation testing. The composite permeability of the infiltration zone was back-calculated using the Porchet equation and the results are summarized in Table 1 below.

TABLE 1
Summary of Back-Calculated Permeability Coefficient

Location	Depth of Well (ft)	Time interval, Δt (min.)	Initial Depth to Water, D_o (ft)	Final Depth to Water, D_f (ft)	Change in Water level, ΔD (in)	Infiltration Rate, It (in/hr)
B-1	80	25	49.1	52.704	43.21	0.38
	80	25	52.81	54.88	24.83	0.24
	80	10	54.96	55.61	7.76	0.20
	80	10	55.68	56.27	7.03	0.18
	80	10	56.33	56.87	6.43	0.17
	80	10	56.91	57.41	5.92	0.16
	80	10	57.46	57.91	5.4	0.15
	80	10	57.95	58.38	5.18	0.14
	80	10	58.42	58.83	4.91	0.14
	80	10	58.86	59.23	4.44	0.13
	80	10	59.28	59.64	4.32	0.13
	80	10	59.67	60.02	4.2	0.12
	80	10	60.05	60.39	4.08	0.12
	80	10	60.43	60.76	3.96	0.12
	80	10	60.79	61.1	3.72	0.12
	80	10	61.13	61.41	3.36	0.11
	80	10	61.45	61.72	3.24	0.10
	80	10	61.75	62.02	3.24	0.10
	80	10	62.04	62.3	3.12	0.10
	80	10	62.34	62.55	2.52	0.08
	80	18	62.57	62.74	2.04	0.04
B-2	80	25	54.91	58.839	47.21	0.50
	80	25	58.98	61.66	32.11	0.39
	80	10	61.75	62.54	9.54	0.31
	80	10	62.63	63.39	9.1	0.31
	80	10	63.47	64.14	8.05	0.28
	80	10	64.21	64.83	7.39	0.27
	80	10	64.9	65.45	6.67	0.25
	80	10	65.51	66.02	6.07	0.24
	80	10	66.07	66.53	5.52	0.22
	80	10	66.59	67	4.99	0.2
	80	10	67.05	67.45	4.8	0.2
	80	10	67.5	67.86	4.43	0.19
	80	10	67.91	68.26	4.15	0.18
	80	10	68.31	68.62	3.73	0.17

Location	Depth of Well (ft)	Time interval, Δt (min.)	Initial Depth to Water, D_o (ft)	Final Depth to Water, D_f (ft)	Change in Water level, ΔD (in)	Infiltration Rate, It (in/hr)
B-2	80	10	68.65	68.92	3.24	0.15
	80	10	68.94	69.22	3.31	0.15
	80	10	69.25	69.51	3.18	0.15
	80	10	69.53	69.75	2.62	0.13
	80	10	69.77	70	2.78	0.14
	80	10	70.03	70.25	2.63	0.13
	80	10	70.26	70.47	2.59	0.13
	80	3	70.49	70.54	0.59	0.10
	100	25	65.47	72.331	82.36	0.79
	100	25	72.51	76.37	46.32	0.54
	100	10	76.5	77.52	12.24	0.40
	100	10	77.64	78.5	10.32	0.35
	100	10	78.6	79.34	8.94	0.32
	100	10	79.41	80.04	7.57	0.28
	100	10	80.12	80.74	7.49	0.29
	100	10	80.81	81.4	7.03	0.28
	100	10	81.45	82.21	9.11	0.37
	100	10	82.29	83	8.53	0.37
	100	10	83.06	83.73	8.14	0.36
	100	10	83.78	84.42	7.67	0.36
	100	10	84.51	85.34	9.98	0.49
	100	10	85.46	86.13	8.04	0.42
	100	10	86.24	87.23	11.87	0.66
	100	10	87.3	88.01	8.57	0.52
	100	10	88.09	88.78	8.3	0.53
	100	10	88.79	88.9	1.32	0.09
	100	10	88.98	89.65	8.03	0.56
	100	10	89.7	90.03	3.89	0.28
	100	10	90.03	90.42	4.58	0.35
	100	10	90.46	90.77	3.77	0.30
	100	10	90.79	90.92	1.49	0.12
	100	10	90.89	91.19	3.61	0.30
	100	10	91.23	91.47	2.82	0.24

Design of Dry Well

Infiltration in a dry well was modeled using the software Seep/W, version 2007, by Geo-Slope International. The program allows for modeling of both partially-saturated and saturated porous medium using a finite element approach to solve Darcy's Law. The program can evaluate both steady-state and transient flow in planer and axisymmetric cases. Boundaries of the model can be identified with various conditions including fix total head, fix pressure head, fix flow rate, and head as a function of flow. Soil conductivity properties can be modeled with either Fredlund et al (1994), Green and Corey (1971), or Van Genuchten (1980). The Van Genuchten parameters were selected for use in our models and were based on test results of particle-size analyses and estimated in-place densities. The saturated conductivities for the infiltration zones are set to the values obtained from back-calculation of the percolation tests.

From the 3 well tests, we identified two different zones with unique permeability characteristics. A model was setup with two zones of material to represent the general soil profile at each of the two boring locations. A summary of the well profiles are provided in Tables 2.

TABLE 2
Summary of Characteristic Curve Parameters

Material No.	Depth (ft)	Ks (in/hr)	Van Genuchten Parameters				
			a (1/cm)	n	m	Sat. Water Content	Residual Water Content
1	0-40	0.20	0.023	1.11	0.10	0.34	0.01
2	+40	0.38	0.012	1.13	0.12	0.33	0.01

Steady state analysis was performed to estimate the maximum inflow that the wells could accommodate. The water head was set at a depth of 5 feet below ground level and water was not allowed to infiltrate in the upper 50 feet. Using a well that is 4 feet in diameter and 100 feet in depth, we obtain a static total flow of 0.07 ft^3/sec. An effective percolation surface area (wetted surface) of 640.89 ft^2 was determined for the zone from 50 to 100 feet. The static flow divided by the effective surface area (Q/A) would then yield an average peak infiltration rate of 4.9 in/hr. A Plot depicting the resulting pressure head contours and flow vectors for the model are provided on Plate B-1 in Appendix B.

To evaluate the time required to empty the well once no more water is introduced, the model was reanalyzed with a variable head condition that was dependent upon the volume of water leaving the well. As water infiltrates into the surrounding soil, the volume of water remaining in the well is reduced as well as the resulting water head. A graph of the well head versus exit volume for a depth of 100 feet is provided in Figure 3. The models are based on an upper chamber that is 20 feet long and 4 feet in diameter set in a shaft 6 feet in diameter. The remainder of the well is assumed to be 4 feet in diameter below the chamber section. Gravel is assumed to occupy the annular space between the outer and inner diameters and the lower shaft section. The function assumes a void ratio of 0.4

within the zones occupied by gravel. If some other well configuration is used, then the analyses may require updating. A more detailed model of the dry well design is attached as Plate 1.

Analysis was performed as a transient case over a total time of 30 hours. The condition in the model was evaluated in 30 minute increments of time over the total duration. The water was completely evacuated in less than 27 hours for a 100 foot deep well. Plots depicting the resulting pressure head contours and flow vectors are provided in Appendix B on Plates B-2 through B-6. A plot of time versus water height in the well is shown on Figure 4.

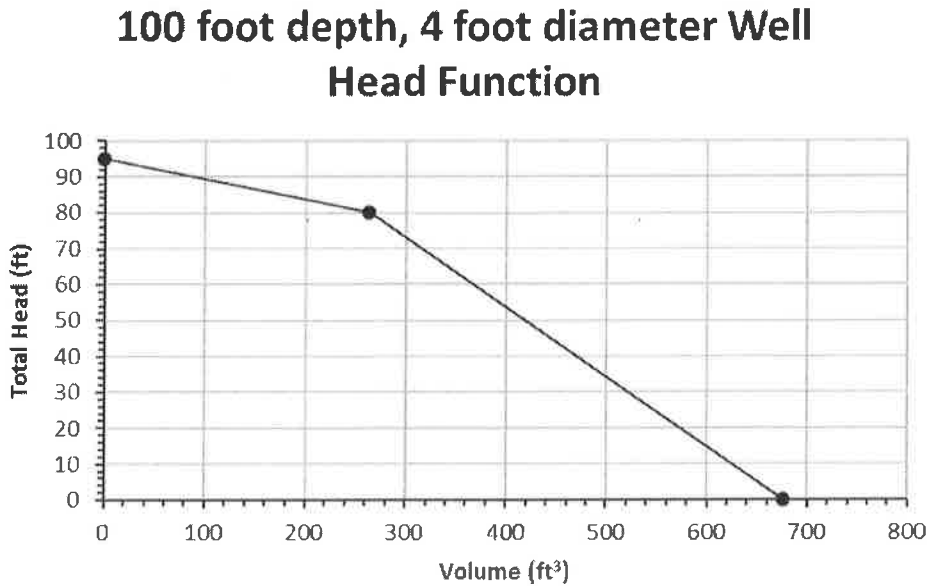


FIGURE 3

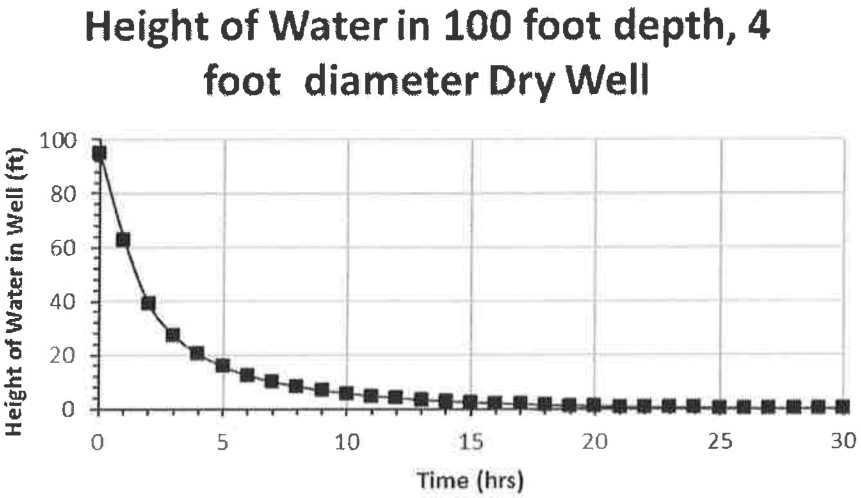


FIGURE 4

CONCLUSIONS AND RECOMMENDATIONS

Results of our work indicate a storm water disposal system consisting of a dry well is feasible at the site. Based on results of percolation testing and analyses, the percolation rate for a 4-foot-diameter dry well with a total depth of at least 100 feet may utilize an unfactored peak flow rate of 0.07 ft^3/sec. At this flow rate, an average measured peak infiltration rate of 4.9 in is achieved by the dry well system when applied to the wetted surface area from 50 to 100 feet.

An appropriate factor of safety should be applied to these values as required by the appropriate governmental authority. The project geotechnical consultant should observe the drilling to confirm the intent of this report.

Should you require multiple dry wells across the site, the wells should be spaced at least 60 feet center to center for a 4-foot-diameter dry well with a total depth of at 100 feet to avoid cross influence. Wells spaced closer than 60 feet will require a reduction factor to account for cross influence. The dry wells should be setback from structures, slopes, streets, and property lines as recommended by the geotechnical engineer of record.

The actual flow capacity of the dry well could be more or less than the estimated value. As such, provisions should be made to accommodate excess flow quantities in the event the dry well does not infiltrate the anticipated amount. The design also assumes that sediments will be removed from the inflowing water. Sediments that are allowed to enter the dry well will tend to degrade the flow capacity by plugging up the infiltration surfaces.

The dry well should be constructed as indicated on Plate 1. A cement slurry should be used around the concrete chamber to prevent infiltration within the upper 20 feet. Additional provisions will be require to prevent infiltration between the depths of 20 and 50 feet such as slurry backfill, a casing, or waterproof membrane. Specific recommendations should be provided by the contractor as approved by the project geotechnical consultant.

The dry well shaft may be adequately stable under temporary construction conditions for uncased drilling. However, most of the site soils are granular and may be prone to sloughing and caving shortly after drilling. The contractor should be prepared to provide casing to maintain stability of the shaft in the event of caving. Workers should not enter the shaft unless the excavation is laid back or shored in accordance with OSHA requirements. The placement and compaction of backfill materials, including the gravel, should be observed by the project geotechnical consultant.

LIMITATIONS

This report is based on the geotechnical data as described herein. The materials encountered in Geocon's boring excavations and utilized in the laboratory testing as part of their investigation are believed representative of the project area, and the conclusions and recommendations contained in this report are presented on that basis. However, soil and bedrock materials can vary in characteristics between points of exploration, both laterally and vertically, and those variations could affect the conclusions and recommendations contained herein. As such, observations by a geotechnical consultant during the construction phase of the storm water infiltration systems are essential to confirming the basis of this report.

This report has been prepared consistent with that level of care being provided by other professionals providing similar services at the same locale and time period. The contents of this report are professional opinions and as such, are not to be considered a guaranty or warranty.

This report should be reviewed and updated after a period of one year or if the site ownership or project concept changes from that described herein.

This report has been prepared for the exclusive use of **Geocon Incorporated** to assist the project consultants in the design of the proposed development. This report has not been prepared for use by parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

This report is subject to review by the controlling governmental agency.

We appreciate this opportunity to be of service to you. If you should have any questions regarding the contents of this report, please do not hesitate to call.
Sincerely,

ALBUS-KEEFE & ASSOCIATES, INC.

Andrew J. Atry
Project Engineer
P.E. C84728

C 84728

Reviewed by:

David E. Albus
Principal Engineer
G.E. 2455

No. 2455
Exp. 12/31/16

Enclosures: Plate 1– Diagram of Dry Well
Appendix A – Previous Data by Geocon
Appendix B - Percolation Analyses

REFERENCES

Reports

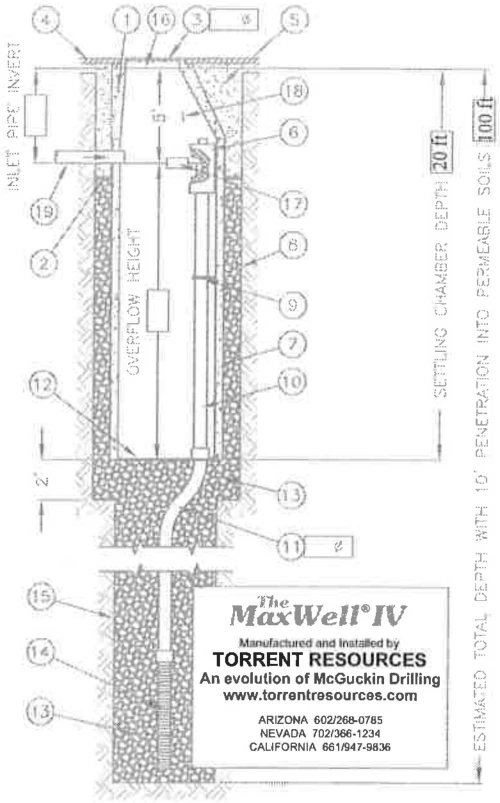
Log of Percolation Test's, Carroll Canyon Road, San Diego, County of San Diego, California, prepared by Geocon Inc. (P.N. G1488-42-03).

MAXWELL® IV DRAINAGE SYSTEM DETAIL AND SPECIFICATIONS

ITEM NUMBERS

1. Manhole Cone – Modified Flat Bottom.
2. Moisture Membrane – 6 Mil. Plastic. Applies only when native material is used for backfill. Place membrane securely against sides of the cone and hole sidewall.
3. Bolted Ring & Grate – Diameter as shown. Clean cast iron with wording "Storm Water Only" in raised letters. Bolted in 2 locations and secured to cone with mortar. Rim elevation ±0.02' of plans.
4. Graded Basin or Paving (by Others).
5. Compacted Base Material – 1-Sack Slurry except in landscaped installations with no pipe connections.
6. PureFlo® Debris Shield – Rolled 16 ga. steel X 24" length with vented anti-siphon and internal .265" Max. SWO flattened expanded steel screen X 12" length. Fusion bonded epoxy coated.
7. Pre-cast Liner – 4000 PSI concrete 48" ID. X 54" OD. Center in hole and align sections to maximize bearing surface.
8. Min. 6' Ø Drilled Shaft.
9. Support Bracket – Formed 12 Ga. steel. Fusion bonded epoxy coated.
10. Overflow Pipe – Sch. 40 PVC mated to drainage pipe at base seal.
11. Drainage Pipe – ABS highway grade with TRI-A coupler. Suspend pipe during backfill operations to prevent buckling or breakage. Diameter as noted.
12. Base Seal – Geotextile or concrete slurry.
13. Rock – Washed, sized between 3/8" and 1-1/2" to best complement soil conditions.
14. FloFast® Drainage Screen – Sch. 40 PVC 0.120" slotted well screen with 32 slots per row/ft. Diameter varies 120" overall length with TRI-B coupler.
15. Min. 4' Ø Shaft – Drilled to maintain permeability of drainage soils.
16. Fabric Seal – U.V. resistant geotextile – to be removed by customer at project completion.
17. Absorbent – Hydrophobic Petrochemical Sponge Min. to 128 oz. capacity.
18. Freeboard Depth Varies with inlet pipe elevation. Increase settling chamber depth as needed to maintain all inlet pipe elevations above overflow pipe inlet.
19. Optional Inlet Pipe (Maximum 4", by Others). Extend moisture membrane and compacted base material or 1 sack slurry backfill below pipe invert.

The referenced drawing and specifications are available on CAD either through our office or web site. This detail is copyrighted (2004) but may be used as is in construction plans without further release. For information on product application, individual project specifications or site evaluation, contact our Design Staff for no-charge assistance in any phase of your planning.



AZ Lic. ROC070465 A, ROC047067 B-4, ADWR 363
CA Lic. 528080 C-42 HAZ
NV Lic. 0035350 A - NM Lic. 90504 GF04

U.S. Patent No. 4,923,330 - ™ Trademark 1974, 1990, 2004

CALCULATING MAXWELL IV REQUIREMENTS

The type of property, soil permeability, rainfall intensity and local drainage ordinances determine the number and design of MaxWell Systems. For general applications draining retained stormwater, use one standard **MaxWell IV** per the instructions below for up to 3 acres of landscaped contributory area, and up to 1 acre of paved surface. For larger paved surfaces, subdivision drainage, nuisance water drainage, connecting pipes larger than 4" Ø from catch basins or underground storage, or other demanding applications, refer to our **MaxWell® Plus** System. For industrial drainage, including gasoline service stations, our **Envibro® System** may be recommended. For additional considerations, please refer to **"Design Suggestions For Retention And Drainage Systems"** or consult our Design Staff.

COMPLETING THE MAXWELL IV DRAWING

To apply the **MaxWell IV** drawing to your specific project, simply fill in the blue boxes per instructions below. For assistance, please consult our Design Staff.

100 feet ESTIMATED TOTAL DEPTH

The Estimated Total Depth is the approximate depth required to achieve 10 continuous feet of penetration into permeable soils. Torrent utilizes specialized **"crowd"** equipped drill rigs to penetrate difficult, cemented soils and to reach permeable materials at depths up to **180 feet.** Our extensive database of drilling logs and soils information is available for use as a reference. Please contact our Design Staff for site-specific information on your project.

20 feet SETTLING CHAMBER DEPTH

On MaxWell IV Systems of over 30 feet overall depth and up to 0.25cfs design rate, the **standard** Settling Chamber Depth is **18 feet.** For systems exposed to greater contributory area than noted above, extreme service conditions, or that require higher design rates, chamber depths up to 25 feet are recommended.

' OVERFLOW HEIGHT

The Overflow Height and Settling Chamber Depth determine the effectiveness of the settling process. The higher the overflow pipe, the deeper the chamber, the greater the settling capacity. For normal drainage applications, an overflow height of **13 feet** is used with the standard settling chamber depth of **18 feet.** Sites with higher design rates than noted above, heavy debris loading or unusual service conditions require greater settling capacities

"Ø DRAINAGE PIPE

This dimension also applies to the **PureFlo®** Debris Shield, the **FloFast®** Drainage Screen, and fittings. The size selected is based upon system design rates, soil conditions, and the need for adequate venting. Choices are 6", 8", or 12" diameter. Refer to "Design Suggestions for Retention and Drainage Systems" for recommendations on which size best matches your application.

"Ø BOLTED RING & GRATE

Standard models are quality cast iron and available to fit 24" Ø or 30" Ø manhole openings. All units are bolted in two locations with wording "Storm Water Only" in raised letters. For other surface treatments, please refer to "Design Suggestions for Retention and Drainage Systems."

"Ø INLET PIPE INVERT

Pipes up to 4" in diameter from catch basins, underground storage, etc. may be connected into the settling chamber. Inverts deeper than 5 feet will require additional settling chamber depth to maintain effective overflow height.

TORRENT RESOURCES INCORPORATED
1509 East Elwood Street, Phoenix Arizona 85040-1391
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An evolution of McGuckin Drilling
The watermark for drainage solutions.®

Plate 1

APPENDIX A

PREVIOUS DATA BY GEOCON

PROJECT NO. G1488-42-03

PERCOLATION TEST P 1

ELEV. (MSL.) **517'** DATE COMPLETED **08-28-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL/SC	**VERY OLD PARALIC DEPOSITS** Very dense, dry, light reddish brown, Clayey, fine to medium SAND to Sandy CLAY			
2								
4								
				GP	**STADIUM CONGLOMERATE** Very dense, dry to damp, yellowish brown CONGLOMERATE with cobbles and Clayey, fine to medium SAND and gravel			
6								
8								
10								
12								
14								
16					-Bccomcs sandy			
18								
20								
22					-Becomes clayey sand with gravel and cobbles			
24								
26								
28								

Figure A-20,
Log of PERCOLATION TEST P 1, Page 1 of 3

G1488-42-03.GPJ

SAMPLE SYMBOLS	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	☒ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1488-42-03

PERCOLATION TEST P 1

ELEV. (MSL.) **517'** DATE COMPLETED **08-28-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30								
32								
34								
36								
38								
40					-Becomes silty sand with gravel and cobbles			
42								
44								
46								
48								
50								
52								
54								
56					-Gravel and cobbles in silty sand matrix			
58								

Figure A-20,
Log of PERCOLATION TEST P 1, Page 2 of 3

G1488-42-03.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1488-42-03

PERCOLATION TEST P 1

ELEV. (MSL.) **517'** DATE COMPLETED **08-28-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60								
62								
64								
66								
68								
70								
72								
74								
76								
78								
80					BORING TEST TERMINATED AT 80 FEET No groundwater encountered			

Figure A-20,
Log of PERCOLATION TEST P 1, Page 3 of 3

G1488-42-03.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	☒ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1488-42-03

PERCOLATION TEST P 2

ELEV. (MSL.)________ DATE COMPLETED **09-08-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL/SC	**VERY OLD PARALIC DEPOSITS** Dense and very stiff, dry to damp, dark brown to grayish brown, Sandy CLAY to Clayey SAND			
2								
4								
6								
8				GP	**STADIUM CONGLOMERATE** Very dense, dry, light yellowish brown, CONGLOMERATE with cobbles, Clayey SAND, and gravel			
10								
12								
14								
16								
18								
20					-Clayey sand with cobbles and gravel			
22								
24								
26								
28								

Figure A-21,
Log of PERCOLATION TEST P 2, Page 1 of 4

G1488-42-03.GPJ

SAMPLE SYMBOLS	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	☒ ... DISTURBED OR BAG SAMPLE	◩ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Plate A-4

GEOCON

PROJECT NO. G1488-42-03

PERCOLATION TEST P 2

ELEV. (MSL.)________ DATE COMPLETED **09-08-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30								
32								
34								
36								
38								
40								
42								
44								
46								
48								
50					-Gravel with silt, sand, and cobbles			
52								
54								
56								
58								

G1488-42-03.GPJ

Figure A-21,
Log of PERCOLATION TEST P 2, Page 2 of 4

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1488-42-03

PERCOLATION TEST P 2

ELEV. (MSL.) ________ DATE COMPLETED **09-08-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60								
62					-Gravel and cobbles with silt and sand			
64								
66								
68								
70								
72								
74								
76								
78					-Sand with gravel and cobbles			
80								
82								
84								
86								
88								

Figure A-21,
Log of PERCOLATION TEST P 2, Page 3 of 4

G1488-42-03.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL

◧ ... STANDARD PENETRATION TEST

■ ... DRIVE SAMPLE (UNDISTURBED)

☒ ... DISTURBED OR BAG SAMPLE

◪ ... CHUNK SAMPLE

▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1488-42-03

PERCOLATION TEST P 2

ELEV. (MSL.) ________ DATE COMPLETED **09-08-2015**

EQUIPMENT **CANTERRA 450 AIR PERCISSION-6"** BY: **G. CANNON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
90		▨						
92		▨						
94		▨						
96		▨						
98		▨						
100					BORING TERMINATED AT 100 FEET No groundwater encountered			

Figure A-21,
Log of PERCOLATION TEST P 2, Page 4 of 4

G1488-42-03.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	☒ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Plate A-7

GEOCON

Carroll Canyon Road Percolation Data

B1(80ft)			
T(min)	Head(ft)	Depth(ft)	EL(msl)
0	28.897	49.103	470.897
1	28.653	49.347	470.653
2	28.396	49.604	470.396
3	28.192	49.808	470.192
4	27.999	50.001	469.999
5	27.823	50.177	469.823
6	27.665	50.335	469.665
7	27.512	50.488	469.512
8	27.362	50.638	469.362
9	27.219	50.781	469.219
10	27.076	50.924	469.076
11	26.936	51.064	468.936
12	26.801	51.199	468.801
13	26.661	51.339	468.661
14	26.534	51.466	468.534
15	26.418	51.582	468.418
16	26.297	51.703	468.297
17	26.169	51.831	468.169
18	26.054	51.946	468.054
19	25.941	52.059	467.941
20	25.834	52.166	467.834
21	25.715	52.285	467.715
22	25.606	52.394	467.606
23	25.501	52.499	467.501
24	25.392	52.608	467.392
25	25.296	52.704	467.296
26	25.188	52.812	467.188
27	25.093	52.907	467.093
28	24.993	53.007	466.993
29	24.894	53.106	466.894
30	24.795	53.205	466.795
31	24.707	53.293	466.707
32	24.614	53.386	466.614
33	24.524	53.476	466.524
34	24.43	53.57	466.43
35	24.345	53.655	466.345
36	24.247	53.753	466.247
37	24.159	53.841	466.159
38	24.076	53.924	466.076
39	23.988	54.012	465.988
40	23.919	54.081	465.919
41	23.826	54.174	465.826
42	23.735	54.265	465.735
43	23.658	54.342	465.658

Carroll Canyon Road Percolation Data

B1(80ft)			
T(min)	Head(ft)	Depth(ft)	EL(msl)
44	23.569	54.431	465.569
45	23.504	54.496	465.504
46	23.424	54.576	465.424
47	23.347	54.653	465.347
48	23.273	54.727	465.273
49	23.199	54.801	465.199
50	23.119	54.881	465.119
51	23.039	54.961	465.039
52	22.971	55.029	464.971
53	22.889	55.111	464.889
54	22.821	55.179	464.821
55	22.741	55.259	464.741
56	22.671	55.329	464.671
57	22.599	55.401	464.599
58	22.528	55.472	464.528
59	22.461	55.539	464.461
60	22.392	55.608	464.392
61	22.32	55.68	464.32
62	22.252	55.748	464.252
63	22.19	55.81	464.19
64	22.125	55.875	464.125
65	22.056	55.944	464.056
66	21.99	56.01	463.99
67	21.924	56.076	463.924
68	21.859	56.141	463.859
69	21.797	56.203	463.797
70	21.734	56.266	463.734
71	21.671	56.329	463.671
72	21.606	56.394	463.606
73	21.543	56.457	463.543
74	21.482	56.518	463.482
75	21.429	56.571	463.429
76	21.361	56.639	463.361
77	21.296	56.704	463.296
78	21.245	56.755	463.245
79	21.19	56.81	463.19
80	21.135	56.865	463.135
81	21.087	56.913	463.087
82	21.026	56.974	463.026
83	20.961	57.039	462.961
84	20.914	57.086	462.914
85	20.853	57.147	462.853
86	20.803	57.197	462.803
87	20.748	57.252	462.748

Carroll Canyon Road Percolation Data

B1(80ft)			
T(min)	Head(ft)	Depth(ft)	EL(msl)
88	20.696	57.304	462.696
89	20.64	57.36	462.64
90	20.594	57.406	462.594
91	20.539	57.461	462.539
92	20.484	57.516	462.484
93	20.427	57.573	462.427
94	20.382	57.618	462.382
95	20.331	57.669	462.331
96	20.282	57.718	462.282
97	20.236	57.764	462.236
98	20.186	57.814	462.186
99	20.139	57.861	462.139
100	20.089	57.911	462.089
101	20.055	57.945	462.055
102	20.007	57.993	462.007
103	19.956	58.044	461.956
104	19.911	58.089	461.911
105	19.873	58.127	461.873
106	19.817	58.183	461.817
107	19.773	58.227	461.773
108	19.725	58.275	461.725
109	19.677	58.323	461.677
110	19.623	58.377	461.623
111	19.584	58.416	461.584
112	19.539	58.461	461.539
113	19.484	58.516	461.484
114	19.441	58.559	461.441
115	19.402	58.598	461.402
116	19.356	58.644	461.356
117	19.31	58.69	461.31
118	19.26	58.74	461.26
119	19.222	58.778	461.222
120	19.175	58.825	461.175
121	19.138	58.862	461.138
122	19.094	58.906	461.094
123	19.049	58.951	461.049
124	19.006	58.994	461.006
125	18.973	59.027	460.973
126	18.919	59.081	460.919
127	18.889	59.111	460.889
128	18.849	59.151	460.849
129	18.815	59.185	460.815
130	18.768	59.232	460.768
131	18.724	59.276	460.724

Carroll Canyon Road Percolation Data

B1(80ft)			
T(min)	Head(ft)	Depth(ft)	EL(msl)
132	18.687	59.313	460.687
133	18.641	59.359	460.641
134	18.597	59.403	460.597
135	18.557	59.443	460.557
136	18.523	59.477	460.523
137	18.481	59.519	460.481
138	18.433	59.567	460.433
139	18.399	59.601	460.399
140	18.36	59.64	460.36
141	18.326	59.674	460.326
142	18.289	59.711	460.289
143	18.257	59.743	460.257
144	18.217	59.783	460.217
145	18.172	59.828	460.172
146	18.142	59.858	460.142
147	18.101	59.899	460.101
148	18.062	59.938	460.062
149	18.022	59.978	460.022
150	17.985	60.015	459.985
151	17.946	60.054	459.946
152	17.919	60.081	459.919
153	17.883	60.117	459.883
154	17.829	60.171	459.829
155	17.803	60.197	459.803
156	17.762	60.238	459.762
157	17.706	60.294	459.706
158	17.684	60.316	459.684
159	17.639	60.361	459.639
160	17.611	60.389	459.611
161	17.571	60.429	459.571
162	17.531	60.469	459.531
163	17.494	60.506	459.494
164	17.459	60.541	459.459
165	17.417	60.583	459.417
166	17.386	60.614	459.386
167	17.361	60.639	459.361
168	17.311	60.689	459.311
169	17.276	60.724	459.276
170	17.241	60.759	459.241
171	17.212	60.788	459.212
172	17.172	60.828	459.172
173	17.133	60.867	459.133
174	17.11	60.89	459.11
175	17.071	60.929	459.071

Carroll Canyon Road Percolation Data

B1(80ft)			
T(min)	Head(ft)	Depth(ft)	EL(msl)
176	17.03	60.97	459.03
177	17	61	459
178	16.96	61.04	458.96
179	16.928	61.072	458.928
180	16.904	61.096	458.904
181	16.868	61.132	458.868
182	16.84	61.16	458.84
183	16.809	61.191	458.809
184	16.772	61.228	458.772
185	16.745	61.255	458.745
186	16.703	61.297	458.703
187	16.678	61.322	458.678
188	16.645	61.355	458.645
189	16.613	61.387	458.613
190	16.586	61.414	458.586
191	16.55	61.45	458.55
192	16.515	61.485	458.515
193	16.485	61.515	458.485
194	16.453	61.547	458.453
195	16.422	61.578	458.422
196	16.39	61.61	458.39
197	16.362	61.638	458.362
198	16.336	61.664	458.336
199	16.307	61.693	458.307
200	16.278	61.722	458.278
201	16.249	61.751	458.249
202	16.22	61.78	458.22
203	16.189	61.811	458.189
204	16.165	61.835	458.165
205	16.127	61.873	458.127
206	16.104	61.896	458.104
207	16.071	61.929	458.071
208	16.043	61.957	458.043
209	16.01	61.99	458.01
210	15.978	62.022	457.978
211	15.96	62.04	457.96
212	15.929	62.071	457.929
213	15.889	62.111	457.889
214	15.873	62.127	457.873
215	15.837	62.163	457.837
216	15.809	62.191	457.809
217	15.789	62.211	457.789
218	15.75	62.25	457.75
219	15.731	62.269	457.731

Carroll Canyon Road Percolation Data

B1(80ft)			
T(min)	Head(ft)	Depth(ft)	EL(msl)
220	15.704	62.296	457.704
221	15.665	62.335	457.665
222	15.643	62.357	457.643
223	15.61	62.39	457.61
224	15.591	62.409	457.591
225	15.567	62.433	457.567
226	15.541	62.459	457.541
227	15.518	62.482	457.518
228	15.5	62.5	457.5
229	15.476	62.524	457.476
230	15.447	62.553	457.447
231	15.433	62.567	457.433
232	15.398	62.602	457.398
233	15.37	62.63	457.37
234	15.359	62.641	457.359
235	15.332	62.668	457.332
236	15.305	62.695	457.305
237	15.282	62.718	457.282
238	15.261	62.739	457.261

Carroll Canyon Road Percolation Data

B2(80ft)			
T(min)	Head(ft)	Depth(ft)	El (msl)
0	23.095	54.905	461.095
1	22.86	55.14	460.86
2	22.656	55.344	460.656
3	22.451	55.549	460.451
4	22.277	55.723	460.277
5	22.103	55.897	460.103
6	21.926	56.074	459.926
7	21.761	56.239	459.761
8	21.591	56.409	459.591
9	21.413	56.587	459.413
10	21.227	56.773	459.227
11	21.045	56.955	459.045
12	20.89	57.11	458.89
13	20.746	57.254	458.746
14	20.604	57.396	458.604
15	20.463	57.537	458.463
16	20.316	57.684	458.316
17	20.182	57.818	458.182
18	20.042	57.958	458.042
19	19.905	58.095	457.905
20	19.78	58.22	457.78
21	19.649	58.351	457.649
22	19.515	58.485	457.515
23	19.402	58.598	457.402
24	19.279	58.721	457.279
25	19.161	58.839	457.161
26	19.019	58.981	457.019
27	18.895	59.105	456.895
28	18.768	59.232	456.768
29	18.649	59.351	456.649
30	18.541	59.459	456.541
31	18.425	59.575	456.425
32	18.309	59.691	456.309
33	18.197	59.803	456.197
34	18.089	59.911	456.089
35	17.985	60.015	455.985
36	17.872	60.128	455.872
37	17.758	60.242	455.758
38	17.641	60.359	455.641
39	17.524	60.476	455.524
40	17.412	60.588	455.412
41	17.288	60.712	455.288
42	17.181	60.819	455.181
43	17.073	60.927	455.073

Plate A-14

Carroll Canyon Road Percolation Data

B2(80ft)			
T(min)	Head(ft)	Depth(ft)	El (msl)
44	16.965	61.035	454.965
45	16.856	61.144	454.856
46	16.752	61.248	454.752
47	16.648	61.352	454.648
48	16.543	61.457	454.543
49	16.441	61.559	454.441
50	16.343	61.657	454.343
51	16.254	61.746	454.254
52	16.163	61.837	454.163
53	16.078	61.922	454.078
54	15.995	62.005	453.995
55	15.91	62.09	453.91
56	15.831	62.169	453.831
57	15.735	62.265	453.735
58	15.645	62.355	453.645
59	15.555	62.445	453.555
60	15.459	62.541	453.459
61	15.37	62.63	453.37
62	15.288	62.712	453.288
63	15.21	62.79	453.21
64	15.122	62.878	453.122
65	15.036	62.964	453.036
66	14.956	63.044	452.956
67	14.871	63.129	452.871
68	14.778	63.222	452.778
69	14.69	63.31	452.69
70	14.612	63.388	452.612
71	14.535	63.465	452.535
72	14.455	63.545	452.455
73	14.382	63.618	452.382
74	14.303	63.697	452.303
75	14.222	63.778	452.222
76	14.145	63.855	452.145
77	14.071	63.929	452.071
78	14.006	63.994	452.006
79	13.939	64.061	451.939
80	13.864	64.136	451.864
81	13.79	64.21	451.79
82	13.72	64.28	451.72
83	13.645	64.355	451.645
84	13.581	64.419	451.581
85	13.507	64.493	451.507
86	13.444	64.556	451.444
87	13.379	64.621	451.379

Carroll Canyon Road Percolation Data

B2(80ft)			
T(min)	Head(ft)	Depth(ft)	El (msl)
88	13.307	64.693	451.307
89	13.24	64.76	451.24
90	13.174	64.826	451.174
91	13.103	64.897	451.103
92	13.035	64.965	451.035
93	12.974	65.026	450.974
94	12.906	65.094	450.906
95	12.834	65.166	450.834
96	12.774	65.226	450.774
97	12.71	65.29	450.71
98	12.67	65.33	450.67
99	12.61	65.39	450.61
100	12.547	65.453	450.547
101	12.488	65.512	450.488
102	12.435	65.565	450.435
103	12.387	65.613	450.387
104	12.326	65.674	450.326
105	12.272	65.728	450.272
106	12.218	65.782	450.218
107	12.155	65.845	450.155
108	12.104	65.896	450.104
109	12.049	65.951	450.049
110	11.982	66.018	449.982
111	11.927	66.073	449.927
112	11.872	66.128	449.872
113	11.822	66.178	449.822
114	11.763	66.237	449.763
115	11.716	66.284	449.716
116	11.663	66.337	449.663
117	11.617	66.383	449.617
118	11.563	66.437	449.563
119	11.513	66.487	449.513
120	11.467	66.533	449.467
121	11.412	66.588	449.412
122	11.368	66.632	449.368
123	11.316	66.684	449.316
124	11.263	66.737	449.263
125	11.223	66.777	449.223
126	11.174	66.826	449.174
127	11.128	66.872	449.128
128	11.09	66.91	449.09
129	11.042	66.958	449.042
130	10.996	67.004	448.996
131	10.95	67.05	448.95

Carroll Canyon Road Percolation Data

B2(80ft)			
T(min)	Head(ft)	Depth(ft)	El (msl)
132	10.906	67.094	448.906
133	10.863	67.137	448.863
134	10.815	67.185	448.815
135	10.771	67.229	448.771
136	10.719	67.281	448.719
137	10.675	67.325	448.675
138	10.632	67.368	448.632
139	10.596	67.404	448.596
140	10.55	67.45	448.55
141	10.505	67.495	448.505
142	10.463	67.537	448.463
143	10.422	67.578	448.422
144	10.381	67.619	448.381
145	10.333	67.667	448.333
146	10.301	67.699	448.301
147	10.264	67.736	448.264
148	10.221	67.779	448.221
149	10.17	67.83	448.17
150	10.136	67.864	448.136
151	10.087	67.913	448.087
152	10.052	67.948	448.052
153	10.005	67.995	448.005
154	9.964	68.036	447.964
155	9.923	68.077	447.923
156	9.883	68.117	447.883
157	9.854	68.146	447.854
158	9.816	68.184	447.816
159	9.783	68.217	447.783
160	9.741	68.259	447.741
161	9.694	68.306	447.694
162	9.662	68.338	447.662
163	9.624	68.376	447.624
164	9.588	68.412	447.588
165	9.549	68.451	447.549
166	9.518	68.482	447.518
167	9.48	68.52	447.48
168	9.454	68.546	447.454
169	9.412	68.588	447.412
170	9.383	68.617	447.383
171	9.351	68.649	447.351
172	9.321	68.679	447.321
173	9.294	68.706	447.294
174	9.26	68.74	447.26
175	9.232	68.768	447.232

Carroll Canyon Road Percolation Data

B2(80ft)			
T(min)	Head(ft)	Depth(ft)	El (msl)
176	9.205	68.795	447.205
177	9.167	68.833	447.167
178	9.133	68.867	447.133
179	9.111	68.889	447.111
180	9.081	68.919	447.081
181	9.059	68.941	447.059
182	9.025	68.975	447.025
183	9.004	68.996	447.004
184	8.975	69.025	446.975
185	8.939	69.061	446.939
186	8.913	69.087	446.913
187	8.88	69.12	446.88
188	8.842	69.158	446.842
189	8.809	69.191	446.809
190	8.783	69.217	446.783
191	8.755	69.245	446.755
192	8.717	69.283	446.717
193	8.689	69.311	446.689
194	8.657	69.343	446.657
195	8.625	69.375	446.625
196	8.594	69.406	446.594
197	8.568	69.432	446.568
198	8.543	69.457	446.543
199	8.52	69.48	446.52
200	8.49	69.51	446.49
201	8.469	69.531	446.469
202	8.445	69.555	446.445
203	8.417	69.583	446.417
204	8.389	69.611	446.389
205	8.367	69.633	446.367
206	8.345	69.655	446.345
207	8.316	69.684	446.316
208	8.294	69.706	446.294
209	8.264	69.736	446.264
210	8.252	69.748	446.252
211	8.228	69.772	446.228
212	8.209	69.791	446.209
213	8.181	69.819	446.181
214	8.153	69.847	446.153
215	8.129	69.871	446.129
216	8.102	69.898	446.102
217	8.077	69.923	446.077
218	8.046	69.954	446.046
219	8.02	69.98	446.02

Carroll Canyon Road Percolation Data

B2(80ft)			
T(min)	Head(ft)	Depth(ft)	El (msl)
220	7.996	70.004	445.996
221	7.973	70.027	445.973
222	7.949	70.051	445.949
223	7.922	70.078	445.922
224	7.896	70.104	445.896
225	7.874	70.126	445.874
226	7.85	70.15	445.85
227	7.829	70.171	445.829
228	7.807	70.193	445.807
229	7.784	70.216	445.784
230	7.754	70.246	445.754
231	7.743	70.257	445.743
232	7.71	70.29	445.71
233	7.696	70.304	445.696
234	7.669	70.331	445.669
235	7.643	70.357	445.643
236	7.623	70.377	445.623
237	7.597	70.403	445.597
238	7.576	70.424	445.576
239	7.555	70.445	445.555
240	7.527	70.473	445.527
241	7.506	70.494	445.506
242	7.476	70.524	445.476
243	7.457	70.543	445.457

Carroll Canyon Road Percolation Data

B2(100ft)			
T(min)	Head(ft)	Depth	EL (msl)
0	31.532	65.468	450.532
1	31.16	65.84	450.16
2	30.817	66.183	449.817
3	30.506	66.494	449.506
4	30.213	66.787	449.213
5	29.91	67.09	448.91
6	29.59	67.41	448.59
7	29.274	67.726	448.274
8	28.969	68.031	447.969
9	28.666	68.334	447.666
10	28.36	68.64	447.36
11	28.057	68.943	447.057
12	27.765	69.235	446.765
13	27.484	69.516	446.484
14	27.218	69.782	446.218
15	26.946	70.054	445.946
16	26.683	70.317	445.683
17	26.491	70.509	445.491
18	26.187	70.813	445.187
19	25.97	71.03	444.97
20	25.731	71.269	444.731
21	25.502	71.498	444.502
22	25.287	71.713	444.287
23	25.079	71.921	444.079
24	24.88	72.12	443.88
25	24.669	72.331	443.669
26	24.487	72.513	443.487
27	24.27	72.73	443.27
28	24.083	72.917	443.083
29	23.892	73.108	442.892
30	23.688	73.312	442.688
31	23.518	73.482	442.518
32	23.336	73.664	442.336
33	23.165	73.835	442.165
34	22.997	74.003	441.997
35	22.818	74.182	441.818
36	22.649	74.351	441.649
37	22.471	74.529	441.471
38	22.362	74.638	441.362
39	22.206	74.794	441.206
40	22.04	74.96	441.04
41	21.874	75.126	440.874
42	21.704	75.296	440.704
43	21.567	75.433	440.567

Carroll Canyon Road Percolation Data

B2(100ft)			
T(min)	Head(ft)	Depth	EL (msl)
44	21.431	75.569	440.431
45	21.3	75.7	440.3
46	21.162	75.838	440.162
47	21.012	75.988	440.012
48	20.876	76.124	439.876
49	20.755	76.245	439.755
50	20.627	76.373	439.627
51	20.503	76.497	439.503
52	20.378	76.622	439.378
52	20.37	76.63	439.37
53	20.248	76.752	439.248
54	20.132	76.868	439.132
55	20.025	76.975	439.025
56	19.924	77.076	438.924
57	19.801	77.199	438.801
58	19.672	77.328	438.672
59	19.588	77.412	438.588
60	19.483	77.517	438.483
61	19.362	77.638	438.362
62	19.281	77.719	438.281
63	19.178	77.822	438.178
64	19.083	77.917	438.083
65	18.992	78.008	437.992
66	18.882	78.118	437.882
67	18.789	78.211	437.789
68	18.68	78.32	437.68
69	18.598	78.402	437.598
70	18.502	78.498	437.502
71	18.401	78.599	437.401
72	18.32	78.68	437.32
73	18.232	78.768	437.232
74	18.155	78.845	437.155
75	18.07	78.93	437.07
76	17.98	79.02	436.98
77	17.894	79.106	436.894
78	17.804	79.196	436.804
79	17.738	79.262	436.738
80	17.656	79.344	436.656
81	17.588	79.412	436.588
82	17.527	79.473	436.527
83	17.457	79.543	436.457
84	17.385	79.615	436.385
85	17.302	79.698	436.302
86	17.234	79.766	436.234

Carroll Canyon Road Percolation Data

B2(100ft)			
T(min)	Head(ft)	Depth	EL (msl)
87	17.154	79.846	436.154
88	17.079	79.921	436.079
89	17.023	79.977	436.023
90	16.957	80.043	435.957
91	16.885	80.115	435.885
92	16.845	80.155	435.845
93	16.766	80.234	435.766
94	16.685	80.315	435.685
95	16.612	80.388	435.612
96	16.529	80.471	435.529
97	16.457	80.543	435.457
98	16.394	80.606	435.394
99	16.328	80.672	435.328
100	16.261	80.739	435.261
101	16.187	80.813	435.187
102	16.128	80.872	435.128
103	16.058	80.942	435.058
104	15.968	81.032	434.968
105	15.91	81.09	434.91
106	15.838	81.162	434.838
107	15.78	81.22	434.78
108	15.725	81.275	434.725
109	15.65	81.35	434.65
110	15.601	81.399	434.601
111	15.549	81.451	434.549
112	15.481	81.519	434.481
113	15.411	81.589	434.411
114	15.317	81.683	434.317
115	15.232	81.768	434.232
116	15.16	81.84	434.16
117	15.07	81.93	434.07
118	14.986	82.014	433.986
119	14.886	82.114	433.886
120	14.79	82.21	433.79
121	14.714	82.286	433.714
122	14.664	82.336	433.664
123	14.604	82.396	433.604
124	14.522	82.478	433.522
125	14.435	82.565	433.435
126	14.336	82.664	433.336
127	14.216	82.784	433.216
128	14.145	82.855	433.145
129	14.077	82.923	433.077
130	14.003	82.997	433.003

Carroll Canyon Road Percolation Data

B2(100ft)			
T(min)	Head(ft)	Depth	EL (msl)
131	13.944	83.056	432.944
132	13.869	83.131	432.869
133	13.813	83.187	432.813
134	13.743	83.257	432.743
135	13.681	83.319	432.681
136	13.597	83.403	432.597
137	13.516	83.484	432.516
138	13.422	83.578	432.422
139	13.347	83.653	432.347
140	13.266	83.734	432.266
141	13.219	83.781	432.219
142	13.218	83.782	432.218
143	13.197	83.803	432.197
144	13.163	83.837	432.163
145	13.106	83.894	432.106
146	13.05	83.95	432.05
147	12.946	84.054	431.946
148	12.857	84.143	431.857
149	12.74	84.26	431.74
150	12.58	84.42	431.58
151	12.491	84.509	431.491
152	12.436	84.564	431.436
153	12.347	84.653	431.347
154	12.311	84.689	431.311
155	12.244	84.756	431.244
156	12.105	84.895	431.105
157	11.931	85.069	430.931
158	11.901	85.099	430.901
159	11.814	85.186	430.814
160	11.659	85.341	430.659
161	11.54	85.46	430.54
162	11.488	85.512	430.488
163	11.461	85.539	430.461
164	11.392	85.608	430.392
165	11.31	85.69	430.31
166	11.225	85.775	430.225
167	11.138	85.862	430.138
168	11.048	85.952	430.048
169	10.967	86.033	429.967
170	10.87	86.13	429.87
171	10.759	86.241	429.759
172	10.667	86.333	429.667
173	10.554	86.446	429.554
174	10.42	86.58	429.42

Carroll Canyon Road Percolation Data

B2(100ft)			
T(min)	Head(ft)	Depth	EL (msl)
175	10.267	86.733	429.267
176	10.183	86.817	429.183
177	10.065	86.935	429.065
178	9.947	87.053	428.947
179	9.847	87.153	428.847
180	9.77	87.23	428.77
181	9.702	87.298	428.702
182	9.598	87.402	428.598
183	9.497	87.503	428.497
184	9.416	87.584	428.416
185	9.314	87.686	428.314
186	9.234	87.766	428.234
187	9.204	87.796	428.204
188	9.143	87.857	428.143
189	9.058	87.942	428.058
190	8.988	88.012	427.988
191	8.915	88.085	427.915
192	8.833	88.167	427.833
193	8.766	88.234	427.766
194	8.697	88.303	427.697
195	8.612	88.388	427.612
196	8.544	88.456	427.544
197	8.468	88.532	427.468
198	8.378	88.622	427.378
199	8.295	88.705	427.295
200	8.223	88.777	427.223
201	8.207	88.793	427.207
202	8.25	88.75	427.25
203	8.385	88.615	427.385
204	8.416	88.584	427.416
205	8.388	88.612	427.388
206	8.334	88.666	427.334
207	8.286	88.714	427.286
208	8.212	88.788	427.212
209	8.158	88.842	427.158
210	8.097	88.903	427.097
211	8.023	88.977	427.023
212	7.955	89.045	426.955
213	7.9	89.1	426.9
214	7.83	89.17	426.83
215	7.747	89.253	426.747
216	7.67	89.33	426.67
217	7.584	89.416	426.584
218	7.466	89.534	426.466

Carroll Canyon Road Percolation Data

B2(100ft)			
T(min)	Head(ft)	Depth	EL (msl)
219	7.417	89.583	426.417
220	7.354	89.646	426.354
221	7.299	89.701	426.299
222	7.278	89.722	426.278
223	7.248	89.752	426.248
224	7.226	89.774	426.226
225	7.22	89.78	426.22
226	7.174	89.826	426.174
227	7.14	89.86	426.14
228	7.111	89.889	426.111
229	7.057	89.943	426.057
230	6.975	90.025	425.975
231	6.966	90.034	425.966
232	6.911	90.089	425.911
233	6.876	90.124	425.876
234	6.839	90.161	425.839
235	6.791	90.209	425.791
236	6.747	90.253	425.747
237	6.692	90.308	425.692
238	6.663	90.337	425.663
239	6.626	90.374	425.626
240	6.584	90.416	425.584
241	6.544	90.456	425.544
242	6.499	90.501	425.499
243	6.462	90.538	425.462
244	6.436	90.564	425.436
245	6.397	90.603	425.397
246	6.364	90.636	425.364
247	6.329	90.671	425.329
248	6.297	90.703	425.297
249	6.267	90.733	425.267
250	6.23	90.77	425.23
251	6.207	90.793	425.207
252	6.2	90.8	425.2
253	6.202	90.798	425.202
254	6.198	90.802	425.198
255	6.179	90.821	425.179
256	6.168	90.832	425.168
257	6.147	90.853	425.147
258	6.117	90.883	425.117
259	6.099	90.901	425.099
260	6.083	90.917	425.083
261	6.107	90.893	425.107
262	6.089	90.911	425.089

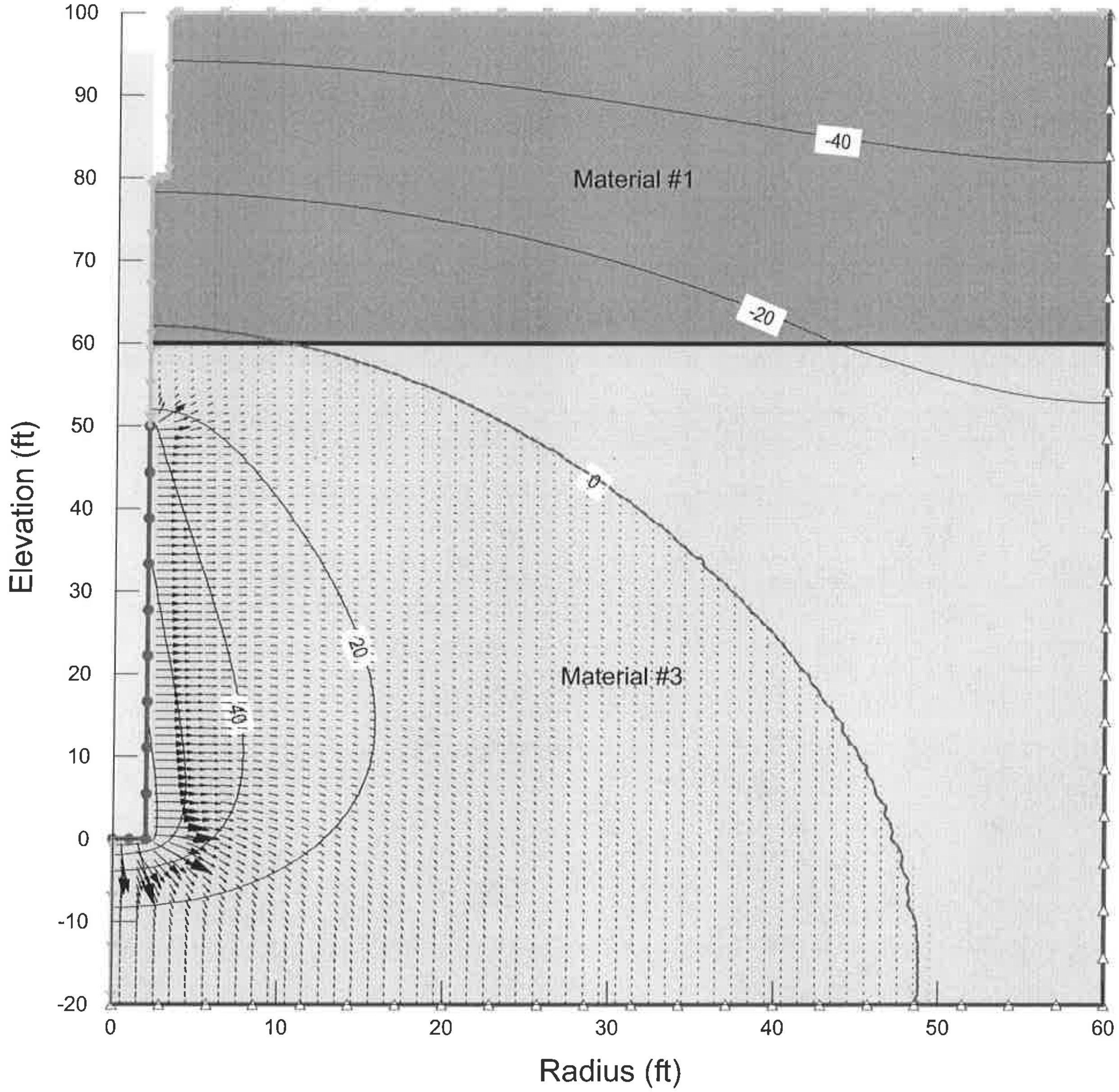
Carroll Canyon Road Percolation Data

B2(100ft)			
T(min)	Head(ft)	Depth	EL (msl)
263	6.049	90.951	425.049
264	6.006	90.994	425.006
265	5.964	91.036	424.964
266	5.944	91.056	424.944
267	5.91	91.09	424.91
268	5.873	91.127	424.873
269	5.84	91.16	424.84
270	5.806	91.194	424.806
271	5.77	91.23	424.77
272	5.737	91.263	424.737
273	5.709	91.291	424.709
274	5.682	91.318	424.682
275	5.666	91.334	424.666
276	5.635	91.365	424.635
277	5.608	91.392	424.608
278	5.586	91.414	424.586
279	5.558	91.442	424.558
280	5.535	91.465	424.535

APPENDIX B

PERCOLATION ANALYSES

STEADY STATE
FLOW ANALYSIS OF 100 ft DEEP, 4 ft DIAMETER DRY WELL



Arrows indicate direction of flow and relative magnitude of velocity.
Contours are Pressure Head in Feet.

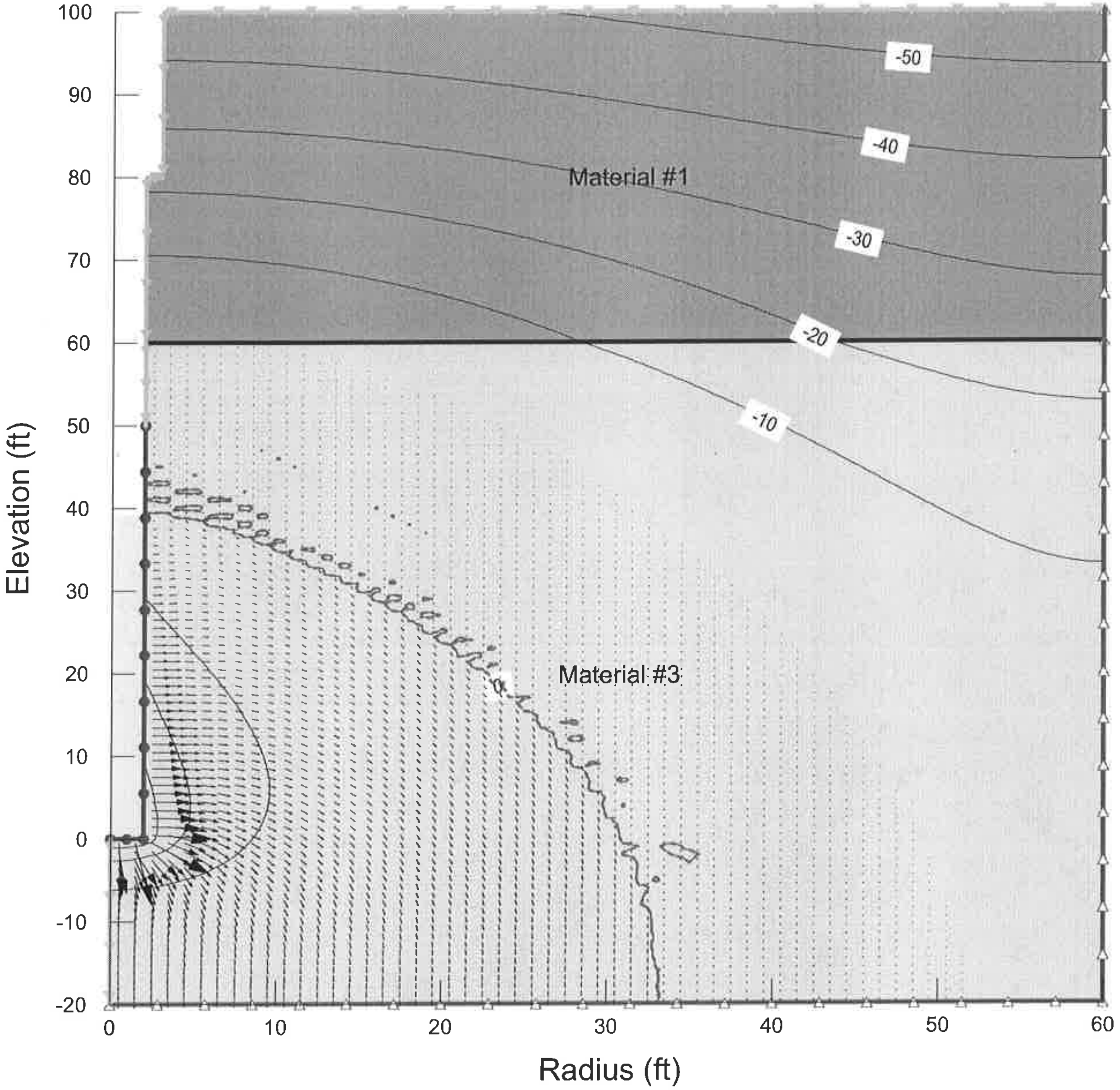
LEGEND

Zero Flux

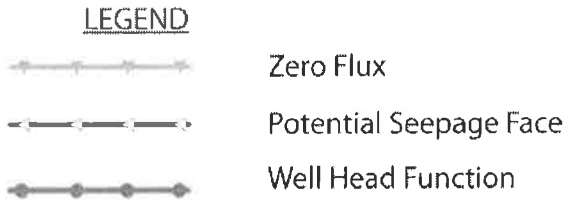
Potential Seepage Face

Fixed Total Head = 95′

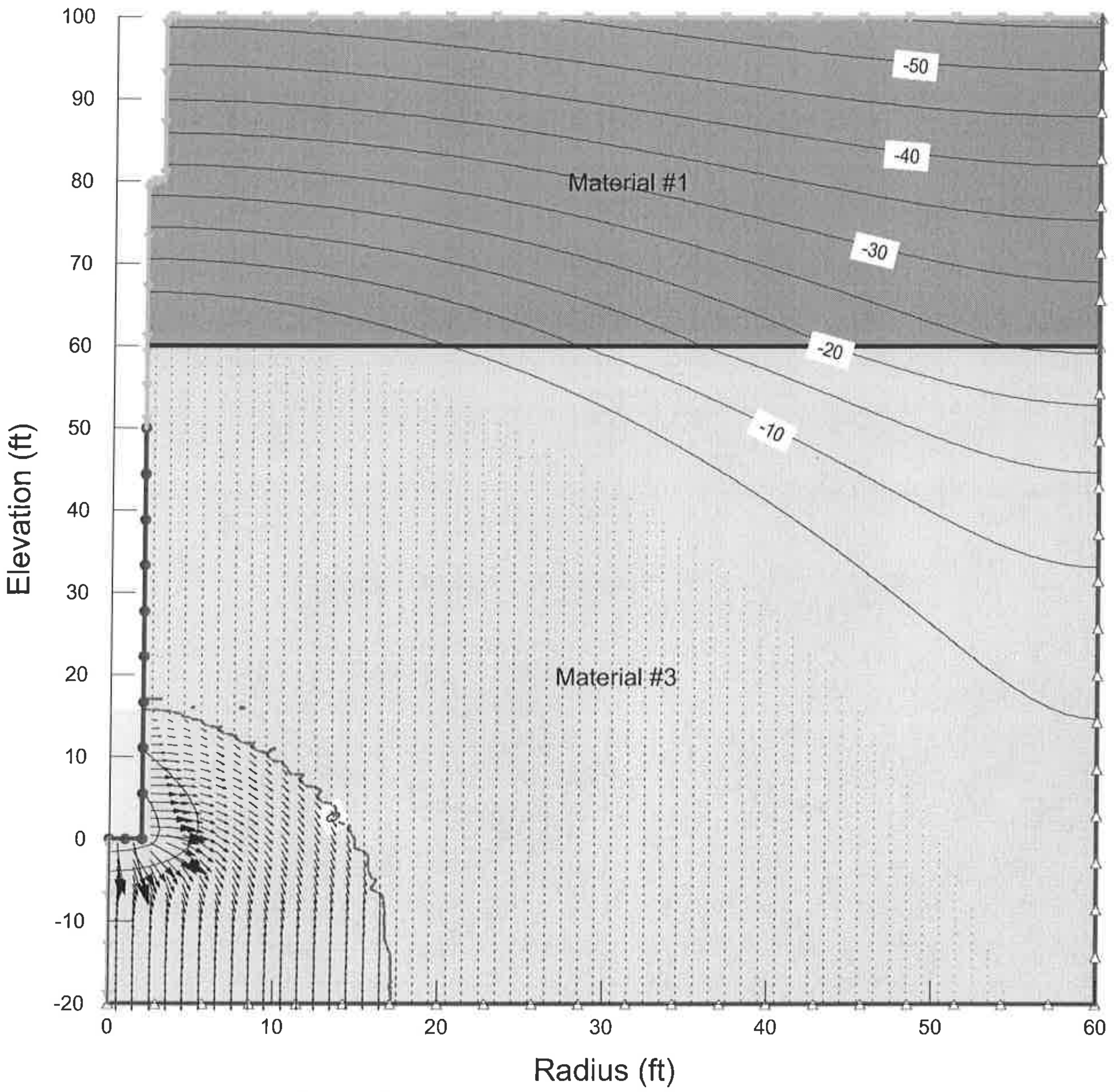
TRANSIENT @ 2 Hours
FLOW ANALYSIS OF 100 ft DEEP, 4 ft DIAMETER DRY WELL



Arrows indicate direction of flow and relative magnitude of velocity.
Contours are Pressure Head in Feet.



TRANSIENT @ 5 Hours
FLOW ANALYSIS OF 100 ft DEEP, 4 ft DIAMETER DRY WELL



Arrows indicate direction of flow and relative magnitude of velocity.
Contours are Pressure Head in Feet.

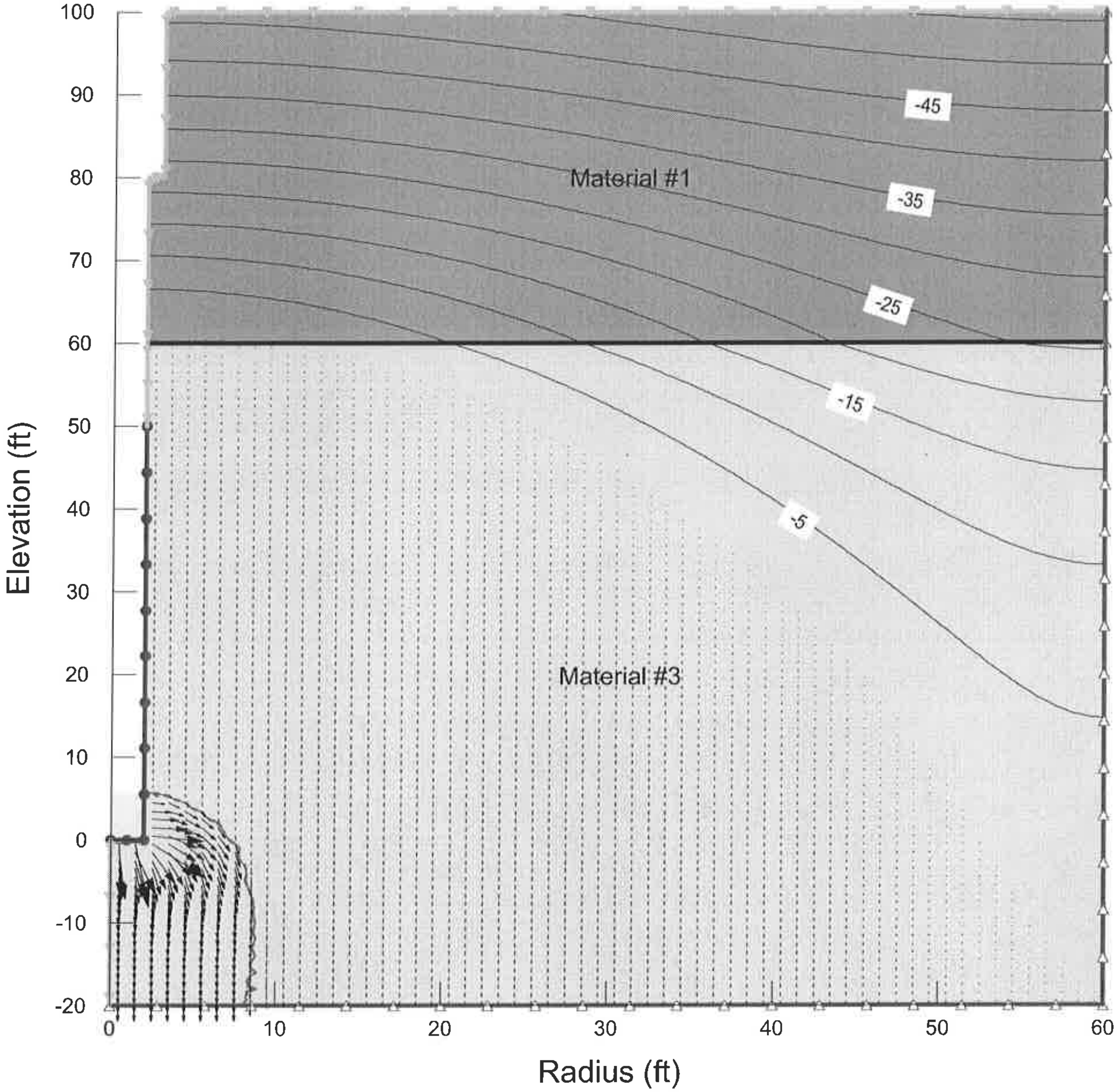
LEGEND

Zero Flux

Potential Seepage Face

Well Head Function

TRANSIENT @ 10 Hours
FLOW ANALYSIS OF 100 ft DEEP, 4 ft DIAMETER DRY WELL

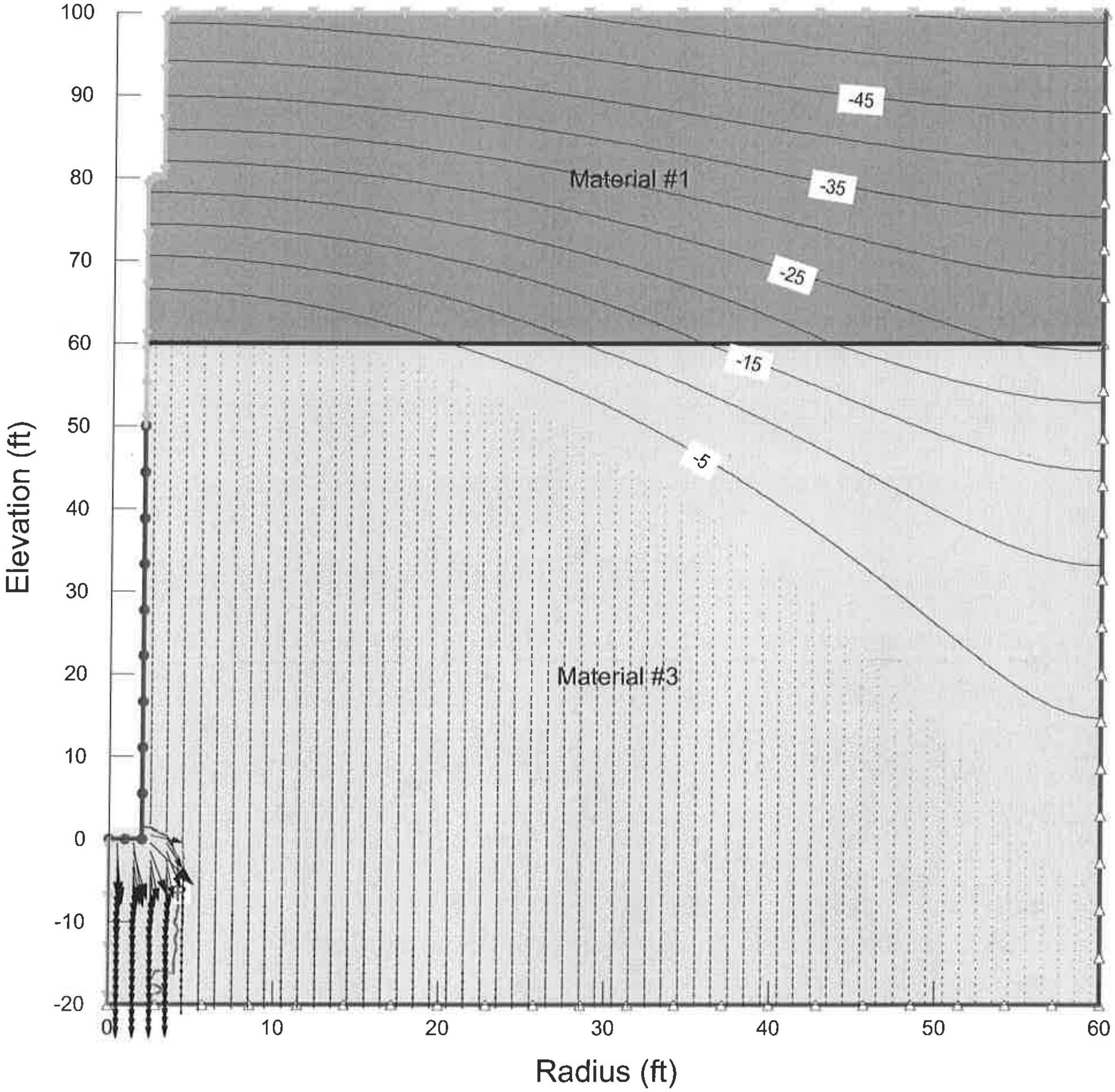


Arrows indicate direction of flow and relative magnitude of velocity.
Contours are Pressure Head in Feet.

<u>LEGEND</u>

	Zero Flux
	Potential Seepage Face
	Well Head Function

TRANSIENT @ 18 Hours
FLOW ANALYSIS OF 100 ft DEEP, 4 ft DIAMETER DRY WELL



Arrows indicate direction of flow and relative magnitude of velocity.
Contours are Pressure Head in Feet.

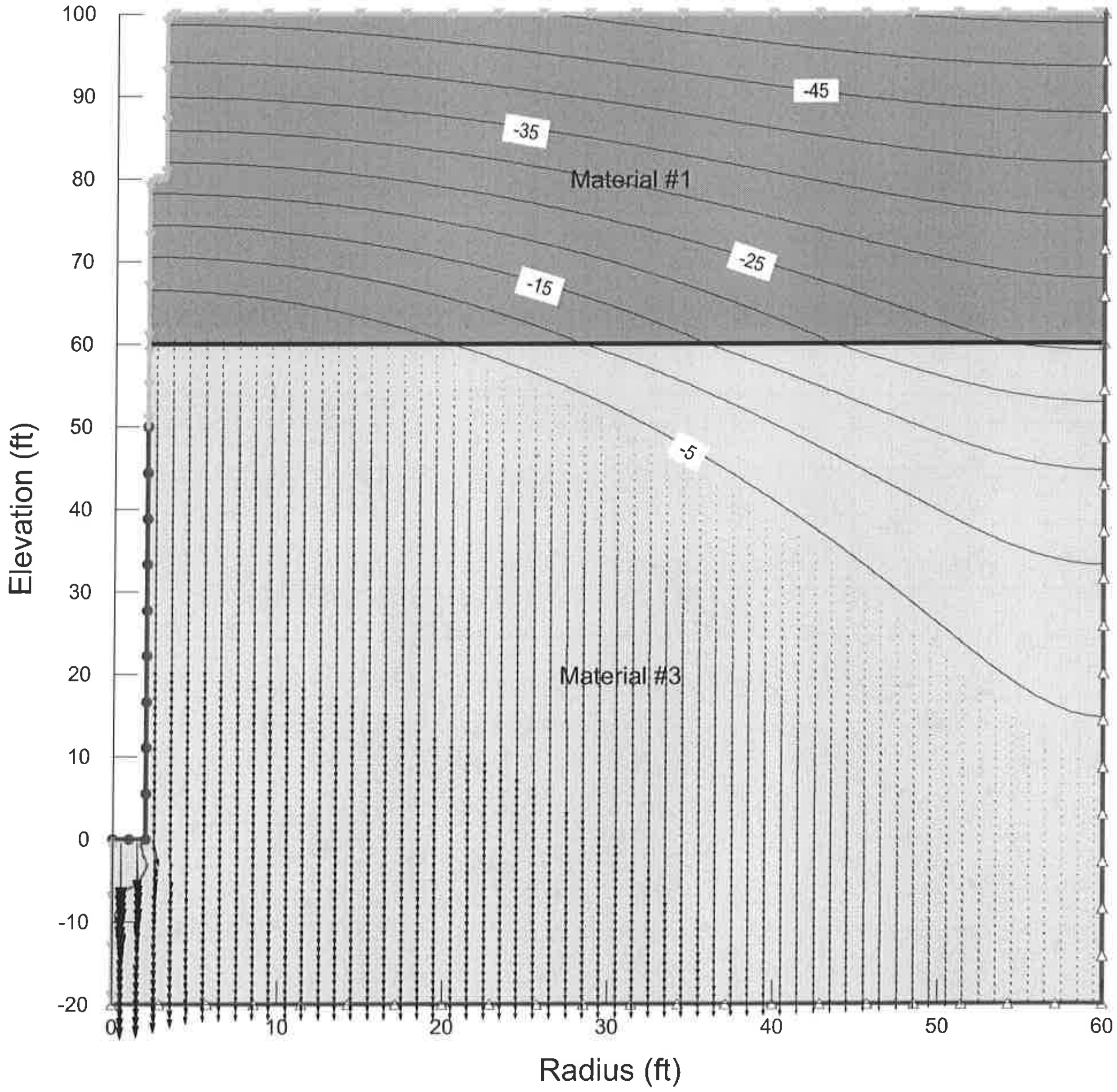
LEGEND

Zero Flux

Potential Seepage Face

Well Head Function

TRANSIENT @ 27 Hours
FLOW ANALYSIS OF 100 ft DEEP, 4 ft DIAMETER DRY WELL



Arrows indicate direction of flow and relative magnitude of velocity.
Contours are Pressure Head in Feet.

LEGEND

Zero Flux

Potential Seepage Face

Well Head Function

Appendix 7

Form J-1 – BMP Applicability and Selection for Green Streets Exemption

BMP Applicability and Selection for Green Street Exemption

Form J-1

Project Identification

Project Name: Carroll Canyon Mixed-Use

Permit Application Number: VTM 979190 / PTS 240716

Date: 08/26/16

Project Characterization and Selection Synopsis

The purpose of this form is to guide the selection of BMPs, given project specific constraints to meet the Green Streets exemption as defined in Appendix J.2 of the BMP Design Manual. In order to qualify for a PDP exemption, the project must incorporate all applicable Green Street BMP elements described in Appendix J.2, based on the applicability guidance provided in Appendix J.2.

Complete the sections below providing detailed justification for each selection.

Step 1: Does this project include retrofitting or redevelopment of an existing alley, street, or roadway criteria? Exemptions do not apply for projects that construct new alleys, streets, or roadways. See Appendix J for additional guidance on distinguishing between redevelopment of a street and new development.

☒ Yes ☐ No (if No is selected, the Green Street exemption is not applicable)

Provide a brief overview of the project, key details, and site-specific opportunities and constraints:

Step 2: Complete the BMP-specific applicability checklists on the following pages and attach them to this form. Complete forms for all BMPs, including those that were used and those that were not used.

Step 3: Summarize the BMP(s) that were selected through the guidance process (Select all that apply):

BMP Type	Applicable?	Used?	Summary of justification for Inclusion or Finding of Non-applicability
Vegetated Swales	☒	☐	The proposed parkway width is not wide enough to accomodate a vegetated swale. A green gutter was used in lieu of a vegetated swale.
Sidewalk Planters	☒	☒	
Curb Extensions	☐	☐	The project's location along Carroll Canyon Road does not lend itself to curb extensions since they would conflict with the proposed bike lanes and right turn lanes into the project and I-15 north.
Permeable Surfaces	☒	☐	Surface infiltration is not fully or partially feasible which eliminated the use of permeable surfaces. In addition, Carroll Canyon Road conveys a significant amount of traffic for permeable surface use.
Green Gutters	☒	☒	
Rain Gardens	☒	☐	The project's right-of-way frontage lends itself to the use of long, linear green street elements, i.e. a green gutter. In addition, the lack of storm drain infrastructure in the area would preclude a subdrain.
Trees	☒	☒	
Other____________	☐	☐	

Form J-1 Page 2 of 8: Vegetated Swale

Brief Description: Vegetated Swales are shallow, open channels that are designed to remove storm water pollutants by physically straining/filtering runoff through vegetation in the channel.

Site Type (Check all that apply):	Street Type	Rating[12]	Present in Project?
	Residential Streets	◉	☐
	Commercial Street/ Business District	○	☐
	Collector Street	◉	☐
	Arterial and Boulevard	◉	☒
	Alleys	○	☐
	Parking Areas	◉	☐
Key Opportunities for Vegetated Swales (Check all that apply):	Parkway strips		☒
	Medians		☐
	Long, mostly continuous space		☒
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Vegetated Swales		
	Slope > 1% and <3%		☒
	Conveying run-on to a site		☐
	Infiltration is partially feasible or not feasible		☒
	Long continuous segments available		☐
	More parkway width		☐
	Unfavorable Conditions for Vegetated Swales		
	Available width is < 8 feet		☒
	Frequent driveway interruption		☒
	ROW width too limited		☒

Summary of Findings:

Were Vegetated Swales determined to be applicable as part of the Green Streets BMP plan? ☐ Yes ☒ No	If yes, were they used? ☐ Yes ☐ No

Provide discussion/justifications for selections and decisions above:

The proposed parkway width did not provide adequate available space and geometric opportunities to accomodate a vegetated swale in this project's design. A green gutter was used in lieu of a vegetated swale.

---

[12] ● High applicability within this category, however may still be limited by site-specific factors

◉ Generally applicable in this category; largely dependent on site-specific factors

○ Limited applicability within this category; may still be applicable in some cases; should be considered

Form J-1 Page 3 of 8: Sidewalk Planters

Brief Description: A planter imbedded in the sidewalk designed to manage storm water runoff from the adjacent roadway and sidewalk.

Site Type (Check all that apply):	Street Type	Rating	Present in Project?
	Residential Streets	◉	☐
	Commercial Street/ Business District	◉	☐
	Collector Street	●	☐
	Arterial and Boulevard	●	☒
	Alleys	○	☐
	Parking Areas	◉	☐
Key Opportunities for Sidewalk Planters (Check all that apply):	Parkway strips		☒
	Medians		☐
	Between driveways		☒
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Sidewalk Planters		
	Slope <4%		☒
	Wide sidewalks		☐
	More parkway width		☐
	Unfavorable Conditions for Sidewalk Planters		
	Conflicts with car egress		☐
	ROW width too limited		☐

Summary of Findings:

Were Sidewalk Planters determined to be applicable as part of the Green Streets BMP plan?	If yes, were they used?
☒ Yes ☐ No	☒ Yes ☐ No

Provide discussion/justifications for selections and decisions above:

Sidewalk planters were incorporated into the project's design. In addition, this BMP will be used in combination with a green gutter as a combination Green Street feature.

Form J-1 Page 4 of 8: Curb Extensions

Brief Description: Curb extensions expand the edge of the sidewalk into the roadway or parking area and allow storm water runoff to collect and infiltrate through a detention area of porous media.

Site Type (Check all that apply):	Street Type	Rating	Present in Project?
	Residential Streets	●	☐
	Commercial Street/ Business District	●	☐
	Collector Street	◉	☐
	Arterial and Boulevard	◉	☒
	Alleys	○	☐
	Parking Areas	◉	☐
Key Opportunities for Curb Extensions (Check all that apply):	Intersections		☐
	Parking area		☐
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Curb Extensions		
	Slope <4%		☒
	Traffic calming needed		☐
	Unfavorable Conditions for Curb Extensions		
	Conflicts with bike lanes		☒
	Site distance issues at intersection		☒

Summary of Findings:

Were Curb Extensions determined to be applicable as part of the Green Streets BMP plan? ☐ Yes ☒ No	If yes, were they used? ☐ Yes ☐ No

Provide discussion/justifications for selections and decisions above:

Carroll Canyon Road has an 85th percentile speed of 44 mph which requires substantial sight visibility areas associated with the project's proposed entrances in order to maintain clear lines of sight. These lines of sight could potentially conflict with the use of curb extensions and the planting typically associated with this particular BMP. In addition, the project does not front on an intersection that would lend itself to the use of curb extensions since the project incorproates a new right turn lane into the project and to the I-15 northbound on-ramp. In addition, the proposed project will include bike lanes along the project's public right-of-way frontage and curb extensions would conflict with bike traffic through this area.

Form J-1 Page 5 of 8: Permeable Surfaces

Brief Description: Permeable surfaces are pavement that allows for percolation through void spaces into subsurface layers.

Site Type (Check all that apply):	Street Type	Rating	Present in Project?
	Residential Streets	●	☐
	Commercial Street/ Business District	●	☐
	Collector Street	◉	☐
	Arterial and Boulevard	◉	☒
	Alleys	●	☐
	Parking Areas	◉	☐
Key Opportunities for Permeable Surfaces (Check all that apply):	Sidewalks		☒
	Parking strips		☐
	Shoulders		☐
	Low traffic roadways		☐
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Permeable Surfaces		
	Slope < 2-3%		☒
	Conveying limited run-on to a site		☐
	Low traffic area		☐
	Unfavorable Conditions for Permeable Surfaces		
	High traffic area		☐
	Run-on has high sediment load		☐

Summary of Findings:

Were Permeable Surfaces determined to be applicable as part of the Green Streets BMP plan? ☒ Yes ☐ No	If yes, were they used? ☐ Yes ☒ No

Provide discussion/justifications for selections and decisions above:

The proposed project site does not have suitable infiltration characteristics for full or partial infiltration at shallow depths due to poor in situ soils. In addition, long term maintenance and ADA compatible surfaces are a concern with the use of permeable sidewalk materials. Permeable concrete is prone to clogging and would be a concern in this location due to the adjacent landscape areas and associated debris generated from them. Lastly, the proposed road widening of Carroll Canyon Road will convey a significant amount of vehicle and bike traffic and durability of a permeable pavement is a concern for this road in the community.

Form J-1 Page 6 of 8: Green Gutters

Brief Description: Green Gutters are shallow and narrow strips of landscaping in a typical curb and gutter location with a lower elevation than the street gutter elevation to allow capture of storm water from the sidewalk and street.

Site Type (Check all that apply):	Street Type	Rating	Present in Project?
	Residential Streets	○	☐
	Commercial Street/ Business District	◉	☐
	Collector Street	●	☐
	Arterial and Boulevard	●	☒
	Alleys	◉	☐
	Parking Areas	○	☐
Key Opportunities for Green Gutters (Check all that apply):	Parkway strips		☒
	Medians		☐
	Long, mostly continuous space		☒
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Green Gutters		
	Slope > 1% and <3%		☒
	Conveying run-on to a site		☐
	Infiltration is partially feasible or not feasible		☒
	Long continuous segments available		☒
	Narrower spaces (as little as 2 to 3 feet)		☒
	Unfavorable Conditions for Green Gutters		
	Frequent driveway interruption		☒
	ROW width too limited		☒

Summary of Findings:

Were Green Gutters determined to be applicable as part of the Green Streets BMP plan? ☒ Yes ☐ No	If yes, were they used? ☒ Yes ☐ No

Provide discussion/justifications for selections and decisions above:

Green gutters will be implemented along the proposed widening of Carroll Canyon Road in the project's landscaped parkway. This area provides the opportunity to implement this linear BMP which will convey and treat storm water from the widened road in a narrow, linear fashion which suits the project's available space and geometric opportunity. In addition, this BMP does not rely on infiltration which works well with the poor infiltration characteristics of the surficial, in situ soils.

Form J-1 Page 7 of 8: Rain Gardens

Brief Description: Rain Gardens are shallow detention basins with vegetation that temporarily store water to allow for infiltration of the stored volume.

Site Type (Check all that apply):	Street Type	Rating	Present in Project?
	Residential Streets	◉	☐
	Commercial Street/ Business District	◉	☐
	Collector Street	◉	☐
	Arterial and Boulevard	◉	☒
	Alleys	○	☐
	Parking Areas	●	☐
Key Opportunities for Rain Gardens (Check all that apply):	Irregularly shaped areas in ROW		☐
	Broad and flat areas		☐
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Rain Gardens		
	Slope <2%		☐
	Infiltration is partially feasible or not feasible		☒
	Large area available		
	Unfavorable Conditions for Rain Gardens		
	Slope > 2%		☒
	ROW too limited		☒

Summary of Findings:

Were Rain Gardens determined to be applicable as part of the Green Streets BMP plan? ☐ Yes ☒ No	If yes, were they used? ☐ Yes ☒ No

Provide discussion/justifications for selections and decisions above:

Rain gardens were determined to not be an applicable Green Street BMP for this project due to the lack of available space and geometric opportunity to site a rain garden. The project has long, linear sidewalk planters associated with the proposed road widening which is better suited for a green gutter instead of a rain garden due to the lack of available space and running slope of the existing road. In addition, the poor infiltration characteristics of the surficial, in situ soil would prohibit any infiltration benefits typically associated with a rain garden.

Form J-1 Page 8 of 8: Trees

Brief Description: Trees planted in the sidewalk right-of-way provide rainfall interception and infiltration benefits and typically supplements other storm water management tools.

Site Type (Check all that apply):	Street Type	Rating[1]	Present in Project?
	Residential Streets	●	☐
	Commercial Street/ Business District	◉	☐
	Collector Street	◉	☐
	Arterial and Boulevard	◉	☒
	Alleys	◉	☐
	Parking Areas	●	☐
Key Opportunities for Trees (Check all that apply):	Parkway strips		☒
	Medians		☐
	Irregularly shaped areas		☐
	Extra ROW on back side of sidewalk		☒
	Other (must justify below)		☐
Site-Specific Factors (Check all that apply):	Favorable Conditions for Trees		
	Located outside of clear zone		☒
	Infiltration is feasible		☐
	ROW not limiting		
	Unfavorable Conditions for Trees		
	Limited space for root growth		☐
	Clear zone issues		☒

Summary of Findings:

Were Trees determined to be applicable as part of the Green Streets BMP plan? ☒ Yes ☐ No	If yes, were they used? ☒ Yes ☐ No

Provide discussion/justifications for selections and decisions above:

Street trees as well as other on site trees will be used along the project's Carroll Canyon Road frontage as a Green Street BMP feature. Street trees which may conflict with clear zone will be relocated directly outside of the clear zone, but still contiguous with the street widening and the proposed Green Street BMPs.

KLR planning

P.O. Box 882676
San Diego, CA 92168-2676
karen@klrplanning.com
619.578.9505

March 23, 2015

Sarah Hudson, Demographer
Instructional Facilities Planning Department
San Diego City Schools
4100 Normal Street
Annex 2, Room 101
San Diego, CA 92103-2682

SUBJECT: SCHOOL SERVICE FOR THE PROPOSED PROJECT CARROLL CANYON MIXED USE PROJECT IN THE SCRIPPS MIRAMAR RANCH COMMUNITY OF THE CITY OF SAN DIEGO

Dear Ms. Hudson:

Sudberry Properties (applicant) is proposing the *Carroll Canyon Mixed Use* project on an approximate 9.28-net acre site in the Scripps Miramar Ranch community. KLR Planning will be preparing an Environmental Impact Report (EIR) for the project based on specific issues identified by the City of San Diego, as Lead Agency, including public services and utilities.

The Carroll Canyon Mixed Use project involves a Site Development Permit, a Planned Development Permit, and a Vesting Tentative Map for the development of the project site to be rezoned RM-3-7. The proposed project involves demolition of existing structures (76,241 square feet) and on-site surface parking and construction of a mixed-use development consisting of residential, commercial, and restaurant uses. The project would have a total of 260 multi-family residential units and 12,200 square feet of commercial retail and restaurant space.

The City of San Diego has requested that we provide information relative to the ability for existing utilities and public services to serve the project. This information will be used in the project's the environmental documentation.

In order to adequately assess the project's potential impacts on school services, we would like to request the following information from your office:

1. Which schools would serve the project site? Please provide addresses, design capacity, and present and projected enrollments at these schools.
2. How many portable/relocatable classrooms are utilized at these schools? Are there any identified deficiencies in school services and facilities?

3. Has the District implemented reduced class sizes? If so, what has been the effect on the District in terms of providing classroom space, teachers, and other components necessary for the District to provide adequate educational facilities and service to the community?
4. According to the District's generation rates, how many students would the project generate? What are the generation rates?
5. Based on the District's calculation of the project's student generation, would the project result in a need for additional school facilities?
6. Please describe any developer fee assessment program, which has been implemented by the District. Who is responsible, how is the amount determined, and what is the payment method?
7. Please describe any agreements the District has with the City regarding use of school fields and game courts by the public?
8. Does the District anticipate or expect any long-term (10-year, 20-year, 30-year, or longer) impacts associated with school services due to anticipated development within Scripps Miramar Ranch? If so, please describe the nature of these impacts and how this project may contribute to those impacts. If impact would occur, what suggestions do you have to minimize their effects?

Please include any other information concerning your services and other issues that may be relevant to the proposed project. We would appreciate receiving this information prior to *April 8, 2015*. If you prefer to e-mail information, my e-mail address is brittany@klrplanning.com. If you need additional information about the project, or if there are fees associated with this request, please call me at 619.204.9757. Thank you for your assistance.

Sincerely,

KLR Planning

Brittany Erin Ruggels, MCP

San Diego Unified
SCHOOL DISTRICT

Office of Special Projects
Instructional Facilities Planning Department
Sarah Hudson, Demographer
TEL.: (619) 725-7369
FAX: (619) 725-7382
shudson@sandi.net

April 7, 2015

Karen Ruggels, KLR Planning
P.O. Box 882676
San Diego, CA 92168
karen@klrplanning.com

Subject: CARROLL CANYON MIXED USE PROJECT (SUDBERRY PROPERTIES)
260 multi-family apartments at 9850 Carroll Canyon Road, San Diego, CA 92131
(125 1-bedroom, 124 2-bedroom, and 11 3-bedroom)

Dear Ms. Ruggels:

We are in receipt of your March 23, 2015 letter requesting school information for the Environmental Impact Report (EIR) for the above referenced development. In this letter we address your questions and provide requested information.

1. The following schools serve the project site:

School Name	Address	Estimated Program Capacity	2014-15 Enrollment	2015-16 Projected Enrollment
Miramar Ranch Elementary	10770 Red Cedar Drive San Diego, CA 92131	910	761	784
Marshall Middle	9700 Avenue of Nations San Diego, CA 92131	At capacity	1616	1591
Scripps Ranch High	10410 Treena Street San Diego, CA 92131	2385	2238	2263

Capacities are approximate and are calculated using current class size ratios; if class sizes ratios change, additional or less capacity may be available.

2. The number of portable/relocatable classrooms at each school site are as follows:
Miramar Ranch: 21 Marshall: 0 Scripps Ranch: 35
At this time there are no identified deficiencies in school facilities.

3. For the 2014-15 school year, the following class size ratios are in effect for regular schools: 25.5:1 for K-3, 32.13:1 for 4-6, and 30.0:1 for 7-8 and 9-12. At this time Scripps Ranch schools are not subject to class size reduction.

4. Student generation rates vary based on the type of project, number of units, bedroom mix, neighborhood, and other factors. There are not district standard rates. The information available indicates this project will be 260 multi-family apartments: 125 1-bedroom units, 124 2-bedroom units, and 11 3-bedroom units.

   In order to estimate the number of students generated by this project, we reference existing similar residential developments in the vicinity of the proposed project. The table below lists nearby developments and the number of students generated by each.

Existing Developments: Student Generation

Development	Address	Year Built	Number of Units	2014-15 Students	Student Generation Rate
Solterra	9865-9895 Erma Road San Diego, CA 92131	2013	114	K-5: 4 6-8: 6 9-12: 8 **K-12: 18**	K-5: 0.035 6-8: 0.053 9-12: 0.070 **K-12: 0.158**
Allure	10752-10848 Scripps Ranch Blvd San Diego, CA 92131	2002	194	K-5: 23 6-8: 15 9-12: 31 **K-12: 69**	K-5: 0.119 6-8: 0.077 9-12: 0.160 **K-12: 0.356**
Casa Mira View	Various addresses San Diego, CA 92126	2013-present	Currently 810	K-5: 67 6-8: 22 9-12: 33 **K-12: 122**	K-5: 0.083 6-8: 0.027 9-12: 0.041 **K-12: 0.151**

Based on the above information, the table below shows preliminary student generation rates for the proposed project. The student generation rates are the average from the developments noted above, with a low and high range.

Potential Student Generation — 260 Proposed Multi-Family Units

School Level	Student Generation Rate	Estimated Number of Students
K-5	0.079-0.158	21-41
6-8	0.053-0.105	14-27
9-12	0.090-0.180	23-47
K-12	**0.222-0.443**	**58-115**

5. **The schools serving this project are already operating at between 80% to 100% of their capacity. Therefore, this project has the potential to result in the need for additional school facilities, particularly at the middle and high school level. We are especially concerned about the impact this project could have on Marshall Middle school, which is already operating at full capacity.**

6-7. For the developer fee assessment program and joint use agreements with the City, please contact Randy White at (619) 725-7375 or rwhite1@sandi.net.

8. We are not aware of any other specific projects within the Scripps Ranch area.

Please keep us informed about this development and any changes that may occur to the proposal. If you have questions about the information in this letter or other school-related issues, please contact me at (619) 725-7369 or shudson@sandi.net.

Sincerely,

Sarah A Hudson

Sarah Hudson
Demographer

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
2601 Meacham Boulevard
Fort Worth, TX 76193

Aeronautical Study No.
2015-AWP-6768-OE

Issued Date: 07/01/2015

Karen Ruggels
Sudberry Properties
P.O.Box 882676
San Diego, CA 92168

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building Bldg 3
Location:	San Diego, CA
Latitude:	32-54-16.07N NAD 83
Longitude:	117-06-54.93W
Heights:	515 feet site elevation (SE) 48 feet above ground level (AGL) 563 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/lighting are accomplished on a voluntary basis, we recommend it be installed and maintained in accordance with FAA Advisory circular 70/7460-1 K Change 2.

The structure considered under this study lies in proximity to an airport and occupants may be subjected to noise from aircraft operating to and from the airport.

This determination expires on 01/01/2017 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within

6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates , heights, frequency(ies) and power . Any changes in coordinates , heights, and frequencies or use of greater power will void this determination. Any future construction or alteration , including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

If we can be of further assistance, please contact our office at (310) 725-6557. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2015-AWP-6768-OE.

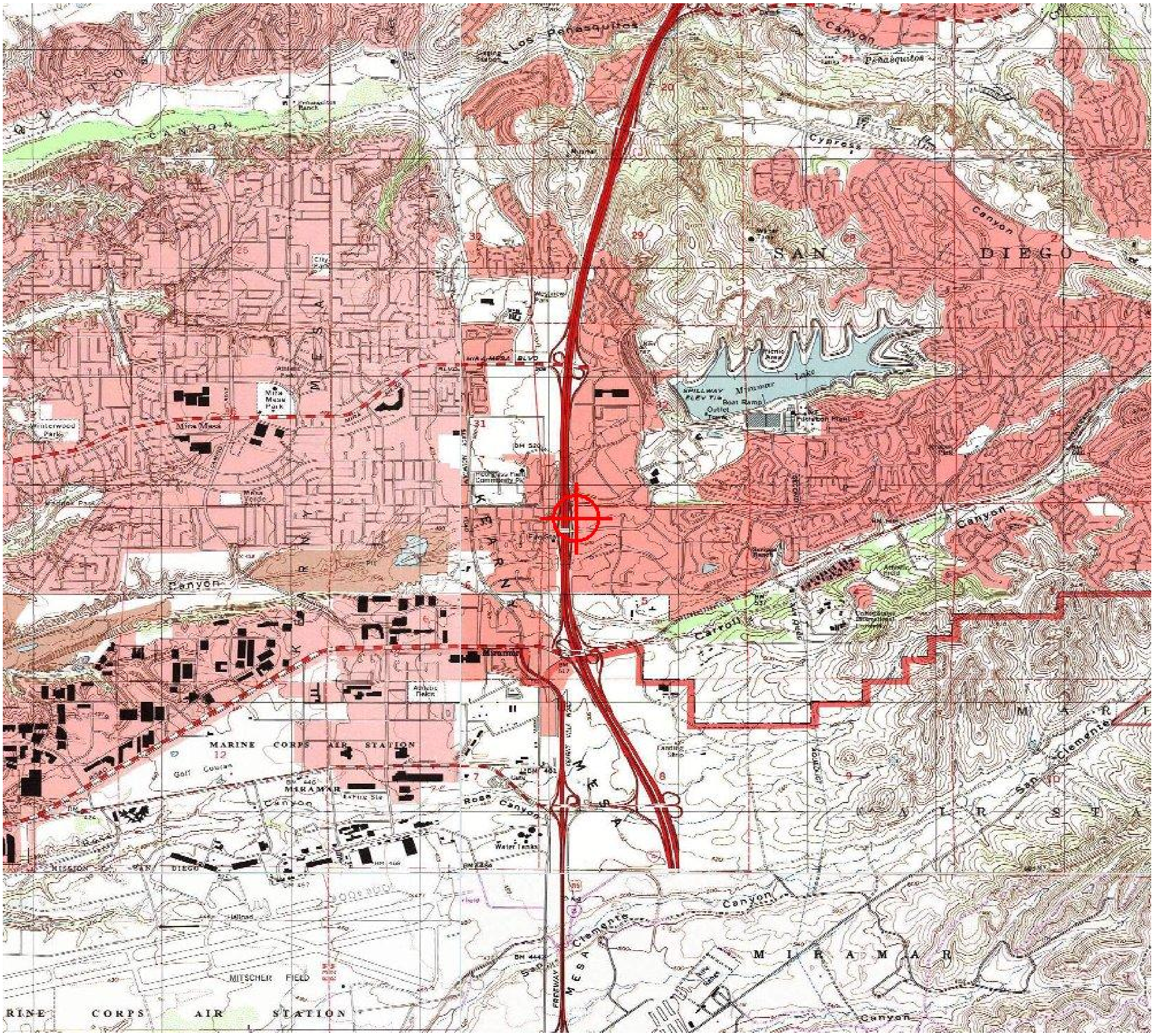
Signature Control No: 255480985-256626899 (DNE)
Karen McDonald
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2015-AWP-6768-OE

Mixed use development with Restaurant, Retail/Restaurant, Housing

TOPO Map for ASN 2015-AWP-6768-OE



SAN DIEGO COUNTY
REGIONAL AIRPORT AUTHORITY

P.O. BOX 82776, SAN DIEGO, CA 92138-2776
619.400.2400 WWW.SAN.ORG

October 25, 2012

Ms Jeanette Temple
City of San Diego
Development Services Department
1222 First Avenue
San Diego, California 92101

Re: Airport Land Use Commission Consistency Determination – Community Plan Amendment and Zone Reclassification to Convert an Existing Industrial Office Building Complex into Retail, Service and Restaurant Uses at 9850 Carroll Canyon Road, City of San Diego; APN 363-360-28

Dear Ms Temple:

As the Airport Land Use Commission (ALUC) for San Diego County, the San Diego County Regional Airport Authority acknowledges receipt of an application for a determination of consistency for the project described above. This project is located within the Airport Influence Area (AIA) for the Marine Corps Air Station (MCAS) Miramar Airport Land Use Compatibility Plan (ALUCP).

ALUC staff has reviewed your application and accompanying materials and has determined that it meets our requirements for completeness. In accordance with ALUC Policies and applicable provisions of the State Aeronautics Act (Cal. Pub. Util. Code §21670-21679.5), ALUC staff has determined that the proposed project is **consistent** with the MCAS Miramar ALUCP based upon the facts and findings summarized below:

(1) The proposed project involves a community plan amendment and zone reclassification to change the designation and zone for a property from industrial to commercial in order to allow for the redevelopment of a complex of existing industrial office buildings for retail, service, and restaurant uses.

(2) The proposed project is located within the 60-65 dB CNEL noise contour. The ALUCP identifies commercial uses located within the 60-65 dB CNEL noise contour as compatible with airport uses.

(3) The proposed project is in compliance with the ALUCP airspace protection surfaces because a determination of no hazard to air navigation has been issued by the Federal Aviation Administration (FAA).

(4) The proposed project is located outside the Accident Potential Zones and Transition Zone.

(5) Therefore, the proposed project is consistent with the adopted MCAS Miramar ALUCP.

(6) This determination of consistency is not a "project" as defined by the California Environmental Quality Act (CEQA), Cal. Pub. Res. Code §21065.

Please contact Ed Gowens at (619) 400-2244 if you have any questions regarding this letter.

Yours truly,

Angela Jamison

Angela Jamison
Manager
Airport Planning

cc: Amy Gonzalez, SDCRAA – General Counsel
Ron Bolyard, Caltrans – Division of Aeronautics
Chris Schmidt, Caltrans – District 11
Tait Galloway, City of San Diego
C. Laura Thornton, MCAS Miramar – Community Plans & Liaison

WASTE MANAGEMENT PLAN

FOR

CARROLL CANYON MIXED-USE PROJECT

San Diego, California
Project No. 240716

Prepared for:
City of San Diego Environmental Services Department
9601 Ridgehaven Court, Suite 320
San Diego, California 92123-1636

Prepared by:
KLR Planning
P. O. Box 882676
San Diego, California 92168-2676
Telephone: 619-578-9505
Facsimile: 619-692-4243

December 2015

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1.0 INTRODUCTION

The purpose of this Waste Management Plan (WMP) for the *Carroll Canyon Mixed-Use* project in the City of San Diego is to provide analysis of the solid waste impacts anticipated for the *Carroll Canyon Mixed-Use* project and how those impacts will be mitigated. The goal of this WMP is to identify sufficient mitigation to reduce the potential impacts of the *Carroll Canyon Mixed-Use* project on solid waste services. Two acceptable approaches to managing waste are to reduce the tons disposed to 60 tons or less, or to provide diversion of 75 percent or more, thus meeting the goal established by Assembly Bill 341.

The 9.28-net acre (9.52 gross acres) *Carroll Canyon Mixed-Use* project site is located at 9850 Carroll Canyon Road, San Diego, California 92131. The site is situated in the northeast quadrant where Interstate 15 (I-15) and Carroll Canyon Road intersect and is within the Scripps Miramar Ranch Community Plan area. (See Figure 1, *Carroll Canyon Mixed-Use Project Location and Aerial.*) Open space borders the project site to the north. A mix of light industrial, office, private vocational schools, and wholesale uses are located to the east, southeast, and south of the project site. A commercial center is also located south of the project site. Multi-family residential uses are located west of the project site, beyond I-15.

The Carroll Canyon Mixed Use Project proposes the redevelopment of an existing office complex with a mixed-use development that would include multi-family residential units, retail shops, and restaurants. The existing 76,241 square feet of office buildings and associated facilities would be demolished and replaced with 260 multi-family residential units and approximately and 12,200 square feet of retail/restaurant space. The project requires discretionary approvals including: a General Plan Amendment to change the current land use designation from Industrial Employment to Multiple Use, a Community Plan Amendment to change the current land use designation from Industrial to Residential and Community Shopping, a Rezone of the site from IP-2-1 to RM-3-7 and CC-2-3, a Site Development Permit, a Planned Development Permit, and a Vesting Tentative Map.

Figure 1
Carroll Canyon Mixed-Use - Project Location and Aerial

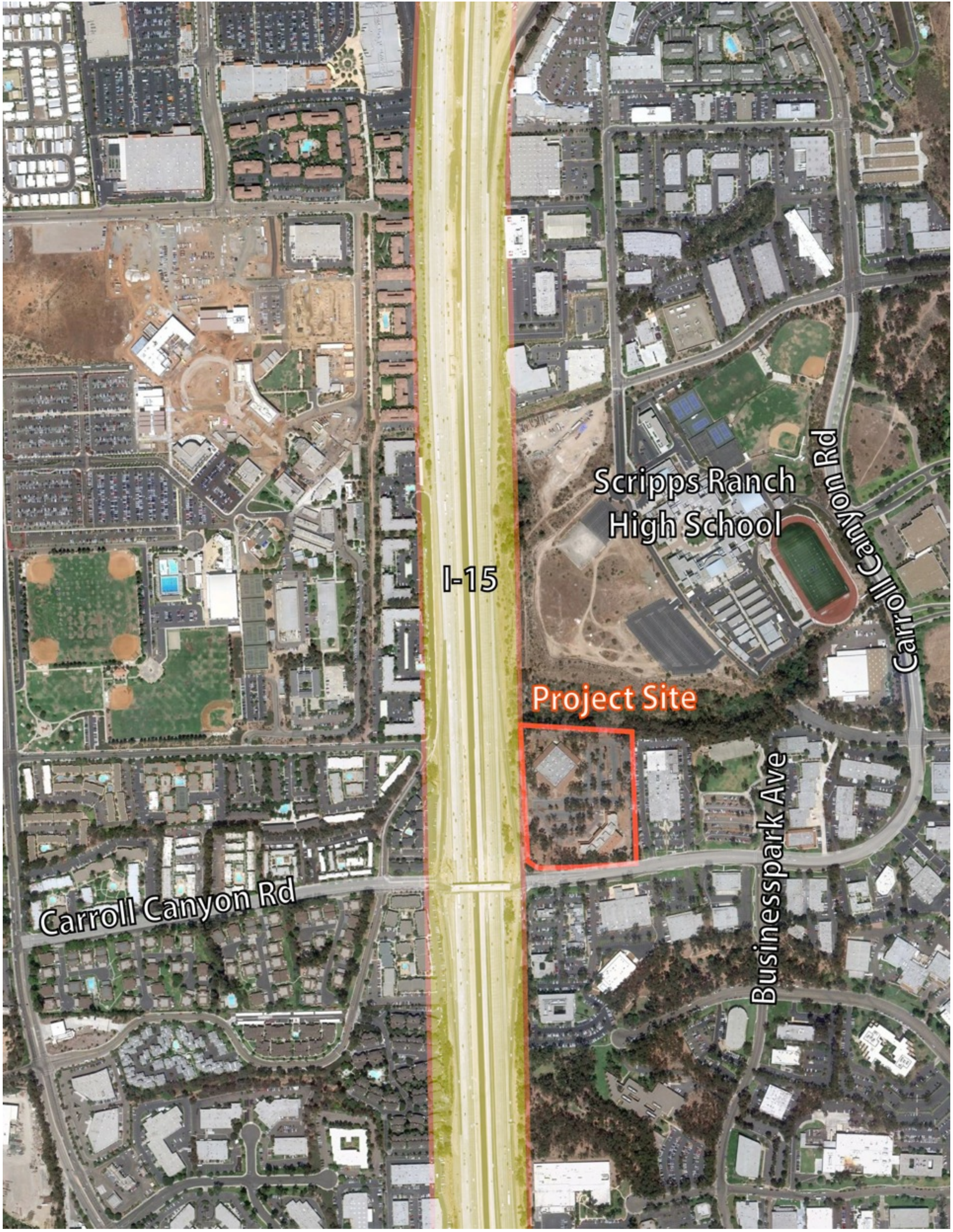
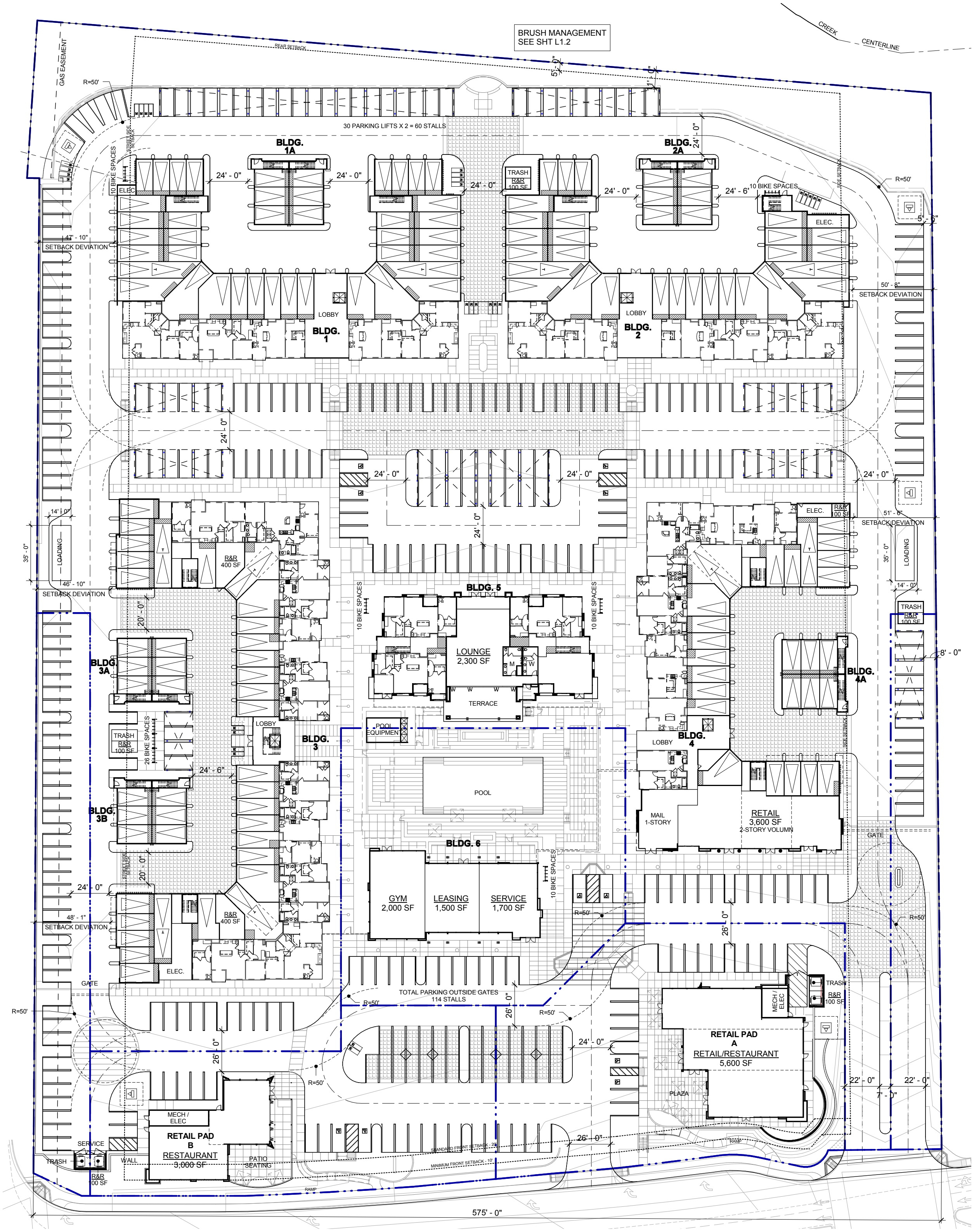


Figure 2
Carroll Canyon Mixed-Use Project Site Plan



This WMP consists of two sections corresponding to the implementation of site development: the *Construction Phase* (to include demolition) and the *Occupancy Phase* (post-construction). The WMP addresses the projected amount of waste that could be generated by the project based on current City generation rates and estimates; waste reduction goals; and recommended techniques to achieve the waste reduction goals, such as recycling. The project includes a 2- to 3-month demolition phase. Construction of the project will take approximately 12 – 14 months. Construction will take place as a single phase and is estimated to begin last quarter 2016.

Waste disposal sites and recycling methods and opportunities may change from those available today; however, it is not expected that waste diversion and disposal sites listed in Table 4 would change by the time the project is anticipated to begin construction. This WMP includes the following general information known at the time the WMP was prepared:

- Projected waste generation calculations and identification of types of waste materials generated;
- Source separation techniques for waste generated;
- How materials will be re-used on-site;
- Name and location of current recycling, re-use, and landfill facilities where waste will be disposed of if not re-used on-site;
- A "buy recycled" program;
- Measures to be implemented directed at reducing construction debris;
- Method(s) for communicating waste reduction and recycling goals to subcontractors;
- A general time line for construction and development; and
- A list of required progress and inspections by City staff, based on current ordinances.

2.0 BACKGROUND

In 1989, the California Legislature passed Assembly Bill (AB) 939: Integrated Waste Management Act, which mandated that all cities reduce waste disposed in landfills from generators within their borders by 50 percent by the year 2000. AB 939 required all local governments to prepare a Source Reduction and Recycling Element, which incorporates waste management policies and programs to achieve the mandated waste reduction. Since 2004, the City has diverted more than 50 percent of its generated waste stream from disposal. This bill specified that solid waste should be considered by the equation GENERATED = DISPOSED + DIVERTED. "Diverted" materials are put into a *hierarchy* in the law, as follows:

- First *source reduction*, such as using a reusable bag, making double-sided copies, or other measure that stops waste at the source.
- Secondary measures include *recycling* and *composting*. Because these measures often have transportation and processing impacts, they are considered less preferable than source reduction.
- In the Public Resources Code, various methods of *transformation* for energy production are limited to 10 percent of the total waste reduction target.

In 2008, SB 1016 was chaptered. Known as the Solid Waste Disposal Measurement Act, SB 1016 maintained the 50 percent diversion requirement, but changed to a disposal-based measurement system, expressed as the 50 percent Equivalent Per Capita Disposal Target. This built upon AB 939 by implementing a simplified and timelier indicator of jurisdiction performance that focuses on reported disposal at Board-permitted disposal facilities. This established a goal of not recycling more, but disposing of less. AB 341: Jobs and Recycling, chaptered in 2011, was intended to create green jobs by expanding recycling to every multi-family dwelling and business. It charged CalRecycle with responsibility for ensuring that the State is diverting at least 75 percent of solid waste that is generated within the State by 2020. SB 1016 establishes that compliance with State law is measured by reducing the amount of waste material requiring disposal, and AB 341 increases the diversion target to 75 percent.

Additional local regulation pertaining to solid waste management includes the City of San Diego's Municipal Code Ch.14 Art. 2 Div. 8: §142.0810, §142.0820, Ch. 6 Art. 6 Div. 7; §66.0706, §66.0709, §66.0710; and Ch. 6 Art. 6 Div. 6; §66.0711, §66.0604, §66.0606. These statues designate refuse and recycling space allocation requirements for:

- on-site refuse and recyclable material storage requirements,
- diversion of construction and demolition debris regulations, and
- diversion of recyclable materials generated from residential facilities, businesses, commercial/institutional facilities, apartments, condominiums, and special events requiring a City permit.

The City of San Diego has established a threshold of 40,000 square feet of development as generating sufficient waste (60 tons) to have a potentially cumulatively significant impact on solid waste services. *Carroll Canyon Mixed-Use* project as proposed exceeds this threshold. The purpose of this WMP is to identify mitigation measures to reduce this potential impact to below a level of significance.

The City Recycling Ordinance is found in Municipal Code section 66.0701 et. seq. It requires the provision of recycling service for all single-family residences; and commercial facilities and multifamily residences with service for four cubic yards or more. In addition, the ordinance also requires development of educational materials to ensure occupants are informed about the City's ordinance and recycling services including information on types of recyclable materials accepted.

Construction and Demolition (C&D) Debris Diversion Deposit Program applies to all applicants for building, demolition, and removal permits. This ordinance requires that the applicant post a deposit (Table 1, *C&D Debris Deposit Table*). The deposit is not returned until the applicant demonstrates that a minimum amount of the material generated has been diverted from disposal in landfills. Mixed construction debris recycling facilities in San Diego are evaluated quarterly to determine how much of the throughput is recycled, and how much is a "residual" material requiring disposal. Facilities that accept mixed debris typically achieve a 68 percent or less diversion rate. Single materials recyclers, such as metal recyclers, often achieve a nearly 100 percent diversion rate. When comingled materials are sent to a mixed facility, the 75 percent diversion goal established by AB 341 will not be met. Depending on the project, to ensure that the overall diversion goal is attained, some materials must often be separated and trucked to facilities with higher diversion rates, such as aggregate and metal recyclers.

Table 1
C&D Debris Deposit Table

Building Category	Sq. Ft. Subject to Ordinance*	Deposit per Sq. Ft.	Range of Deposits
Residential New Construction	500-125,000 detached 500-100,000 attached	$0.40	$200-$50,000 $200-$40,000
Non-residential New Construction	1,000-25,000 commercial 1,000-75,000 industrial	$0.20	$200-$5,000 $200-$15,000
Non-residential Alterations	286 with no maximum	$0.70	$200 and up
Residential Demolition	286 with no maximum	$0.70	$200 and up
Non-residential Demolition	1,000 with no maximum	$0.20	$200 and up
Roof Tear-off	All projects	-	$200
Residential Alterations	500 and above	-	$1,000

* Projects under the minimum square footage subject to the ordinance are exempt from the C&D debris recycling deposit.

2.1 Exterior Refuse and Recyclable Material Storage Area Requirements

The *Carroll Canyon Mixed-Use* project will develop in one phase over an approximate 14- to 17-month period. Development is anticipated to begin late 2016. Because the *Carroll Canyon Mixed-Use Project* includes residential and nonresidential development, exterior refuse and recyclable material storage areas will be provided in accordance with City regulations per Chapter 14, Article 2, Division 8: Refuse and Recyclable Material Storage Regulations, §142.0820 and §142.0830.

2.2 Exterior Refuse and Recyclable Material Storage Areas for *Carroll Canyon Mixed-Use Project*

Carroll Canyon Mixed-Use Project would develop a mixed-use project with a total of 260 residential units and 12,200 square feet of commercial space. Table 2, *Minimum Exterior and Recyclable Material Storage Areas for Residential Development*, shows the required amount of refuse and recyclable storage areas for the project's residential element. As shown in Table 2, the project would be required to provide 497 square feet each of exterior refuse and recyclable material storage area, for a total of 994 square feet of material storage area. Table 3, *Minimum Exterior and Recyclable Material Storage Areas for Commercial and Industrial Development*, shows the required amount of refuse and recyclable storage areas for the project's commercial retail element. As shown in Table 3, the project would be required to provide 48 square feet each of exterior refuse and recyclable material storage area, for a total of 96 square feet of material storage area.

Table 2
Minimum Exterior Refuse and Recyclable Material Storage Areas for Residential Development

Number of Dwelling Units per Development	Minimum Refuse Storage Area per Development (square feet)	Minimum Recyclable Material Storage Area per Development (square feet)	Total Minimum Storage Area per Development (square feet)
2-6	12	12	24
7-15	24	24	48
16-25	48	48	96
26-50	96	96	192
51-75	144	144	288
76-100	192	192	384
101-125	240	240	480
126-150	288	288	576
151-175	336	336	672
176-200	384	384	768
201+	384 plus 48 square feet for every 25 dwelling units above 201	384 plus 48 square feet for every 25 dwelling units above 201	768 plus 96 square feet for every 25 dwelling units above 201

Source: City of San Diego Municipal Code, Chapter 14, Article 2, Division 8: Refuse and Recyclable Material Storage Regulations, §142.0820, Table 142-08B, effective January 1, 2000.

Table 3
Minimum Exterior Refuse and Recyclable Material Storage Areas for Commercial and Industrial Development

Gross Floor Area per Development (square feet)	Minimum Refuse Storage Area per Development (square feet)	Minimum Recyclable Material Storage Area per Development (square feet)	Total Minimum Storage Area per Development (square feet)
0 – 5,000	12	12	24
5,001 – 10,000	24	24	48
10,001 – 25,0000	48	48	96
25,001 – 50,000	96	96	192
50,001 – 75,000	144	144	288
75,001 – 100,000	192	192	384
100, 001+	192 plus 48 square feet for every 25,000 square feet of building area above 100,001	192 plus 48 square feet for every 25,000 square feet of building area above 100,001	384 plus 96 square feet for every 25,000 square feet of building area above 100,001

Source: City of San Diego Municipal Code, Chapter 14, Article 2, Division 8: Refuse and Recyclable Material Storage Regulations, §142.0830, Table 142-08C, effective January 1, 2000.

3.0 EXISTING CONDITIONS

The *Carroll Canyon Mixed-Use* project site is located in the northeast quadrant of I-15 and Carroll Canyon Road. Situated north of Carroll Canyon Road, east of I-15, a distance west of Scripps Ranch Boulevard, and south of an intermittent natural drainage corridor, the Carroll Canyon Mixed-Use project site encompasses approximately 9.28 net acres (9.52 gross acres). Multi-family residential development within the Mira Mesa community occurs west of the project site, on the west side of I-15. An intermittent drainage corridor separates the Carroll Canyon Mixed-Use site from Scripps Ranch High School to the northeast. Commercial office development is located immediately east of the project site, with mixed-use commercial retail and commercial office development occurring south of the project site along Carroll Canyon Road. Access to the project site is provided off Carroll Canyon Road. I-15 freeway ramps occur at Carroll Canyon Road, providing north- and south-bound access to the interstate.

4.0 PROPOSED CONDITIONS

The *Carroll Canyon Mixed-Use* project proposes to rezone of the project site from IP-2-1 to RM-3-7 and CC-2-3 to allow for the redevelopment of an existing office complex with mixed-use development that would include a 260 multi-family residential units and 12,200 square feet of retail/restaurant space on approximately 9.28 acres in the Scripps Miramar Ranch Community (see Figure 2, *Carroll Canyon Mixed-Use Site Plan*). The existing 76,241 square feet of office buildings and associated facilities would be demolished. Of the approximately 9.28-net acre project site, the currently graded area comprises nine acres. The proposed Carroll Canyon Mixed-Use project would require only finish grading to accommodate development. Earthwork for the project would be localized and required to rebuild the project site where a split-level building exists. Additionally, over-excavation is necessary to render the site suitable for the proposed development. Earthwork would involve approximately 39,000 cubic yards of cut and approximately 4,500 cubic yards of fill. Approximately 34,500 cubic yards of material would be exported. Maximum cut depth would be nine feet; maximum fill depth would be nine feet. All manufactured slopes would have a gradient of 2:1.

The project requires discretionary approval including: a General Plan Amendment to change the land use designation from Industrial Employment to Multiple use. A Community Plan Amendment to change the land use designation from Industrial Park to Residential and Community Shopping, Rezone of the site from IP-2-1 to RM-3-7 and CC-2-3, Planned Development Permit, Site Development Permit, and Vesting Tentative Map. Construction will be completed in a single phase over a 14- to 17-month period with construction anticipated to begin in fourth quarter 2016. Construction practices will comply with local, state, and federal regulations regarding handling of building materials to ensure waste minimization requirements are met.

5.0 DEMOLITION, GRADING, AND CONSTRUCTION WASTE

Demolition and construction will occur over a period of approximately 14 to 17 months. ESD staff would be present for an early pre-construction meeting to evaluate waste segregation, signage, and salvage.

5.1 Demolition

The project site is the location of an existing office development. The demolition phase will include the deconstruction/demolition and removal of the existing office buildings, associated structures, asphalt parking and walkway areas, and interior landscaping. Approximately 11,000 tons of waste is expected to be generated during demolition. Approximately 8,978 tons of material would be recycled, to include trees, concrete, asphalt, foundations, building structure, masonry walls, curb and gutter, and switch gear and cable. Approximately 2,131 tons of debris would be disposed in a landfill, to include non-useable lumber, drywall, glass, miscellaneous trash, roofing paper, broken roof tiles, and floor tile. Table 4, *Carroll Canyon Mixed-Use Project Waste Generation – Demolition*, summarizes the type and amount of demolition materials, as well as diversion/disposal.

Table 4
Carroll Canyon Mixed-Use Project Waste Generation – Demolition

Material Type	Estimated Waste Quantity (tons)	Handling	Estimated Diversion (tons)	Estimated Disposal (tons)
		DEMOLITION WASTE		
Asphalt and Concrete	3,332.70	**Hanson Aggregates** 9229 Harris Plant Road San Diego, CA 92126 (100% diversion)	3,332.70	--
Foundations/ Building Structure	4,443.60	**Vulcan Carroll Canyon Landfill and Recycle Site** 10051 Black Mountain Road San Diego, CA 92126 (100% diversion)	4,443.60	--
Brick/Masonry/ Tile	1,576.26	**Vulcan Carroll Canyon Landfill and Recycle Site** 10051 Black Mountain Road San Diego, CA 92126 (100% diversion)	1,575/26	--
Cubs/Gutter	277.73	**Vulcan Carroll Canyon Landfill and Recycle Site** 10051 Black Mountain Road San Diego, CA 92126 (100% diversion)	277.73	--
Switch Gear/Cable	1.11	**Vulcan Carroll Canyon Landfill and Recycle Site** 10051 Black Mountain Road San Diego, CA 92126 (100% diversion)	1.11	--
Drywall	555.45	**EDCO Station Transfer and Buy Back Center** 8184 Commercial Street La Mesa, CA 91942 (70% diversion)	388.83	166.64
Landscape Materials	333.27	**Miramar Greenery** 5180 Convoy Street San Diego, CA 92111 (100% diversion)	333.27	--
Roofing Materials	277.73	**LEED Recycling** 8725 Miramar Place San Diego, CA 92121 (100% diversion)	277.73	--
Floor Tile	1.11	**Otay C&D/Inert Debris Processing Facility** 1700 Maxwell Road Chula Vista, CA 91913 (76% diversion)	0.84	0.27
Glass	22.22	**Otay C&D/Inert Debris Processing Facility** 1700 Maxwell Road Chula Vista, CA 91913 (76% diversion)	16.89	5.33
Non-Useable Lumber	11.11	**Otay C&D/Inert Debris Processing Facility** 1700 Maxwell Road Chula Vista, CA 91913 (76% diversion)	8.44	2.67
Garbage/Trash	277.73	**Miramar Landfill** 5180 Convoy Street San Diego, CA 92111 (0% diversion)	--	277.73
TOTAL	11,109.00		8,978.00	2,131.00

5.2 Grading

As discussed in Section 1.0, the project site has been completely graded and is currently developed with 76,241 square feet of office buildings and associated facilities. Following demolition activities, the project would require approximately 39,000 cubic yards of cut and 4,500 cubic yards of fill. Approximately 34,500 cubic yards of material would be exported. Table 5, *Carroll Canyon Mixed-Use Project Waste Generation – Grading*, summarizes the type and amount of demolition materials, as well as diversion/disposal.

Table 5
Carroll Canyon Mixed-Use Project Waste Generation – Grading

Material Type	Estimated Waste Quantity (cubic yards)	Handling	Estimated Diversion (cubic yards)	Estimated Disposal (cubic yards)
Exported Earth	34,500	**Miramar Landfill** 5180 Convoy Street San Diego, CA 92111 (100% diversion)	34,500	--

5.3 Construction

Construction activities would generate packaging materials and unpainted wood, including wood pallets, and other miscellaneous debris. Construction debris would be separated on-site into material-specific containers to facilitate reuse and recycling and to increase the efficiency of waste reclamation. Source separation of materials at the construction site is essential to (1) ensure appropriate waste diversion rate, (2) minimize costs associated with transportation and disposal, and (3) facilitate compliance with the C&D ordinance. The types of construction waste anticipated to be generated include:

- Asphalt and Concrete
- Brick/Masonry/Tile
- Cardboard
- Carpet, Padding/Foam
- Drywall
- Landscape Debris
- Mixed C&D Debris
- Roofing Materials
- Scrap Metal
- Unpainted Wood and Pallets
- Garbage/Trash

According to the U.S. Environmental Protection Agency, commercial construction projects typically generate 3.9 pounds of construction waste per square feet of building construction and multi-family residential units generate approximately 4.0 pounds per square feet. Based on these estimates, construction waste generated by the Carroll Canyon Mixed Use project is shown in Table 6, *Carroll Canyon Mixed-Use Project Waste Generation*, and would total approximately 713 tons.

Table 6
Carroll Canyon Mixed-Use Project Waste Generation

Building Type	Size (square feet)	Generation Rate (pounds per square foot)	Tons Generated
Retail Commercial	12,200	3.9	22
Multi-Family Residential	380,900	4.0	691
		Total	**713**

In accordance with State diversion targets, a minimum of 75 percent of construction materials will be recycled. Materials to be recycled would be redirected to appropriate recipients selected from ESD's directory of facilities that recycle construction materials, scrap metal, and yard waste.

To facilitate management of construction materials, the developer shall identify one person or agency connected with the proposed development to act as Solid Waste Management Coordinator, whose responsibility it becomes to work with all contractors and subcontractors to ensure material separation and coordinate proper disposal and diversion of waste generated. The Solid Waste Management Coordinator will help to ensure all diversion practices outlined in this Waste Management Plan are upheld and communicate goals to all contractors involved efficiently.

The responsibilities of the Solid Waste Management Coordinator, include, but are not limited to, the following:

- Review the Solid Waste Management Plan including responsibilities of Solid Waste Management Coordinator.
- Review and update procedures as needed for material separation and verify availability of containers and bins needed to avoid delays.
- Review and update procedures for periodic solid waste collection and transportation to recycling and disposing facilities.
- The authority to issue stop work orders if proper procedures are not being allowed.

The contractors will perform daily inspections of the construction site to ensure compliance with the requirements of the Waste Management Plan and all other applicable laws and ordinances and report directly to Solid Waste Management Coordinator. Daily inspections will include verifying the availability and number of dumpsters based on amount of debris being generated, correct labeling of dumpsters, proper sorting and segregation materials, and salvaging of excess materials. Additionally, the following apply:

- Solid waste management coordinator will be responsible for educating contractors and subcontractors regarding waste management plan requirements and ensuring that contractors and subcontractors carry out the measures described in the WMP.
- Solid waste management coordinator will ensure ESD attendance at a Precon and assure compliance with segregation requirements, and verification of recycled content in base materials.
- Recycling areas will be clearly identified with large signs, approved by ESD, and sufficient amounts of material-specific bins will be provided for necessary segregation.

- Recycling bins will be placed in areas that are readily accessible to contractors/subcontractors and in areas that will minimize misuse or contamination by employees and the public.
- Solid waste management coordinator will be responsible for ensuring that contamination rates in bins remain below 5 percent by weight of the bin.

Table 7, *Carroll Canyon Mixed-Use Waste Generation – Construction Waste Diversion and Disposal*, is included below to summarize the types of waste generated, the amount of each waste type diverted, and the overall amount remaining to be disposed of in landfills.

Table 7
Carroll Canyon Mixed-Use Waste Generation – Construction

Material Type	Estimated Waste Quantity (tons)	Handling	Estimated Diversion (tons)	Estimated Disposal (tons)
		CONSTRUCTION WASTE		
Asphalt and Concrete	128.34	**Hanson Aggregates** 9229 Harris Plant Road San Diego, CA 92126 (100% diversion)	128.34	--
Brick/Masonry/Tile	71.30	**Vulcan Carroll Canyon Landfill and Recycle Site** 10051 Black Mountain Road San Diego, CA 92126 (100% diversion)	71.30	--
Cardboard	42.78	**EDCO Station Transfer and Buy Back Center** 8184 Commercial Street La Mesa, CA 91942 (70% diversion)	29.95	12.83
Carpet, Padding/Foam	57.04	**DFS Flooring** 10178 Willow Creek Road San Diego, CA 92131 (100% diversion)	57.04	--
Drywall	49.91	**EDCO Station Transfer and Buy Back Center** 8184 Commercial Street La Mesa, CA 91942 (70% diversion)	34.94	14.97
Landscape Debris	7.13	**Miramar Greenery** 5180 Convoy Street San Diego, CA 92111 (100% diversion)	7.13	--
Mixed C&D Debris	213.90	**Otay C&D/Inert Debris Processing Facility** 1700 Maxwell Road Chula Vista, CA 91913 (76% diversion)	160.42	53.48
Roofing Materials	7.13	**LEED Recycling** 8725 Miramar Place San Diego, CA 92121 (100% diversion)	7.13	--
Scrap Metal	7.13	**EDCO Station Transfer and Buy Back Center** 8184 Commercial Street La Mesa, CA 91942 (70% diversion)	4.99	2.14
Unpainted Wood & Pallets	64.17	**Miramar Greenery** 5180 Convoy Street San Diego, CA 92111	64.17	--

		(100% diversion)		
Garbage/Trash	64.17	**Miramar Landfill** 5180 Convoy Street San Diego, CA 92111 (0% diversion)	--	64.17
TOTAL	713		565.41	147.59

Construction debris will be separated onsite into material-specific containers, corresponding to the materials types in Table 7, to facilitate reuse and recycling and to increase the efficiency of waste reclamation. As shown in Table 7, 79 percent of the construction materials generated are targeted for diversion.

7.0 OCCUPANCY

While the construction phase for the *Carroll Canyon Mixed-Use* project occurs as a one-time waste generation event as construction of the project proceeds, tenant/owner occupancy requires an on-going plan to manage waste disposal to meet the waste reduction goals established by the City and State. The *Carroll Canyon Mixed-Use* project will comply with the City's Recycling Ordinance. Solid waste collection would be provided by a private hauler.

The *Carroll Canyon Mixed-Use* project has been carefully planned to include a mix of commercial land uses and project features on site that will help to achieve the broad goals of smart growth and sustainable development. In accord with the City's Conservation Element, *Carroll Canyon Mixed-Use* seeks to reduce its "environmental footprint" through a variety of sustainable design features. The project's sustainable design features are presented in Table 8, *Carroll Canyon Mixed-Use Project Sustainable Design Features*, below.

Table 8
Carroll Canyon Mixed-Use Project Sustainable Design Features

SITE DESIGN

- At least one principal participant of the project team is a LEED Accredited Professional.
- Located within ¼-mile of one or more transit stops.
- Provide secure bicycle racks and/or storage.
- Use of materials with 20 percent recycled content target.

GRADING and CONSTRUCTION

- Create and implement an erosion and sediment control plan for all construction.
- Protect stored on-site or installed absorptive materials from moisture damage.
- Composite wood and agrifiber products will contain no added urea-formaldehyde resins.
- Individual lighting controls will be provided for a minimum of 90% of building occupants.

PARKING

- Size parking capacity to meet but not exceed minimum parking requirements.
- Provide preferred parking for carpools or vanpools.
- Place a minimum of 40% of parking spaces under cover.

EXTERIOR LIGHTING

- Design exterior lighting so that all site and building mounted luminaires produce a maximum initial luminance value no greater than 0.20 horizontal and vertical foot-candles at the site boundary and no greater than 0.01 horizontal foot-candles 15 feet beyond the site.

BUILDING DESIGN FEATURES

- Use water-conserving fixtures.
- Buildings designed to comply with Title 24 requirements.

- Zero use of CFC-based refrigerants.
- Select refrigerants and HVAC&R that minimize or eliminate the emission of compounds that contribute to ozone depletion and global warming.
- Will not use fire suppression systems that contain ozone-depleting substances (CFCs, HCFCs, or Halons).

SOLID WASTE MANAGEMENT/RECYCLING

- Target 20 percent recycled content of construction materials and 80 percent for landfill diversion.
- On-site recycling services provided to all tenants/residents.
- Easily accessible areas provided to serve buildings that are dedicated to the collection and storage of non-hazardous materials for recycling.
- Adherence to recycling services are required by Section 66.0707 of the City of San Diego Land Development Code.
- Tenants/residents participation in a recycling program by separating recyclable materials from other solid waste and depositing the recyclable materials in the recycling container provided for the occupants.

LANDSCAPE

Irrigation

- State of the art equipment that distributes water in controlled amounts and at controlled times to maximize water efficiency and optimize plant growth.
- Irrigation systems control to allow water to be distributed to plant material with similar watering needs to avoid over/underwatering.
- Use of weather and rain sensors to monitor current conditions and control the system accordingly.
- Utilization of reclaimed water (when available) for irrigation minimizing the need for potable water in the landscape.

Planting

- Grouping of plant material based on the water demands for the specific plant material while still achieving the overall design intent.
- Selection of plant material its adaptability to the region and climate.
- Careful and selective use of enhanced planting (lusher material and seasonal color requiring more water and maintenance) where they have the most impact on the user.
- Use of native or low water/low maintenance material in outlying areas away from the general user.
- Limited use of turf. Where used, select turf varieties for their durability, maintenance needs and low water consumption.
- Use of trees throughout the project to provide shading to users and reduce heat gains on buildings and the heat island effect throughout the site.
- Selection of mix of deciduous trees to allow shade in the summer and sun penetration in the cooler winter months. .

Materials

- Use of recycled materials, where appropriate.
- Use of precast concrete pavers, decomposed granite and post consumer products.
- All planting areas include a 2" layer of a recycled organic mulch to maintain soil moisture, soil temperature and reduce weeding.
- Selection of lighter colored hardscape materials to reduce the heat island effect.

In addition to the energy efficient components provided in Table 4, the project would comply with the Uniform Building Code (UBC) and Title 24 requirements for building materials and insulation in order to reduce unnecessary loss of energy.

The project proposes to utilize portions of areas which are designated for landscaping or other softscape for Low Impact Development (LID) storm water treatment. In addition, landscaped islands within to the private roadway/driveways would be used in the treatment of runoff prior to entering the storm drain system. These LID BMPs would also function to slow down site runoff, increase times of concentration, improve downstream hydrologic conditions, and treat storm water. These BMPs are extremely effective in creating a low impact site design concerning storm water management.

Additionally, pervious concrete/asphalt is proposed for applicable areas on-site, including overflow parking and pavement areas that are not anticipated to carry a high traffic volume. Pervious pavement allows for storm water to filter down through the pavement surface rather than running off into storm drain inlets. The drainage would eventually be conveyed via a perforated pipe system, flowing treatment through the subsurface medium.

As a result of the recommended site design, source control measures, and treatment control measures, water quality exceedances are not anticipated, and pollutants are not expected within project runoff that would adversely affect beneficial uses in downstream receiving waters. The project would implement controls designed to limit discharges to the appropriate standard. The project complies with the requirements of the State Regional Water Quality Control Board concerning coverage under the General Construction Permit.

The proposed Landscape Concept Plan includes the use of indigenous and native material, whenever possible. Planting is intended to be a connecting device linking the various pieces of the project and design style. The Landscape Concept Plan emphasizes a garden setting, where plant material would be used to help define spaces, screen objectionable views, encourage circulation paths, highlight entry points, and provide softness and scale to the architecture. Evergreen, deciduous, and flowering material are proposed throughout the project. Located adjacent to open space slopes, the perimeter planting is proposed as a blend of native material and native friendly fire safe planting.

Circulation throughout the project is accentuated with a hierarchy of landscape treatments. Enhanced paving at major intersections and nodes is proposed to signify pedestrian/vehicle interaction areas. Vehicle nodes with small medians are proposed to help slow the traffic flow, as well as break up long linear drives. Street trees are proposed to define vehicle/pedestrian spaces and to provide shade and scale to the street scene. Entry points would be highlighted with decorative trellis work and enhanced plantings.

7.1 Implementation

The following table expresses the anticipated refuse and recyclable storage requirements based on Table 142-08B and 142.08C of the City of San Diego Municipal Code.

Table 9
Minimum Exterior and Recyclable Material Storage Areas for the Carroll Canyon Mixed-Use Project

Land Use	Gross Floor Area/Units	Minimum Refuse Storage Area (square feet)	Minimum Recyclable Material Storage Area (square feet)	Total Minimum Storage Area (square feet)
Residential	260 units	497	497	994
Commercial Retail	12,200 sq ft	48	48	96
TOTAL		545	545	1,090

The *Carroll Canyon Mixed-Use* project would be required to provide a minimum of 545 square feet refuse storage area and a minimum of 545 square feet recyclable material storage area for a total of approximately 1,090 square feet minimum exterior refuse and recyclable material storage area.

As shown in Table 10, *Estimated Solid Waste Generation from the Carroll Canyon Mixed-Use Project – Occupancy Phase*, during occupancy, the expected generated waste per year from the *Carroll Canyon Mixed-Use Project* when fully occupied would be approximately 346.16 tons.

Table 10
Estimated Solid Waste Generation from the Carroll Canyon Mixed-Use Project – Occupancy Phase

Use	Intensity	Waste Generation Rate	Estimated Waste Generated (tons/year)
Residential	260 units	1.2 tons/year/unit	312
Commercial-Retail	12,200 sq ft	0.0028 tons/year/sq ft	34.16
		TOTAL	346.16

On-site recycling services shall be provided to all tenants/residents within *Carroll Canyon Mixed-Use Project*. Tenants/residents within *Carroll Canyon Mixed-Use Project* that receive solid waste collection service shall participate in a recycling program by separating recyclable materials from other solid waste and depositing the recyclable materials in the recycling container provided for the occupants. Recycling services are required by Section 66.0707 of the City of San Diego Land Development Code. Based on current requirements, these services shall include the following:

- Collection of recyclable materials as frequently as necessary to meet demand;
- Collection of plastic bottles and jars, paper, newspaper, metal containers, cardboard, and glass containers;
- Collection of other recyclable materials for which markets exist, such as scrap metal, wood pallets
- Collection of food waste for recycling by composting, where available (prior to issuance of building and occupancy permits, the project proponent will meet with representatives from ESD to ensure that their educational materials and haulers can comply with the requirements for this service);
- Use of recycling receptacles or containers which comply with the standards in the Container and Signage Guidelines established by the City of San Diego Environmental Services Department;
- Designated recycling collection and storage areas; and
- Signage on all recycling receptacles, containers, chutes, and/or enclosures which complies with the standards described in the Container and Signage Guidelines established by the City of San Diego Environmental Services Department

As required by Section 66.0707 of the City of San Diego Land Development Code, the building management or other designated personnel shall ensure that occupants are educated about the recycling services as follows:

- Information, including the types of recyclable materials accepted, the location of recycling containers, and the occupants responsibility to recycle shall be distributed to all occupants annually;
- All new occupants shall be given information and instructions upon occupancy; and
- All occupants shall be given information and instructions upon any change in recycling

service to the commercial facility.

7.2 Landscaping and Green Waste Recycling

Plant material selection will be guided by the macro-and micro-climate characteristics of the project site and surrounding region to encourage long-term sustainability without the excessive use of water pesticides and fertilizers. Irrigation of these areas, where practical, will utilize reclaimed water applied via low precipitation rate spray heads, drip emitters, or other highly efficient systems. Landscape maintenance would include the collection of green waste and disposal of green waste at recycling centers that accept green waste. This will help further reduce the waste generated by developments within *Carroll Canyon Mixed-Use Project* during the occupancy phases.

8.0 CONCLUSION

The City of San Diego Development Services Department is requiring that this WMP be prepared and submitted to the City of San Diego's ESD.
This WMP will be implemented to the fullest degree of accuracy and efficiency. Additionally, the project will be required to adhere to City ordinances, including the *Construction and Demolition Debris Diversion Deposit Program*, the City's *Recycling Ordinance*, and the *Refuse and Recyclable Materials Storages Regulations*. The WMP plan for the *Carroll Canyon Mixed-Use Project* is designed to implement and adhere to all city ordnance and regulations with regards to waste management. The measures in the WMP would ensure that impacts are mitigated to below a level of significance.

Prior to the issuance of any grading or construction permits, the Solid Waste Coordinator will ensure ESD's attendance at a precon. The Solid Waste Coordinator will ensure that 1) the proposed approach to contractor education is approved, 2) the written specifications for base materials, concrete pavers, decomposed granite, and mulch, is approved, and 3) that the ESD inspector approves the separate waste containers, signage, and hauling contract(s) for the following materials:

- Asphalt/concrete
- Brick/masonry/Tile
- Cardboard
- Carpet/padding/foam
- Drywall
- Landscape debris
- Mixed C&D debris
- Scrap metal
- UNTREATED woodwaste
- Refuse

The project will be designed to achieve 75 percent of construction waste to be source reduced and/or recycled. While diversion activities during occupancy will achieve only 40 percent diversion and will not achieve the State target of 75 percent, the project incorporates several measures above and beyond the requirements of local ordinance.

- First, the project exceeds ordinance requirements and even the State waste reduction target during construction.
- Second, the project includes landscaping that will reduce yardwaste, and will provide transportation to a composting facility for the yard waste that is produced. The project proponent will ensure that ESD reviews the landscaping plans and hauling contract for the facility to verify that waste reduction goals are met.
- Third, the project would include LEED measures to reduce waste.

The project will target 20 percent recycled content of construction materials and 75 percent for landfill diversion.

These measures ensure that the waste generated by the project will be properly managed and that solid waste services will not be impacted.

The following standard mitigation applies to the project to reduce cumulative impacts on solid waste to below a level of significance:

I. Prior to Permit Issuance or Bid opening/Bid award
  A. LDR Plan check
    1. Prior to the issuance of any construction permit, including but is not limited to, demolition, grading, building or any other construction permit, the Assistant Deputy Director (ADD) Environmental Designee shall verify that the all the requirements of the Refuse & Recyclable Materials Storage Regulations and all of the requirements of the waste management plan are shown and noted on the appropriate construction documents. All requirements, notes and graphics shall be in substantial conformance with the conditions and exhibits of the associated discretionary approval.
    2. The construction documents shall include a waste management plan.
    3. Notification shall be sent to:

MMC Environmental Review Specialist
Development Service Department
9601 Ridgehaven Court
Ste. 220, MS 1102 B
San Diego, California 92123 1636
(619) 980 7122

Environmental Services Department (ESD)
9601 Ridgehaven Court
Ste. 210, MS 1102 A
San Diego, California 92123 1636
(858) 573-1236

II. Prior to Start of Construction
  A. Grading and Building Permit - Prior to issuance of any grading or building permit, the permittee shall be responsible to arrange a preconstruction meeting to coordinate the implementation of the MMRP. The Precon Meeting that shall include: the Construction Manager, Building/Grading Contractor; MMC; and ESD and the Building Inspector and/or the RE (whichever is applicable) to verify that implementation of the waste management plan shall be performed in compliance with the plan approved by LDR and the San Diego

ESD, to ensure that impacts to solid waste facilities are mitigated to below a level of significance.

1. At the Precon Meeting, the Permittee shall submit reduced copies (11" x 17") of the approved waste management plan, the RE, BI, MMC, and ESD.
2. Prior to the start of construction, the Permittee/Construction Manager shall verify that the project targets 20 percent recycled content for construction materials and 75 percent of construction materials for landfill diversion.
3. Prior to the start of construction, the Permittee/Construction Manager shall submit a construction schedule to the RE, BI, MMC, and ESD.

III. During Construction

The Permittee/Construction Manager shall call for inspections by the RE/BI and both MMC and ESD, who will periodically visit the demolition/construction site to verify implementation of the waste management plan. The Consultant Site Visit Record (CSVR) shall be used to document the Daily Waste Management Activity/progress.

IV. Post Construction

A. Within 30 days after the completion of the implementation of the Mitigation Monitoring Reporting Program (MMRP), for any demolition or construction permit, a final results report shall be submitted to both MMC and ESD for review and approval to the satisfaction of the City. MMC will coordinate the approval with ESD and issue the approval notification. ESD will review/approve City Recycling Ordinance-required educational materials prior to occupancy.

City of San Diego

SEWER STUDY

For:

Carroll Canyon Mixed Use Project
Entitlement

PTS#: 240716

Parcel 1 of Parcel Map 4337
9850 Carroll Canyon Road
San Diego, CA 92177

Prepared By:

Gregory W. Lang 06/10/16

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CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

Prepared for:
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JUNE 2016

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Appendix

1)…………...…………………….. Sewer Study Map for Carroll Canyon Mixed Use

2)…………...…………………….. Sewer Study Design Criteria

3)…………...…………………….. As-Built Plans

INTRODUCTION

This report has been prepared to analyze the sewer capacity for "Carroll Canyon Mixed Use" project located at 9850 Carroll Canyon Road, San Diego, CA 92177 (PTS 240716). This sewer study estimates the preliminary sewer flow rates generated by the proposed project and presents the hydraulic calculations for the proposed sewer facilities. This study will be used as a guideline for the preparation of the final construction plans for this project. A detailed layout of the buildings included in the sewer study is shown in the Sewer Study Map enclosed in Map Pocket 1. This detailed map area corresponds with Vesting Tentative Map 979190 (current edition).

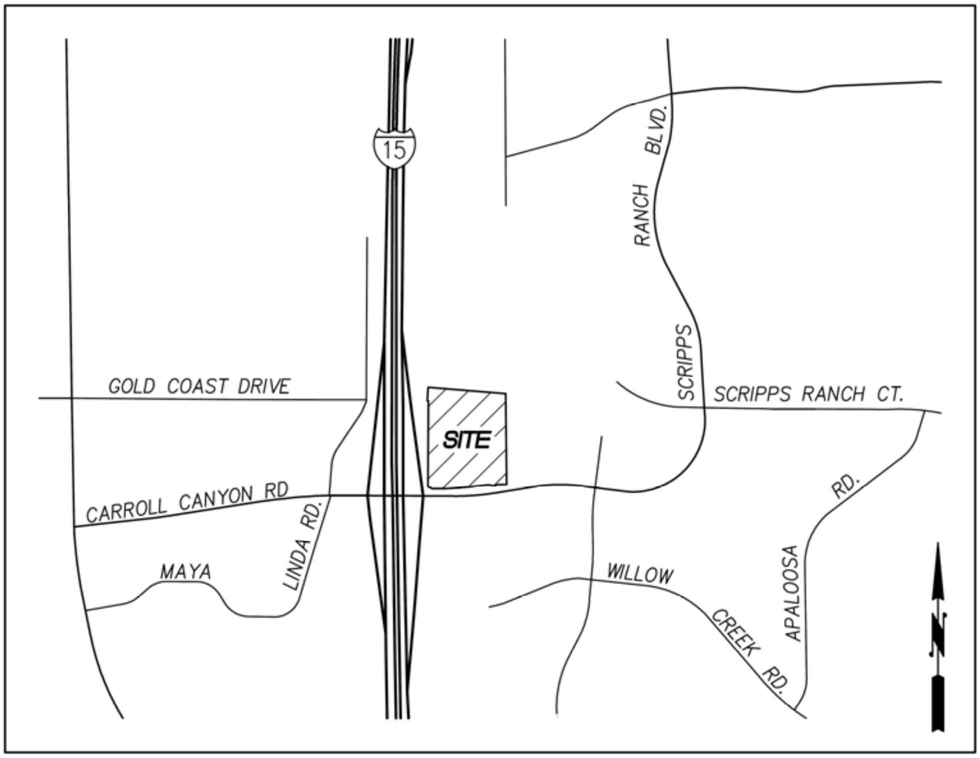
The 9.52± acre project site is to the north by an existing, natural channel, to the east by adjacent industrial uses, to the south by Carroll Canyon Road, and to the west by Interstate 15.

The 9.52 acre project site is located north of Carroll Canyon Road, east of Interstate 15 and west of Business Park Avenue. The existing site is currently zoned IP-2-1 (Industrial Park with a light industrial and office use) and has two (2) existing office buildings. The proposed zoning will be RM-3-7 (Residential Multiple Unit with light Retail/Restaurant use) and includes eight (8) new buildings totaling approximately 12,000 square feet of retail/restaurant space, 236,000 square feet of rentable residential area, and approximately 7,300 square feet of office and amenities associated with the residential space.

The existing private sewer system within the site will be demolished and replaced with new private sewer facilities. The proposed private sewer system will be shared between 4 proposed lots and connected to the existing public 8" PVC dead end sewer main in Carroll Canyon Road that will be extended approximately 125' west. The private sewer system will be designed per City of San Diego Sewer Guidelines.

The existing public sewer system within Carroll Canyon Road is an 8" PVC dead end main. The existing main will be extended 125' feet to the west and will be designed per City of San Diego Sewer Guidelines. The existing public sewer main located in Carroll Canyon Road drains west to east and confluences with an 8" PVC sewer main in Business Park Avenue.

VICINITY MAP



DESIGN CRITERIA

The design for this sewer study was completed in accordance with the design criteria listed in the City of San Diego's Sewer Design Guide (Revised May, 2015). All gravity sewers have been designed to convey peak wet weather flow. Per the City of San Diego Sewer Design Guide, all sewers have been designed to convey this flow when flowing half full. Manning’s Equation with an “n” value of 0.013 was used to size all gravity sewers. All sewers were designed to maintain a minimum velocity of 2 feet per second (ft/sec) at design capacity, or a minimum slope of 1%, per the design manual. All sewer lines in this study are within public streets or appropriately sized easements. All newly proposed locations for sewer have less than 15’ of cover.

ON-SITE SEWER FLOW PROJECTIONS

The on-site sewer flows have been estimated in Equivalent Dwelling Units based the proposed number of residential units for the project site. The on-site sewer flows for the commercial lots associated with the proposed project have projected sewer generations based on lot area as prescribed in the City’s Sewer Design Guide.

OFF SITE SEWER FLOW PROJECTIONS

The existing sewer system has been analyzed using the project's projected sewer flows along with existing sewer flows from the surrounding, existing industrial uses. The existing sewer generation rates have been calculated by lot area and an industrial use, based on (determined by city zoning maps), as prescribed in the City's Sewer Design Guide.

DISCUSSION

The existing 9.52± acre property is currently zoned IP-2-1 which generates a planned peak wet weather flow (design flow) of 0.22 cubic feet per second (cfs) of sewer runoff using the criteria and methodology listed in Sections 1.3.2 and 1.6 of the city's Sewer Design Guide (May, 2015). This flow, when routed through the existing 8-inch sewer main in Carroll Canyon Road (Line G per the enclosed exhibit), has a ratio of depth of flow to pipe diameter (d_n/D) of 0.26 and a velocity of 2.77 feet per second (fps).

The proposed Carroll Canyon Mixed Use project is comprised of 260 residential dwelling units and 1.57 acres of commercial use which will generate a calculated design flow of 0.26 cfs. The proposed project's flow, when routed through the same Line G, as discussed above, has a d_n/D of 0.29 and a velocity of 2.95 fps.

Following the criteria listed in Section 1.8.p, two additional downstream reaches were analyzed for d_n/D and velocity. Analysis of these two reaches also satisfied the guide's study criteria listed in Section 1.7.1 since the proposed 0.04 cfs increase in proposed sewer flow is less than 10% of the total planned flow in one of these reaches. The proposed project's design flow as well as other planned, in-line area design flows were routed through two additional reaches Lines H and I, downstream of Line G. The calculated d_n/D and velocities in these reaches were 0.29 and 2.95 fps and 0.34 and 2.58 fps respectively.

CONCLUSION

This analysis, as shown on the enclosed exhibit, demonstrates that while there is an increase in the planned flow in the existing sewer mains in Carroll Canyon Road with the proposed project, the projected peak wet weather flows in the analyzed, existing sewer mains do not exceed a dn/D of 0.5 as required per Section 1.3.3.3 of the Sewer Design Guide.

Therefore, it is our opinion that the existing sewer infrastructure located in Carroll Canyon Road has sufficient capacity to convey the anticipated sewer flows from the proposed project per the criteria listed in the city’s Sewer Design Guide (May, 2015). Furthermore, the project should not be required to upsize the existing sewer mains in Carroll Canyon Road since an impact to the existing sewer infrastructure does not occur in the area analyzed.

APPENDIX 1
SEWER STUDY MAP FOR CARROLL CANYON MIXED USE

PLAN VIEW - PROPOSED SEWER

SCALE: 1" = 40'

CARROLL CANYON MIXED USE SEWER STUDY SUMMARY

BY: PLSA
JOB NO. 2314

DATE: May 26, 2016
PREPARED BY: RMT
CHECKED: DML

PROPOSED PROJECT SEWER GENERATION

Line No.	From MH	To MH	In-Line Area Served	In-Line Area (SF)	In-Line Area (Acres)	Density Conversion (Table 1-1)	Calculated DU per Architectural Plans	Population per DU	Equivalent Population Served		Avg. Dry Weather Flow (gpd)	Dry Weather Peaking Factor	Wet Weather Peaking Factor	Peak Wet Weather Flow (Design Flow)			Line Size D (in)	Design Slope (%)	Normal Depth d_n (ft)	d_n/D	Velocity (ft/sec)	Remarks
									In-Line	Cumulative Total				gpd	mgd	cfs						
A	12	11	RM-3-7 (Lot 5, Lot 3)	336,002	7.71	Not Used	260.0	2.6	676	676	54,080	2.85	1.00	154,308	0.154	0.24	8	0.50	0.24	0.36	2.09	
B	11	10	Commercial (Lot 2)	28,632	0.66	43.7	Not Used	Not Used	29	705	56,378	2.83	1.00	159,516	0.160	0.25	8	0.50	0.24	0.36	2.09	
C	10	9	N/A	0	0.00	0.0	Not Used	Not Used	0	705	56,378	2.83	1.00	159,516	0.160	0.25	8	0.50	0.24	0.36	2.09	
D	9	8	N/A	0	0.00	0.0	Not Used	Not Used	0	705	56,378	2.83	1.00	159,516	0.160	0.25	8	0.50	0.24	0.36	2.09	
E	8	7	Commercial (Lot 4)	39,646	0.91	43.7	Not Used	Not Used	40	744	59,560	2.80	1.00	166,544	0.167	0.26	8	0.50	0.25	0.37	2.12	
F	7	PLUG	N/A	0	0.00	0.0	Not Used	Not Used	0	744	59,560	2.80	1.00	166,544	0.167	0.26	8	1.25	0.19	0.29	2.95	
G*	PLUG	6A	N/A	0	0.00	0.0	Not Used	Not Used	0	744	59,560	2.80	1.00	166,544	0.167	0.26	8	1.25	0.19	0.29	2.95	
H*	6A	6	N/A	0	0.00	0.0	Not Used	Not Used	0	744	59,560	2.80	1.00	166,544	0.167	0.26	8	1.25	0.19	0.29	2.95	
I*	6	4	Industrial (3 Lots)	526,640	12.09	62.5	Not Used	Not Used	756	1500	120,010	2.38	1.00	285,620	0.286	0.44	10	0.60	0.28	0.34	2.58	

*Denotes existing sewer line in Carroll Canyon Road

EXISTING SEWER GENERATION BY LAND USE

G	PLUG	6A	Industrial	414,862	9.52	62.5	Not Used	Not Used	595	595	47,620	2.92	1.00	139,079	0.139	0.22	8	1.25	0.17	0.26	2.77	

PASCO LARET SUITER
& ASSOCIATES
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CARROLL CANYON MIXED USE
PROPOSED SEWER EXHIBIT

SAN DIEGO, CALIFORNIA
PROJECT NUMBER: PE 2314
SCALE: 1" = 10'
DATE: MAY 26, 2016
SHEET 1 OF 1

APPENDIX B
SEWER STUDY DESIGN CRITERIA

streets, in accordance with Council Policies 400-13 and 400-14 (ATTACHMENT 1).

c. As development or redevelopment occurs, existing sewers in environmentally-sensitive areas shall be relocated to streets or other appropriate areas where possible (Ref. Municipal Code §144.0240(a)).

d. Where an existing canyon sewer main has capacity to serve a new development, the number of sewer mains penetrating the canyon from a new development shall be limited. This shall require coordination with other new developments wanting to access the same canyon sewer main. Sewer main access roads shall be provided to the point of connection and to the extent of all new manholes, and shall be coordinated with other access requirements, such as equestrian, pedestrian, multiple-use recreational trails, or storm water detention/retention/remediation facilities. However, all sewer access in canyons or other environmentally-sensitive lands shall be designed in conformance with Council Policies 400-13 and 400-14 (ATTACHMENT 1).

e. To assist in determining where to direct sewer flow or where new sewer facilities may be located within canyons and environmentally-sensitive lands, a cost-benefit analysis shall be conducted per Council Policy 400-14 (ATTACHMENT 1).

f. Sewer access roads that penetrate into canyons shall not exceed the maximum allowable slope (Ref. Subsection 3.2.3.4c) and shall be aligned along the centerline of the sewer main as much as practicable.

g. To assist in determining where new sewer facilities and sewer access roads may be located within canyons and environmentally-sensitive lands, a sewer maintenance plan shall be prepared in accordance with Council Policy 400-13 (ATTACHMENT 1).

1.3 PLANNING STUDY

1.3.1 General Requirements

For a new development and/or redevelopment, a sewer planning study for new sewer facilities shall be prepared, as directed by the Senior Civil Engineer, to demonstrate that there are no negative impacts on the existing sewer system. A minimum of three (3) copies of the planning study shall be submitted, each stamped and wet/electronically signed by a Civil Engineer registered in the State of California. Each study shall be bound and formatted in accordance with this *Sewer Design Guide* and/or the *Clean Water Program (CWP) Guidelines*.

The final approved sewer study shall also be submitted electronically in PDF format.

For new development, the planning study must be approved prior to approval of the tentative map. The study shall include all items listed in the minimum intake standards for sewer studies and subsequent reviews shall include an explanation for each review comment.

1.3.1.1 Capacity

For new development and/or redevelopment, the planning study shall address the capacity of all sewer collection and trunk sewer systems that will be impacted downstream of the new development and/or redevelopment and shall demonstrate that sewer capacity is available in those systems to accommodate the new development and/or redevelopment (refer to Section 1.7). Authorization and approval to impact any downstream sewer system must be obtained from the reviewing Senior Civil Engineer. If such downstream sewer system has already been identified as critical or sub-critical in a monitoring report, the Senior Civil Engineer may require additional field monitoring to determine if adequate capacity is available.

For an existing development and/or redevelopment, the planning study shall address the existing capacity within the existing sewer collection system, and identify all existing facilities whose capacity will be exceeded by projected sewage flows.

Where available capacity will be exceeded, the planning study shall propose upsizing of sewer facilities in accordance with Subsection 1.3.3.

Where applicable, the DESIGN ENGINEER shall incorporate into the community's existing master sewer plan, including zoning changes and other specific plans, the proposed sewer system amendments resulting from the drainage basin evaluation.

1.3.1.2 Drainage Basin

The planning study shall address the sewage generating potential of the entire drainage basin where the development is located. It shall also include current topographic maps of the entire drainage basin and any and all adjacent new developments for which a planning study has not yet been submitted and/or approved. The maps shall demonstrate that no adjacent development, including potential and existing pumped lands outside of the drainage basin and any lands outside of the incorporated boundaries of the City of San Diego with potential to be served but where no current master sewerage plan exists, will be precluded from obtaining sewer service. The planning study shall also show all proposed sewer system alignments (superimposed on planned street alignments) and all potential points of entry of sewage from surrounding lands.

1.3.1.3 Depth of Mains

The planning study shall clearly identify all existing and/or proposed facilities which will exceed standard depths for sewer mains as defined in Subsection 2.2.1.5. In cases where proposed sewers will exceed 15 feet in depth, a request for design deviation (ATTACHMENT 2) must be submitted to the Water and Sewer Development Review Senior Civil Engineer with the Sewer Planning Study. A design deviation will only be approved in exceptional cases and when adequate justification is provided. Mains more than 20 feet deep shall also require approval from the Wastewater Collection Division Senior Civil Engineer.

1.3.1.4 Existing Studies

The City of San Diego maintains an extensive library of sewer planning studies which were prepared for lands throughout the City. These studies are available for review at the Water and Sewer Development Section, Public Utilities Department. All studies are catalogued by subdivision or trunk sewer name. Logs of sewer flow study analyses for recently monitored trunk sewers and a map of sewers which meet the Regional Water Quality Control Board (RWQCB) criteria for being critical or sub-critical may also be viewed. In addition, information regarding proposed CIP projects within the vicinity of a given project may be requested. In many cases, an addendum or reference to one of the existing planning studies may be acceptable in lieu of an independent study. Concurrent with the preparation of planning studies for sewers proposed to connect to existing canyon sewer mains, a study of flow redirection per Council Policy 400-13 and a cost-benefit analysis per Council Policy 400-14 shall be prepared (Refer to ATTACHMENT 1). An existing analysis of redirection of flows and a cost-benefit analysis, as required by Council Policies 400-13 and 400-14 respectively, may be available for reference for various existing canyon sewers.

1.3.2 Flow Estimation

1.3.2.1 Land Use

Present or future allowable land use, whichever results in higher equivalent population, shall be used to generate potential sewage flows.

1.3.2.2 Flow Determination

Flow definitions and calculation procedures are listed below. All calculations shall be tabulated for each sewer main section (manhole to manhole) in the format shown on Figure 1-2.

Equivalent Population: The equivalent population shall be calculated from zoning information (Ref. Section 1.6). For major new facilities such as high rise apartment buildings, flow rates (assuming one lateral) shall be checked based on the most current, adopted edition of the Uniform Plumbing Code. The most conservative flow rate shall govern.

Daily Per Capita Sewer Flow: The sewer flow for the equivalent population shall be 80 gallons per capita per day (gpcd).

Average Dry Weather Flow (ADWF): Equivalent populations shall be used to calculate the average dry weather flow. The average dry weather flow for each sewer main reach (manhole to manhole) shall be determined by multiplying the total accumulated equivalent population contributing to that reach by 80 gallons per capita per day:

Average Dry Weather Flow = (80 gpcpd) x (Equivalent Population)

Peaking Factor for Dry Weather Flow (PFDWF): The peaking factor is the ratio of peak dry weather flow to average dry weather flow. It is dependent upon the equivalent population within a tributary area. The tributary area is the area upstream of, and including, the current reach for the total flow in each reach of pipe. Figure 1-1, consisting of the table prepared by Holmes and Narver in 1960, shall be used to determine peaking factors for each tributary area. In no instance shall the dry weather flow peaking factor be less than 1.5.

Peak Dry Weather Flow (PDWF): The peak dry weather flow for each sewer main reach shall be determined by multiplying the average dry weather flow by the appropriate peaking factor (Note that peak dry weather flows are not algebraically cumulative as routed through the sewer system, i.e. the peak dry weather flow at any point shall be based on the equivalent population in the basin to that point (Ref. Figure 1-2).

Peak Dry Weather Flow = (Average Dry Weather Flow) x
(Dry Weather Flow Peaking Factor)

Peaking Factor for Wet Weather Flow (PFWWF): The peaking factor for wet weather flow is the ratio of peak wet weather flow to peak dry weather flow. It is basin-specific and shall be based on essential information available at the time of the planning study. Information such as historical rainfall/sewage flow data, land use, soil data, pipe/manhole age, materials and conditions, groundwater elevations (post development), inflow and infiltration (I/I) studies, size, slope and densities of the drainage basin, etc., should be utilized in the wet weather analysis to estimate the peaking factor for wet weather. Upward adjustments shall be made in areas with expected high inflow and infiltration (i.e. high ground water or in areas with lush landscaping schemes). Flow meters are installed throughout the City's sewer system. Flow data collected from these meters are available upon request. The objective of this analysis is to quantify the magnitude of peak wet weather flow with a 10-year return period on a statistical basis.

The Senior Civil Engineer overseeing the preparation of the planning study shall coordinate with the City Sewer Modeling Group for approval of the peaking factors to be used for design.

Peak Wet Weather Flow (PWWF): The peak wet weather flow (or design flow) for a gravity sewer main reach shall be determined by multiplying the peak dry weather flow (ref. Figure 1-2) by the appropriate wet weather peaking factor. The peak wet weather flow is the design flow for a gravity sewer main. It is determined at any point in the system based on the associated upstream average dry weather flow in the basis to that point times the peaking factor for wet weather.

Peak Wet Weather Flow = (Peak Dry Weather Flow) x
(Wet Weather Peaking Factor)

1.3.3 Pipe Sizing Criteria

1.3.3.1 Hydraulic Requirements

Manning's formula for open-channel flows shall be used to calculate flows in gravity sewer mains. Manning's coefficient of roughness "n" shall be assumed to be 0.013 for all types of sewer pipe. Sewer grades shall be designed for velocities of 3 to 5 feet per second (fps) where possible. This is extremely important in areas where peak flow will not be achieved for many years. The minimum allowable velocity is 2 fps at calculated peak dry weather flow, excluding infiltration. Sewer mains that do not sustain 2 fps at peak flows shall be designed to have a minimum slope of 1 percent. Additional slope may be required by the Senior Civil Engineer where fill of varied depth is placed below the pipe in order to provide adequate slope after expected settlement occurs. The maximum allowable velocity shall be 10 fps and shall be avoided by adjusting slopes, by increasing the pipe diameter, or by utilizing a vertical curve transition to lower velocities per subsections 2.2.4 and 2.2.9.4. If the Senior Civil Engineer approves a velocity greater than 10 fps, the pipe shall be upgraded to SDR 18 PVC (standard dimension ratio polyvinyl chloride), concrete-encased VC (vitrified clay), or PVC sheet-lined reinforced concrete pipe.

1.3.3.2 Slope

Slope shall be calculated as the difference in elevation at each end of the pipe divided by the horizontal length of the pipe, and shall be a constant value between manholes.

1.3.3.3 Ratio of Depth of Flow to Pipe Diameter (d_n/D)

New sewer mains 15 inches and smaller in diameter shall be sized to carry the projected peak wet weather flow at a depth not greater than half of the inside diameter of the pipe (d_n/D not to exceed 0.5). New sewer mains 18 inches and larger shall be sized to carry the projected peak wet weather flow at a depth of flow not greater than 3/4 of the inside diameter of the pipe (d_n/D not to exceed 0.75).

1.3.3.4 Minimum Pipe Sizes

The size of a sewer pipe is defined as the inside diameter of the pipe. Sewer mains shall be a minimum of 8 inches in diameter in residential areas, and a minimum of 10 inches in commercial, industrial, and high-rise building areas.

1.3.4 Sewer Study Exhibit Criteria

The DESIGN ENGINEER’s sewer study exhibits shall be used to evaluate hydraulics and to establish minimum street and easement widths. Therefore, these documents need to reflect depths and separation of mains from other utilities and improvements. Refer to the Minimum Intake Standards for Sewer Studies in Subsection 1.8.

1.3.5 Private On-Site Wastewater Treatment and Reuse

Refer to Attachment 6 for permitting guidelines of private on-site wastewater treatment and reuse in the City of San Diego.

1.4 SEPARATION OF MAINS

1.4.1 Horizontal Separation

1.4.1.1 Wet Utilities

The separation of water, sewer, reclaimed water mains, and storm drains shall comply with the *State of California Department of Health Services Criteria for the Separation of Water Mains and Sanitary Sewers*. At least 10 feet of horizontal separation shall be maintained between the nearest outer surfaces of sewer lines and potable water mains. More stringent separation requirements may be necessary if unusual conditions, such as high groundwater levels or large diameter mains, exist (Ref. State of California "Blue Book"). If a horizontal separation of 10 feet or other requirement is not possible, a deviation from standards may be permitted by the City provided the structural integrity of both the pipe and the pipe joints is upgraded in accordance with the *State of California Department of Health Services Criteria for the Separation of Water Mains and Sanitary Sewers - Special Provisions*, and provided it has been reviewed and written approval has been obtained from the California Department of Health Services, Drinking Water Field Operations Branch. This deviation is not applicable for subdivisions, or where sewers are placed in new streets. Lateral connections to sewer mains typically do not meet the upgraded joint requirements for reduced separation. All installations of sewer mains which fail to comply with the basic separation standards must be reviewed and approved by the State of California Department of Health Services. For separation from curbs, see Subsection 2.2.5.2. For separation from structures, see Subsections 2.2.5.8 and 2.2.5.9.

1.4.1.2 Separation for Dry Utility Pipes and Cable Conduits

Other utility pipes, conduits, and cable lines shall be governed by their respective franchise agreement with the City of San Diego. A minimum 10-foot horizontal separation is desirable between sewer mains and any other utility infrastructure. Separations of less than 10 feet must be approved by the Senior Civil Engineer of Water and Sewer Development Section, Public Utilities Department. Additional separation may be required for sewer mains which exceed 10 feet in depth. The DESIGN ENGINEER shall consider the relative depth of adjacent utilities and the stability of the soils where the sewer shall be constructed when designing the separation from other utilities. Refer to San Diego Regional Standard Drawing (SDRSD) M-22 and City of San Diego Drawing SDM-111 for standard locations of utilities in streets.

1.4.2 Vertical Separation

1.4.2.1 Shallow Mains, General

Shallow mains require a special design. Review and written approval is required from the California Department of Health Services, Drinking Water Field Operations Branch for deviations from vertical separation requirements for water and sewer utilities. For mains less than 4 feet deep, special design shall be required for live and dead loads and vertical cyclical deflections which shall include an evaluation to demonstrate zero deflection in the pavement.

1.4.2.2 Parallel Mains

Potable water, reclaimed water, and sewer mains shall be located at various depths below the ground surface, in order of descending water quality. Potable water pipelines shall be located above both reclaimed water pipes and sewer mains, and reclaimed water mains shall be located above sewer mains. A minimum vertical separation of one foot shall be provided between the top and bottom surfaces of the pipes in the same street or easement.

1.4.2.3 Crossing Mains

A minimum vertical separation of 12 inches shall be provided between the top and bottom surfaces of crossing utility conduits and shall comply with the *State of California Department of Health Services Criteria for the Separation of Water Mains and Sanitary Sewers*. Separation measurements shall be taken from the outer most surface of any pipeline protection (i.e. concrete encasement or steel sleeve) which may be installed. Where the vertical separation is less than 12 inches, a request for design deviation (ATTACHMENT 2), with justification, shall be submitted for review. If approved, for pipes 12 inches or less in diameter, a 12-inch sand cushion, or alternatively a minimum 6-inch sand cushion with 1 inch neoprene pad shall be used. Separations of less than 7 inches will not be allowed by the City. For skewed main crossings, see Subsection 2.2.6. Mains crossing large facilities shall evaluate deflection across the span, changes in hydraulics due to change of slope, shear forces, and special joint designs to account for pipe movement.

1.5 PUMP STATION PLANNING CRITERIA

If at all possible, the construction of a sewer pump station is to be avoided. However, in cases where constraints such as topography and environmentally sensitive habitat dictate, a pump station may be necessary (Ref. Council Policies 400-13 and 400-14 – ATTACHMENT 1). The DESIGN ENGINEER shall analyze the planning area for the sewer system to minimize the number of units to be pumped and to design the shortest possible force main. In cases where only a small tributary area is to be served by a pump station, the City will accept the facility as public only if it can be shown that the capitalized cost of facility replacement and maintenance will not exceed 50 percent of the standard sewer fees for the area to be served. Otherwise, the pump station must be privately owned, maintained and operated. In cases where a pump station will be a public facility, specific criteria for the design, construction, and operational testing of sewer pump stations are given in Chapter 7.

1.5.1 Pump Station Design Capacity

The Pump Station Design Capacity shall be calculated as follows:

<u>Pump Station Design Capacity (PSDC)</u>: Pump stations shall be designed to pump the calculated peak wet weather flow from the upstream tributary area.

<u>Pump Station Reserve Capacity Factor (PSRCF)</u>: This is a safety factor that takes into account that service pumps will generally not be operating at their

full intended design capacity due to mechanical wear and the subsequent loss of efficiency, and increases in force main friction loss due to the deposition of solids and grit. The reserve capacity factor shall be 1.0 if two (2) hours emergency storage (Ref. Subsection 7.2.6.7) or six hours emergency storage (Ref. Subsection 7.2.7) are provided. Where this storage is not provided in design, then a reserve capacity factor greater than 1.0 shall be used and an appropriate factor shall be evaluated for approval, on a case-by-case basis, by the Wastewater Collections Division Senior Civil Engineer.

Pump Station Design Capacity = (Peak Wet Weather Flow) x
(Pump Station Reserve Capacity Factor)

1.5.2 Private Pump Stations

Private pump stations (privately-owned and operated) serving more than one lot shall not be located in the public right-of-way. The capacity for private pump stations shall be determined in the same manner as for public pump stations. Station wet well detention times shall not exceed 4 hours. A planning study for the pump station outlining capacity of the pumps, equivalent dwelling units (EDU) served, capacity of the wet well, detention times, length and size of the force main, and provision of any odor control equipment shall be submitted for review to Water and Sewer Development Review, Public Utilities Department. Private pump stations shall require separate structural, mechanical, and electrical permits from the City of San Diego, Development Services Department, Building Review Division. However, private pump station plans are not reviewed for compliance with City of San Diego Sewer Design Guide Chapter 7 criteria. As such, it shall be the responsibility of the DESIGN ENGINEER to ensure that all private pump stations are adequately sized, have sufficient redundant measures (dual force mains, back-up power supply, auto dialer alarm system to a licensed plumber with 24-hour response, etc.), and comply with all applicable local, state, and federal regulations. In the design of such facilities, the DESIGN ENGINEER shall utilize sound engineering judgment to provide for an adequate design for any potential failure during the service life of the pump station. If a developer elects to construct a private sewer system including a sewer pump station, then a letter of agreement must be executed over all lots served in the subdivision if the pump station will serve two or more lots. A copy of this agreement is available at the City Plan Check Counter and the City Website http://www.sandiego.gov/mwwd/business/sewer. Also required is a recorded copy of the CC&R's for the home or business owners association, outlining the responsibility and maintenance requirements for the shared private improvements.

1.6 ZONE - DENSITY CONVERSIONS

Table 1-1 shall be used in planning studies to determine the equivalent population for a given land use. These tabulated figures represent a general case analysis. When more accurate or detailed information, such as fixture unit counts, is available, Table 1-1 shall not be used. For more information on the requirements of the zones shown in Table 1-1, refer to Chapter 13 of the City of San Diego Municipal Code.

1.7 REQUIRED CAPACITY IN EXISTING SEWER SYSTEMS DOWNSTREAM OF NEW FACILITIES

1.7.1 Required Capacity Downstream of New Gravity Sewers

For a new development, the projected peak wet weather flow from the proposed system (ref. Subsection 1.3.2.2) will be added to the field measured maximum flow in the downstream sewer to determine if the projected d_n/D is in compliance with the depth criterion described in Subsection 1.3.3.3. If this criterion is not met, a comprehensive sewer study of the area shall be prepared.

The downstream system shall be studied to the point in the system where the projected peak wet weather flow from the proposed new development is less than 10% of the total flow. All sewers to this point are required to carry the total flow per the depth criterion described in the above paragraph. The existing system to be studied shall not be less than two pipe reaches (i.e. manhole to manhole) from the point of discharge of the new development into the existing system.

1.7.2 Required Capacity Downstream of New Pump Stations

In developed lands, the discharge of the pump station design capacity from the proposed new development will be added to the field measured maximum flow in the existing downstream sewer to determine if the projected d_n/D will comply with the depth criteria described in Subsection 1.3.3.3. If these criteria are not met, a comprehensive sewer study of the area shall be prepared.

The sewer system downstream of the pump station shall be designed for cyclical pumping operation (i.e. on-off pumping). Use the design discharge capacity of the pump station for the tributary area. As a rule of thumb, the cyclical effect in single family residential may be considered negligible when the pump station’s discharge is less than 10% of the total flow. For other density types consult with the Senior Engineer. All sewers to this point are required to carry the total flow per the depth criterion described in the above paragraph. The proposed new system shall discharge at a point not less than two pipe reaches (i.e. manhole to manhole) away the existing system.

1.7.3 Odor Control

The DESIGN ENGINEER shall design the wastewater system so that objectionable odors are not discharged into the atmosphere or through plumbing vents. Odors are caused by organic biologic activity and the location of the problematic area in the system is not always predictable.

The DESIGN ENGINEER shall account for the possibility of odors developing as the subdivisions build out including setting right of way aside that has good access for the locations of odor control equipment. The developer will modify the system up to one year after final occupancy of the drainage basin.

Some of the properties that impact odor may include the following:

- sewage detention times
- force main discharge points
- submerged flow at siphons
- locations with turbulent flow
- flat slopes
- type of discharge content including industrial waste discharge
- temperature and weather conditions

Odor control may include chemical injection such as calcium nitrate or other approved chemicals, or installation of an activated carbon system, or both.

1.8 MINIMUM INTAKE STANDARDS FOR SEWER STUDIES

At a minimum, include the following items on the exhibit and within the body of all wastewater planning studies for new sewer development projects:

a. Internal order numbers, tentative map numbers, and any discretionary permit numbers [i.e. Conditional Use Permit (CUP), Planned Residential Development (PRD), or Planned Industrial Development (PID)].

b. Project name.

c. Vicinity map.

d. Scale of sufficient size to accommodate the details required by this list. Minimum Scale will be 1 inch = 100 feet.

e. Reference drawing numbers for existing sewer mains.

f. Limits of the project area.

g. Streets with names or distinguishing labels and dimensions.

h. All existing and proposed utilities with adequate separation, whether in streets, side yards, or canyon slopes. Cross sections shall show dry and wet utilities.

i. Existing and proposed sewer mains labeled as public or private.

j. Deviation requests for all sewer mains which exceed standard depths.

k. All existing and proposed “sewer access” easements. Indicate whether these will be permanent, to be abandoned after construction, or will be dedicated.

l. Paved width of all easements and connections to streets and manholes.

m. Typical bench section for limits of easement width and paving.

n. Topography of the entire drainage basin and the proposed development.

o. Elevations for existing and proposed grades throughout the project area. A reference copy of the proposed grading plans may be provided instead, if applicable.

p. Manhole numbers and reach or pipe segment numbers for ease of comparison with the flow data in the Sewer Study Summary (Figure 1-2). Label all points of connection where project flows discharge to existing facilities and, where applicable, to the terminus of the study area. For off-site sewer mains, show information for a minimum of two reaches upstream and downstream in accordance with Subsection 1.7.1. Also identify all existing sewer mains in the Remarks column of Figure 1-2 - Sewer Study Summary.

q. Pipes labeled with size, type, flow direction, and slope.

r. Manholes, within the limits of the project area, shown with rim elevation and invert elevation. Note that sewer depth information is more critical where the mains are not at standard depths (refer to section 2.2.1.5), where they are located in easements, where off-site flows join the project area, or where grading is proposed over existing facilities.

s. Number of Dwelling Units per Pipe Reach. Equivalent dwelling units per each reach shall be identified from the most upstream manhole to the downstream end of the project boundary.

t. Land use areas labeled as single family residential, multi-family residential, commercial, industrial, schools, parks, open space, multiple habitat preservation area (MHPA), multiple species conservation program area (MSCP), stream beds or 100-year flood area.

u. Location of all proposed pump stations. Label all pump stations as public or private. For public pump stations, show access roads and lots as dedicated in fee title to the City of San Diego. All pipe systems upstream of private pump stations shall be clearly labeled “private”.

v. Location of any sewer facilities proposed in canyons and environmentally sensitive lands. Show any required sewer access roads in order to implement the Sewer Maintenance Plan to be developed as part of the planning study (refer to Council Policy 400-13 - ATTACHMENT 1).

w. List any documents or studies that are incorporated by reference into the report. Do not include copies of the reports in the sewer study if they are part of the Public Utilities Department’s Library.

x. Master plan of the project area, when requested.

y. As-built plans of existing facilities where any point of connection is planned.

z. Flow metering data, when requested.

APPENDIX C
AS-BUILT PLANS

SEWER LATERAL DATA TABLE

LAT	[illegible]	[illegible]	[illegible]	[illegible]	CURB ELEV	[illegible]	REMARKS
1	[illegible]	1.0	[illegible]	[illegible]	[illegible]	6.0	
2	[illegible]	1.0	[illegible]	[illegible]	[illegible]	6.0	
3	[illegible]	1.0	[illegible]	[illegible]	[illegible]	[illegible]	
4	[illegible]	1.0	[illegible]	[illegible]	[illegible]	[illegible]	
5	[illegible]	1.0	[illegible]	[illegible]	[illegible]	6.0	
6	[illegible]	1.0	[illegible]	[illegible]	[illegible]	6.0	
7	[illegible]	1.0	[illegible]	[illegible]	[illegible]	5.9	
8	[illegible]	1.0	[illegible]	[illegible]	[illegible]	4.1	
9	[illegible]	1.0	[illegible]	[illegible]	[illegible]	6.0	
10	[illegible]	1.0	[illegible]	[illegible]	[illegible]	6.0	
11	[illegible]	1.0	[illegible]	[illegible]	[illegible]	6.0	
12	[illegible]	1.0	[illegible]	44.0	[illegible]	6.0	
13	[illegible]						SEWER CHIMNEY
14	[illegible]						SEWER CHIMNEY
15	[illegible]						SEWER CHIMNEY
16	[illegible]						SEWER CHIMNEY
17	[illegible]	1.0	534.0	30.0	[illegible]	5.7	25 INVERT GRADE
18	540.31	1.0	551.0	30.0	556.21	5.2	25 INVERT GRADE
21	495.0	1.0	496.0	44.0	502.5	5.6	
22	490.0						SEWER CHIMNEY
23	479.6						SEWER CHIMNEY
24	471.9						SEWER CHIMNEY
25	493.9						SEWER CHIMNEY

REFERENCE DRAWINGS

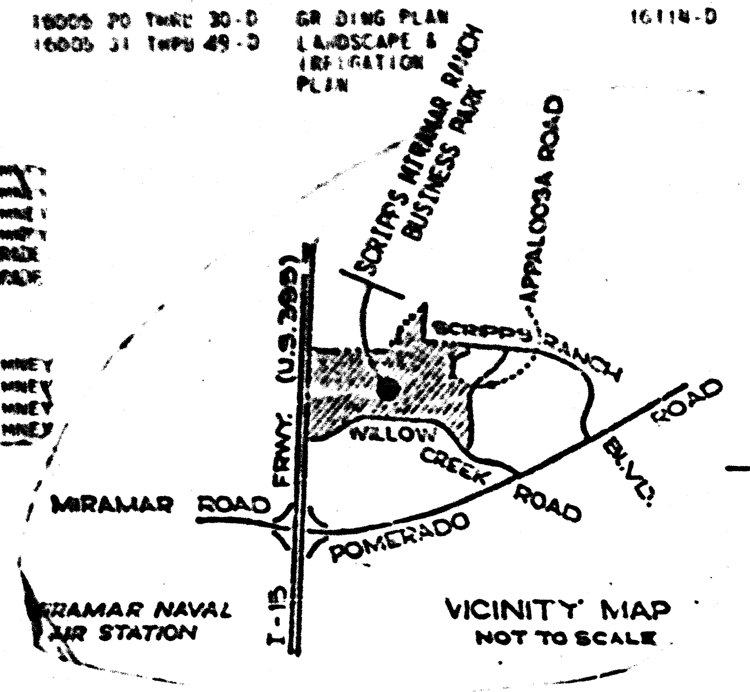
14280 2 THRU 5 D	WILLOW CREEK ROAD
[illegible] THRU [illegible]	OFFSITE SEWER MAIN
14807 [illegible] D	APPALOOSA ROAD
14807 [illegible] D	ATRIUM ROAD
14096-3 D	SCRIPPS RANCH BOULEVARD

LAND DEVELOPMENT

16005 20 THRU 30-D	GRADING PLAN
16005 31 THRU 49-D	LANDSCAPE & IRRIGATION PLAN

PROPERTY ACQUISITION

16114-D	SEWER EASEMENT EXCHANGE DRAWING



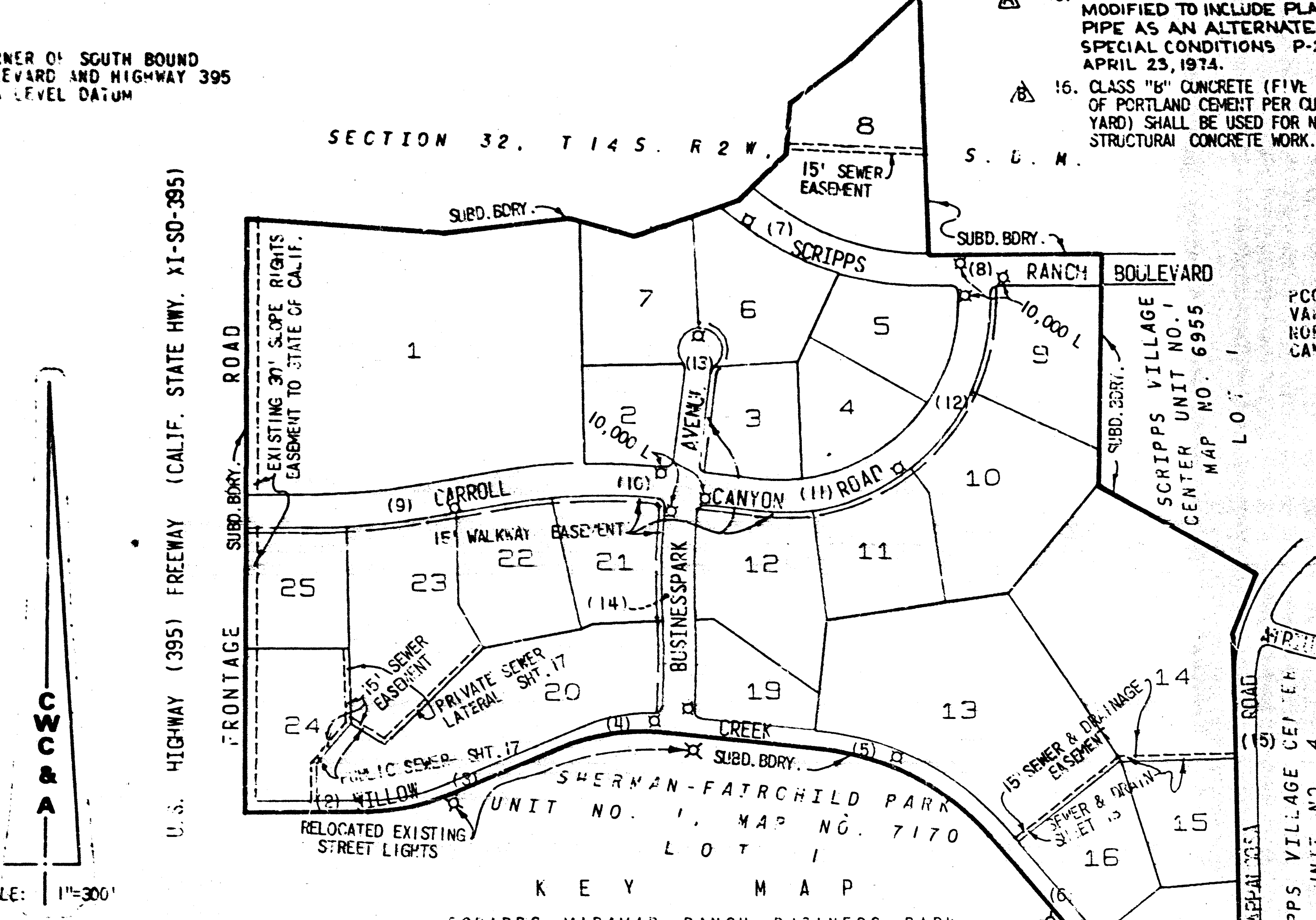
VICINITY MAP
NOT TO SCALE

BENCH MARK

BRASS PLUG AT S.E. CORNER OF SOUTH BOUND BRIDGE, MIRA MESA BOULEVARD AND HIGHWAY 395 ELEV. 52?.308 MEAN SEA LEVEL DATUM

CONSTRUCTION CHANGE BLOCK

Ⓐ REVISED SEW. MAIN INV. GRADES IN LAT. TABLE, ADDED NOTES 14 & 15, REV. ITEMS IN WORK TO BE DONE, ADDED CONSTR. CHG. BLOCK & REV. SHEET OF SHEETS.



KEY MAP
SCRIPPS MIRAMAR RANCH BUSINESS PARK

(2) DENOTES SHEET NUMBER.
SHEETS 20 THRU 30 ARE GRADING PLANS;
SHEETS 31 THRU 49 ARE LANDSCAPE AND IRRIGATION PLANS.
SEE SHEET 20 FOR GRADING & LANDSCAPE KEY MAP.

STREET LIGHT NOTES:

ELECTROLIERS NUMBERED ① ② ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ SHALL BE FURNISHED WITH GALVANIZED STEEL STANDARDS IN ACCORDANCE WITH STANDARD DRAWING E-5, EXCEPT THAT TRANSFORMER BASES WILL NOT BE REQUIRED.

7 - 7,000 LUMEN, 175-WATT, TYPE III
6 - 10,000 LUMEN, 250-WATT, TYPE III

LENGTH OF SHAFT - 7,000 & 10,000 LUMENS - 25'

THIS DESIGNATION, S.P. —▭, ON THE PLANS DENOTES THE APPROXIMATE LOCATION OF THE SAN DIEGO GAS & ELECTRIC CO. SERVICE POINT. VERIFY EXACT LOCATION OF THE S.D.G. & E. CO. SERVICE POINT TO BE USED FOR THE STREET LIGHTS ELECTRIC SERVICE & EXTEND THE CONDUIT WIRE TO THIS LOCATION. ALL WORK SHALL BE IN ACCORDANCE WITH STD. DWG. E-7'-T.

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.

NOTES

1. THESE PLANS ARE DRAWN SHOWING FULL IMPROVEMENTS WITHIN SPOT PORTIONS AREAS BETWEEN SPOT PORTIONS SHALL BE CONSTRUCTED TO RECEIVE THE FULL IMPROVEMENTS AS SHOWN IN THE SPOT PORTIONS.
2. PRIOR TO MIXING WITH CEMENT AND WATER, ALL MINERAL AGGREGATE USED FOR PRODUCTION OF CEMENT-TREATED BASE SHALL HAVE A SAND EQUIVALENT OF NOT LESS THAN 30 WHEN TESTED BY CALIFORNIA DIVISION OF HIGHWAY TEST METHOD NO. CALIF. 2 7.
3.

STREET NAME	PAVEMENT SCHEDULE	STREE. R W WIDTH	20-YEAR A.D.T.
WILLOW CREEK ROAD	I	70'-88'	8,000
SCRIPPS RANCH BOULEVARD	I	88'-98'	20,000
CARROLL CANYON ROAD	I	88'	12,000
BUSINESS PARK AVENUE	I	70'-88'	12,000

4. ELECTRICAL & TELEPHONE FACILITIES SHALL BE INSTALLED UNDERGROUND IN ACCORDANCE WITH ORDINANCE NO. 10064-NS.
5. IMPROVEMENTS NOTED AS EXISTING MAY NOT BE CONSTRUCTED AT THE TIME OF APPROVAL OF THESE DRAWINGS.
6. A.C.P. (ASBESTOS CEMENT PIPE) MAY BE USED FOR STORM DRAIN SYSTEMS IN LIEU OF RCP. IF ASBESTOS CEMENT PIPE IS USED FOR STORM DRAIN SYSTEMS, SPECIAL PROVISIONS P-21, MAY 24, 1968, SHALL APPLY.
7. IF CAST-IN-PLACE PIPE IS USED IN LIEU OF RCP, SPECIAL PROVISIONS P-16 SHALL APPLY.
8. THE ENGINEER OF DESIGN SHALL NOT BE RESPONSIBLE FOR THE CONTRACTOR'S FAILURE TO CARRY OUT THE CONSTRUCTION WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS NOR SHALL HE BE REQUIRED TO SUPERVISE CONDUCT OF THE WORK OR THE CONSTRUCTION PROCEDURES AND SAFETY PROCEDURES FOLLOWED BY THE CONTRACTOR OR SUBCONTRACTORS OR THEIR RESPECTIVE EMPLOYEES OR BY ANOTHER PERSON AT THE JOB SITE OTHER THAN THAT OF THE ENGINEER'S EMPLOYEES.

UNDERGROUND:
LM&H - CARROLL CANYON RD
R&H - SCRIPPS RANCH BLD - APPALOOSE RD
CAMERON BROS. - WILLOW CREEK RD
HAZARD - PAVING
LM&H - STORM DRAINS

9. **ADVANCE TRENCHING NOTE:** THE CONTRACTOR SHALL UNCOVER EXISTING SEWER MAINS AND SEWER LATERALS, TELEPHONE AND ELECTRIC CONDUITS, WATER MAINS AND WATER SERVICES, GAS MAINS, CABLE TV, FIRE ALARM AND OTHER EXISTING UTILITIES AT LEAST TWO HUNDRED (200) FEET IN ADVANCE OF TRENCHING OPERATIONS TO PERMIT GRADE OR ALIGNMENT CHANGES.
10. COSTS FOR WATER MAIN CONNECTIONS ON THESE PLANS ARE AS FOLLOWS:

CONNECTION NO'S. 1, 2, 5, 6 & 7 -	$3,650.00 EACH- INCLUDES F.H., SERVICE & 16"GV
CONNECTION NO. 3	$3,000.00
CONNECTION NO. 4	$1,320.00
CONNECTION NO. 8	$ 795.00

PRESSURE REGULATORS REQUIRED ON WATER SERVICES BELOW ELEV. 462 IN MIRAMAR PRESSURE ZONE.
PRESSURE REGULATORS REQUIRED ON WATER SERVICES BELOW ELEV. 620 IN SCRIPPS VALLEY PRESSURE ZONE.
LOTS 1 THRU 8, 10 THRU 13, 16 & 19 THRU 25 ARE SERVED BY THE MIRAMAR PRESSURE ZONE;
LOTS 9, 14, 15, 17 & 18 ARE SERVED BY THE SCRIPPS VALLEY PRESSURE ZONE.

11. LOCATE METER BOXES OUT OF DRIVEWAYS.

NOTES (CONTINUED):

12. FOR FIRE HYDRANT LOCATIONS ADJACENT TO MEANDERING SIDEWALK:
    - (a) WHERE PRACTICABLE, LOCATE SIDEWALK CONTIGUOUS TO CURB AT POINT OF FIRE HYDRANT LOCATION & PLACE FIRE HYDRANT BEHIND SIDEWALK PER W-14.
    - (b) WHERE CONDITIONS OF ITEM (a) NOTED ABOVE CANNOT BE USED, LOCATE FRONT EDGE OF SIDEWALK 4' MIN. BACK OF CURB LINE & PLACE FIRE HYDRANT 10" TO 20" CLEAR OF BACK OF CURB PER W-14.
13. AN ENCROACHMENT PERMIT WILL BE REQUIRED FROM THE STATE OF CALIFORNIA HIGHWAY DEPT. FOR ALL WORK IN THE STATE RIGHT-OF-WAY.
14. SELECTED ROCK SLOPE PROTECTION SHALL BE ACCORDING TO TO 4.11 OF THE STD. SPECS. OF CITY AND SHALL HAVE A MINIMUM DEPTH OF 1.0' UNLESS OTHERWISE SHOWN ON PLANS.
15. Ⓐ STANDARD DRAWINGS SHALL BE MODIFIED TO INCLUDE PLASTIC PIPE AS AN ALTERNATE PER SPECIAL CONDITIONS P-22, APRIL 23, 1974.
16. Ⓑ CLASS "B" CONCRETE (FIVE SACKS OF PORTLAND CEMENT PER CUBIC YARD) SHALL BE USED FOR NON STRUCTURAL CONCRETE WORK.

WORK TO BE DONE

THE IMPROVEMENTS CONSIST OF THE FOLLOWING WORK TO BE DONE ACCORDING TO THESE PLANS AND THE FOLLOWING STANDARD DRAWINGS AND SPECIFICATIONS OF THE CITY OF SAN DIEGO.

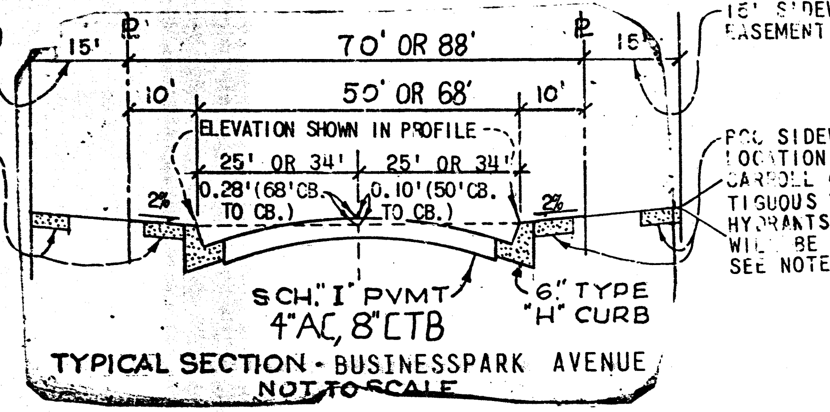
SPECIFICATIONS

CITY OF SAN DIEGO STANDARD SPECIFICATIONS; DOCUMENT NO. 727731, FILED APRIL 14, 1969; SPECIAL CONDITIONS NO. P-18 REVISED DECEMBER 10, 1971, SPECIAL PROVISIONS P-16, JANUARY 23, 1963 FOR CAST-IN-PLACE PIPE AND SPECIAL PROVISIONS P-21, MAY 24, 1966 FOR ASBESTOS CEMENT PIPE; AND SPECIAL CONDITIONS P-22, APRIL 23, 1974 FOR PLASTIC WATER AND SEWER PIPES. Ⓐ

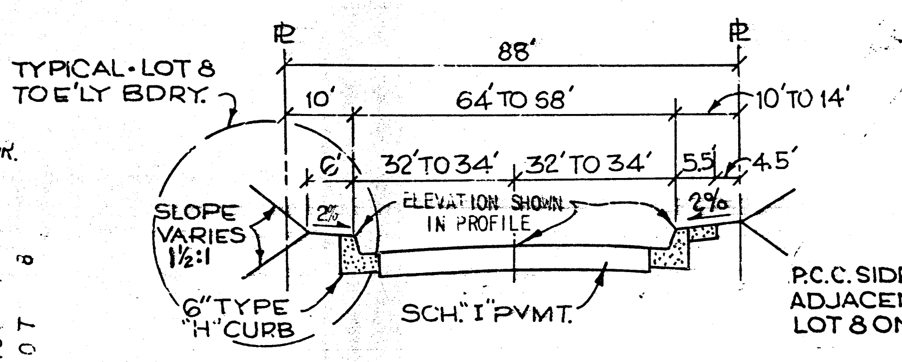
STANDARD DRAWINGS

DOCUMENT NO. 735691 FILED APRIL 26, 1971.

IMPROVEMENTS	STD. DWGS.	SYMBOL
GRADING		▨
PAVING	G-59	
SIDEWALK	G-?, G 42; G-53	
6" STANDARD CURB	G-44	C1
6" TYPE H CURB	G-45	C1
PEDESTRIAN RAMP FOR THE HANDICAPPED	G-60-T	
STREET LIGHT SYSTEM (SEE STREET LIGHT NOTES)	E-5; E-17; E 18; E-?-T; E-4; E-13	
(6) CONCRETE CONTROL MONUMENT	M-21-T	◉
Ⓐ POLYVINYL CHLORIDE (PVC) OR VCP SEWER MAIN AS SHOWN	S-1 (SEE NOTE 15) P-22	S1
6" POLYVINYL CHLORIDE (PVC) SEWER LATERAL	S-22, S-23 (SEE NOTE 15) P-22	38
CONCRETE MANHOLE	S-8; M-23 (SEE NOTE 15)	1
CONCRETE CRADLE	S-3 (SEE NOTE 15)	
CONCRETE ENCASEMENT	S-24 (SEE NOTE 15)	
AC WATER MAIN & APPURTENANCES J-M	W-6; W-61; W-10	W1
Ⓐ 1½" POLYETHYLENE (PE) WATER SERVICE	W-35; W-59 - (SEE NOTE 15) P-22	1½" W
2" POLYVINYL CHLORIDE (PVC) WATER SERVICE	W-35; W-59 - (SEE NOTE 15) P-22	2" W
GATE VALVE & BOX CLOW	W-71; W-72	GV
6" FIRE HYDRANT & SERVICE (3-WAY) RICH	W-14; W-15; W-17 (SEE NOTE 12)	FH
GRAVITY TYPE HEADWALL	D-?	
STORM DRAIN RCP	D-3; D-9	D1
TYPE A CLEANOUT	D-11	
TYPE B CURB INLET	D-6	
TYPE B-2 CURB INLET	D-6	
MODIFIED TYPE J INLET	SEE DETAIL SHEET 12	⊠
LEGEND EXISTING WORK	P-1	
LAND DEVELOPMENT FILL SLOPE	L-43	SEE GRADING PLAN
LAND DEVELOPMENT CUT SLOPE	L-48	SEE GRADING PLAN
LAND DEVELOPMENT BROW DITCH	L-45	SEE GRADING PLAN
LAND DEVELOPMENT FILL SLOPE PLANTING	L-82	SEE GRADING PLAN
LAND DEVELOPMENT CUT SLOPE PLANTING	L-81	SEE GRADING PLAN
PIPE COLLAR	D-?	
6" B-1 BERM	?-21	6"B-1
Ⓐ CURTAIN WALL	D-28	
DOWNDRAIN, A.C. OR PCC AS NOTED ON PLANS	L-50	
PAVEMENT CUT OFF WALL	G-27	
3" BLOWOFF ASSEMBLY	W-7	3"BO
PERMANENT STREET NAME SIGN	T-63-T	
STANDARD DRAINAGE OUTLET	D-20	
COMMERCIAL DRIVEWAY	G-24; G-40; G-41	LOCATE AS REQUIRED
SELECTED ROCK SLOPE PROTECTION (SEE NOTE 14)		
CONCRETE LUG	D12	



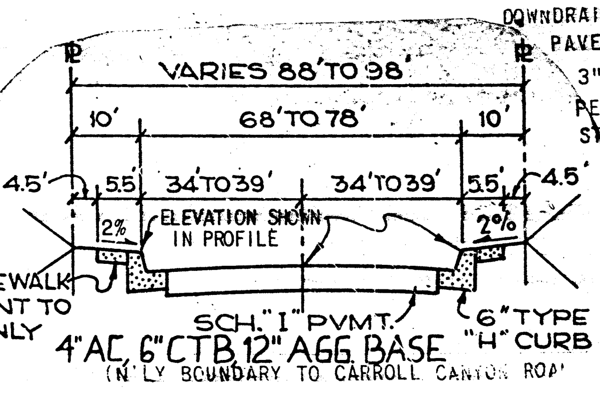
TYPICAL SECTION - BUSINESSPARK AVENUE
NOT TO SCALE



(CARROLL CANYON ROAD TO E'LY BOUNDARY)

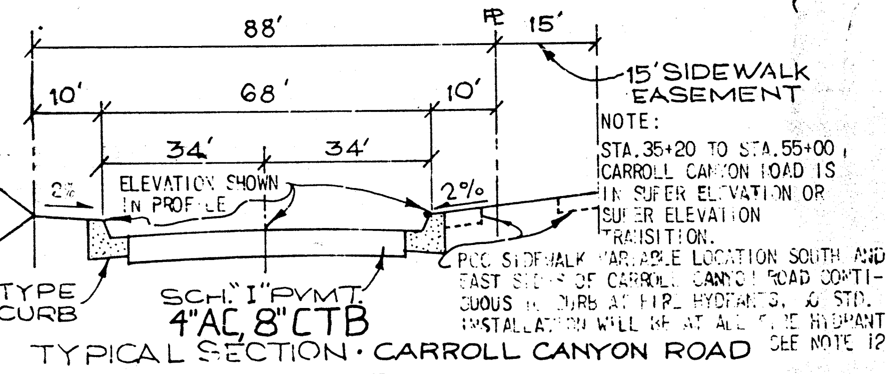
TYPICAL SECTION
SCRIPPS RANCH BOULEVARD
NOT TO SCALE

NOTE:
SCRIPPS RANCH IS IN SUPER ELEVATION OR SUPER ELEVATION TRANSITION.



(N'LY BOUNDARY TO CARROLL CANYON ROAD)

TYPICAL SECTION
SCRIPPS RANCH BOULEVARD
NOT TO SCALE



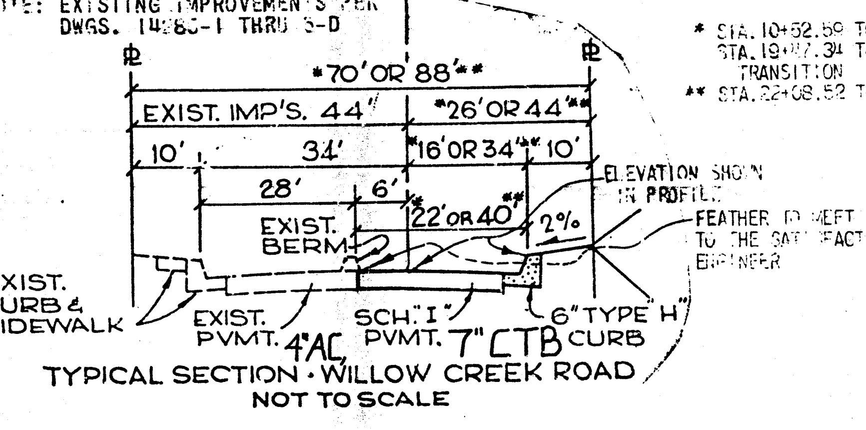
NOTE:
STA. 35+20 TO STA. 55+00, CARROLL CANYON ROAD IS IN SUPER ELEVATION OR SUPER ELEVATION TRANSITION.

PCC SIDEWALK VARIABLE LOCATION SOUTH AND EAST SIDES OF CARROLL CANYON ROAD CONTIGUOUS TO CURB AT FIRE HYDRANTS, SO STD. INSTALLATION WILL BE AT ALL FIRE HYDRANTS. SEE NOTE 12.

TYPICAL SECTION - CARROLL CANYON ROAD
NOT TO SCALE

CTR. STATIONING PER MAP NO. 7170 (BASIS OF STATIONING)

NOTE: EXISTING IMPROVEMENTS PER DWGS. 14?8?-1 THRU 5-D



* STA. 10+52.59 TO 19+47.34
STA. 19+47.34 TO 22+08.52 TRANSITION
** STA. 22+08.52 TO 40+?1.57

TYPICAL SECTION - WILLOW CREEK ROAD
NOT TO SCALE

UTILITY WORK ORDER NO. 95968

BEFORE EXCAVATING, VERIFY LOCATION OF UNDERGROUND UTILITIES - CONTACT:

GAS & ELECTRIC CO.	232-4252, EXT. 1658
TELEPHONE CO. & FIRE ALARM	298-0595
WATER & SEWER	236-5650
COMMUNICATIONS DIVISION	236-5505

PRIVATE CONTRACT
ENGINEER OF DESIGN
CHARLES W. CHRISTENSEN & ASSOCIATES
Bill K. Bramble
Bill K. Bramble, R.C.E 8102

PLANS FOR THE IMPROVEMENTS OF:
WILLOW CREEK ROAD, SCRIPPS RANCH BOULEVARD, CARROLL CANYON ROAD, BUSINESSPARK AVENUE, PUBLIC SEWER, PRIVATE SEWER AND STORM DRAINS IN AND ADJOINING

SCRIPPS MIRAMAR RANCH BUSINESS PARK

CITY OF SAN DIEGO, CALIFORNIA
SHEET 1 OF 50 SHEETS Ⓐ

TM-NO-73-126
W.O. NO. 70397

~~DIRECTOR~~ FOR CITY ENGINEER 4-22-74 DATE

4-22-74 CONTROL ENGR.

Tom 4-18-74 T.M. ENGINEER

CONTROL CERTIFICATION 4-16-74

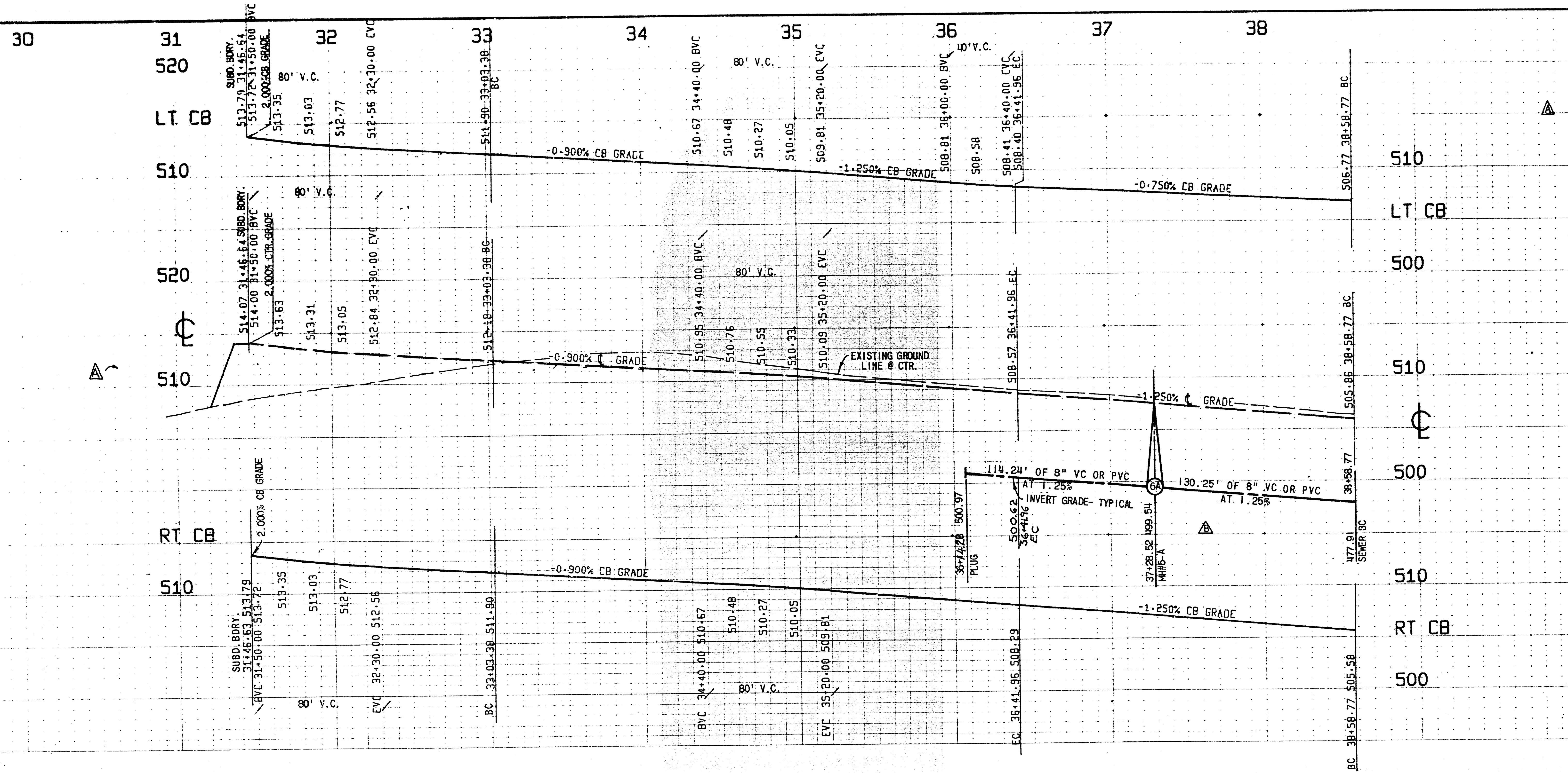
266-1733 LAMBERT COORDINATES

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL CWC&A	KB 10-25-73			
Ⓐ SEE CHANGE BLOCK	CWC/RB 5/30/74		7-5-74	
Ⓑ ADDED NOTE 16	7-29-76	Jim Mull	8-13-76	
AS BUILT	7-25-79 CWC&A			

CONTRACTOR CAMERON BROS. DATE STARTED 4-30-74
INSPECTOR JONES DATE COMPLETED 7-20-79

16005 - 1-D

A 6416



PROFILE OF CARROLL CANYON ROAD

SCALE
HORZ: 1" = 40'
VERT: 1" = 6'

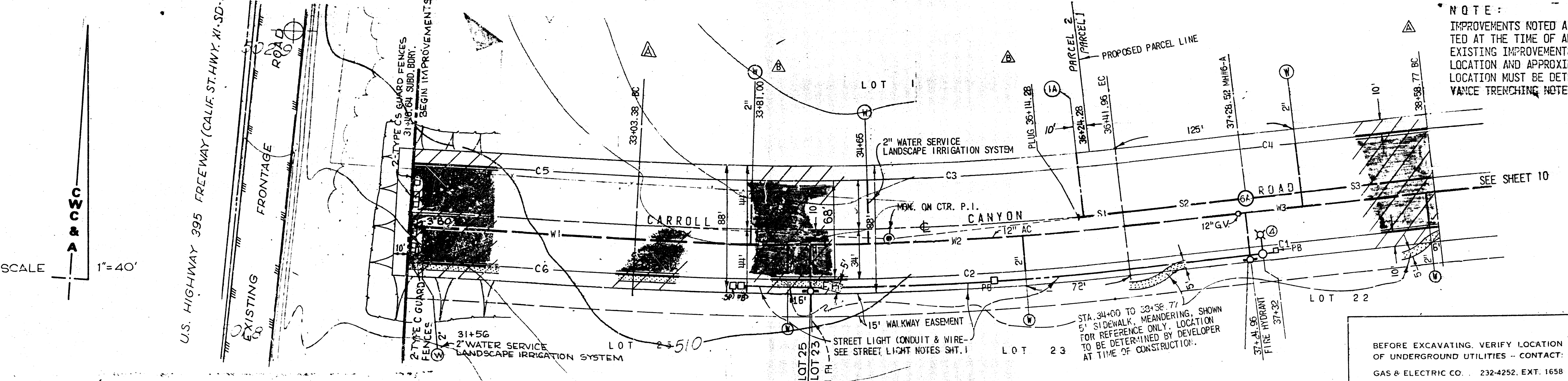
COURSE	ITEM	RADIUS	DELTA OR BEARING	LENGTH
C 1	6 IN TYPE H CURB		S80-38-17W	216.81
C 2		2034.00	9-41-59	344.35
C 3		1966.00	9-41-59	332.83
C 4			N80-38-17E	216.81
C 5			S89-39-44E	156.74
C 6			S89-39-44E	156.74
	6 IN TYPE H CURB		TOTAL	1424.28
W 1	12 IN AC		S89-39-44E	156.74
W 2		2010.00	9-41-59	340.27
W 3			N80-38-17E	216.81
	12 IN AC		TOTAL	713.82

CENTERLINE DATA

FROM STATION	TO STATION	RADIUS	DELTA OR BEARING	LENGTH
31+46.64	33+ 3.38	0.00	S89-39-44E	156.75
33+ 3.38	36+41.96	2000.00	9-41-59	338.58
36+41.96	38+58.77	0.00	N80-38-17E	216.81
S 1 8 IN PVC OR VC		2000.00	0-47-35	27.68
S 2			N80-38-17E	86.56
S 3			N80-38-17E	130.25
8 IN PVC OR VC			TOTAL	244.49

BENCH MARK:

BRASS PLUG AT S.E. CORNER OF SOUTH BOUND BRIDGE,
MIRA MESA BOULEVARD AND HIGHWAY 395
ELEV 524.388 MEAN SEA LEVEL DATUM



* NOTE:

IMPROVEMENTS NOTED AS EXISTING MAY NOT BE CONSTRUCTED AT THE TIME OF APPROVAL OF THESE DRAWINGS. ALL EXISTING IMPROVEMENTS ARE SHOWN AT AN APPROXIMATE LOCATION AND APPROXIMATE ELEVATION ONLY. EXACT LOCATION MUST BE DETERMINED IN THE FIELD. SEE ADVANCE TRENCHING NOTE.

PRIVATE CONTRACT
ENGINEER OF DESIGN
CHARLES W. CHRISTENSEN & ASSOCIATES
Bill K. Bramble
Bill K. Bramble, R.C.E 8102

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.

A.C. SURFACING NOTE:

USE A.C. SURFACING, THICKNESS = 2"±, AS REQUIRED, FOR SMOOTH TRANSITION AND CONNECTION TO EXISTING PAVEMENT. AMOUNT OF A.C. SURFACING REQUIRED TO BE DETERMINED IN FIELD.

ADVANCE TRENCHING NOTE:

THE CONTRACTOR SHALL UNCOVER EXISTING SEWER MAINS AND SEWER LATERALS, TELEPHONE AND ELECTRIC CONDUITS, WATER MAINS AND WATER SERVICES, GAS MAINS, CABLE TV, FIRE ALARM AND OTHER EXISTING UTILITIES AT LEAST TWO HUNDRED (200) FEET IN ADVANCE OF TRENCHING OPERATIONS TO PERMIT GRADE OR ALIGNMENT CHANGES.

BEFORE EXCAVATING, VERIFY LOCATION OF UNDERGROUND UTILITIES -- CONTACT:

GAS & ELECTRIC CO.	232-4252, EXT. 1658
TELEPHONE CO. & FIRE ALARM	298-0595
WATER & SEWER	236-5650
COMMUNICATIONS DIVISION	236-5505

CARROLL CANYON ROAD

SCRIPPS MIRAMAR RANCH BUSINESS PARK

CITY OF SAN DIEGO, CALIFORNIA
SHEET 9 OF 50 SHEETS

IM. NO. 73-126
W.O. NO. 70397

CITY ENGINEER 4-22-74 DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL CWC&A	WB 10-25-73			
Ⓐ DELETED STD. DRAINAGE OUTLET, DELETED BERM TRANS. REVISE CURB, ADD 2" WAT. SER.	MB 6-26-74		7-5-74	
Ⓑ ADD SEWER MAIN, LAT., WATER LAT. & PCL. LINE REV.	M.P. 8-8-74		8-23-74	
AS BUILT	7-25-79 CWC&A			

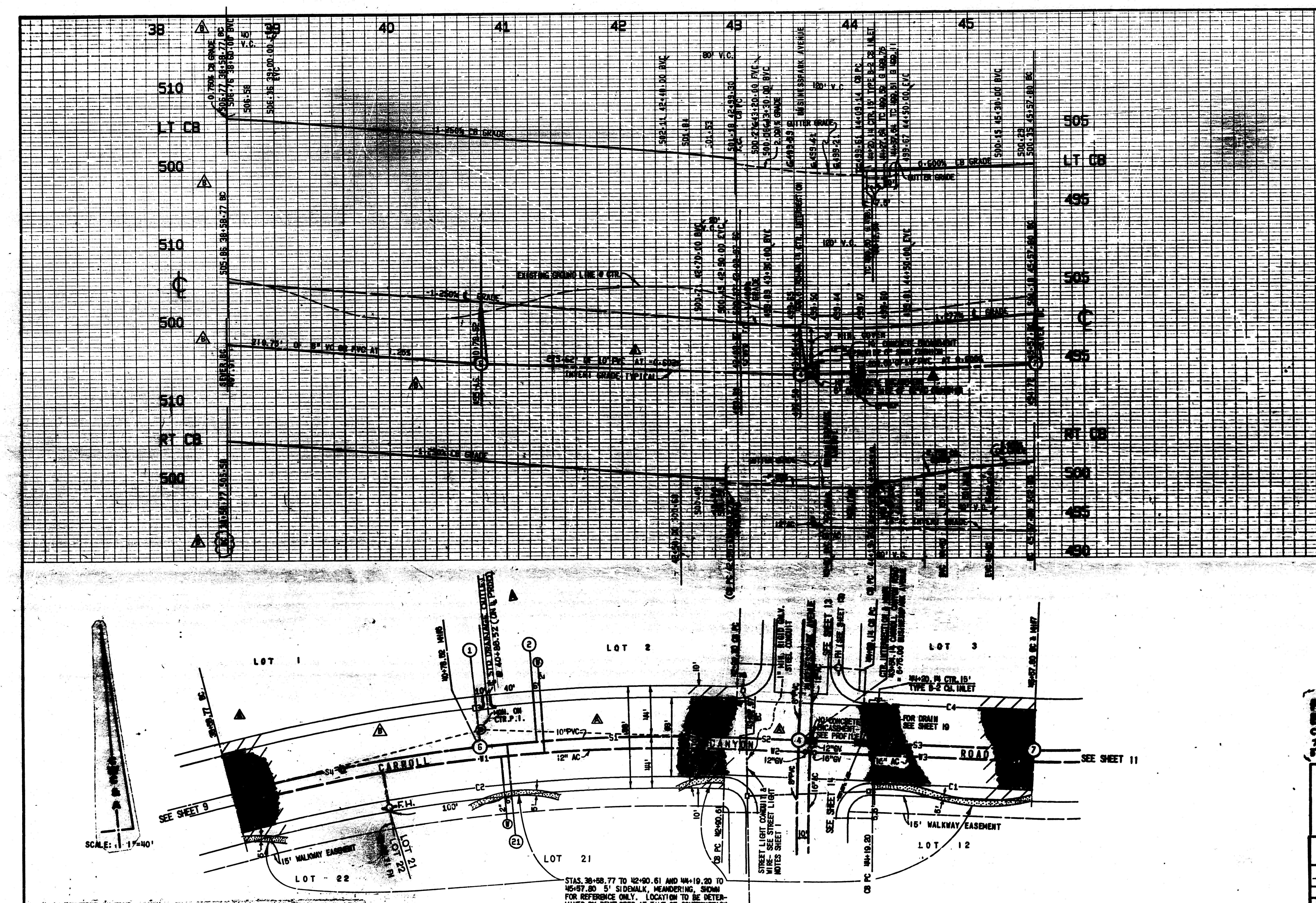
CONTRACTOR CAMERON BROS DATE STARTED 4-30-74
INSPECTOR JONES DATE COMPLETED 7-20-79

CONTROL CERTIFICATION 4-16-74

266-1733
LAMBERT COORDINATES

16005 - 9-D

A-6416



COURSE	ITEM	RADIUS	DELTA OR BEARING	LENGTH
C 1	6 IN TYPE H CURB		N82-23-41W	138.60
C 2		1466.00	16-29-41	422.05
C 3		1534.00	16-49-37	450.51
C 4			S82-23-41E	148.66
	6 IN TYPE H CURB		TOTAL	1159.82
S 1	10 IN PVC	1500.00	8-34-24	224.45
S 2			S82-23-41E	51.17
S 3			S82-23-41E	203.66
	10 IN PVC		TOTAL	479.28
W 1	12 IN AC	1490.00	16-58- 2	441.24
W 2			S82-23-41E	61.19
	12 IN AC		TOTAL	502.43
W 3	16 IN AC		S82-23-41E	193.63
	16 IN AC		TOTAL	193.63
S 4	8 IN PVC OR VC	1500.00	8-23-38	219.75
	8 IN PVC OR VC		TOTAL	219.75

CENTERLINE DATA

FROM STATION	TO STATION	RADIUS	DELTA OR BEARING	LENGTH
38+58.77	43+ 2.97	1500.00	16-58- 2	444.20
43+ 2.97	43+54.14	0.00	S82-23-41E	51.17
43+54.14	45+57.80	0.00	S82-23-41E	203.66

BENCH MARK:

BRASS PLUG AT S.E. CORNER OF SOUTH BOUND BRIDGE,
MIRA MESA BOULEVARD AND HIGHWAY 395
ELEV 524.380 MEAN SEA LEVEL DATUM

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.

PRIVATE CONTRACT
ENGINEER OF DESIGN
CHARLES W. CHRISTENSEN & ASSOCIATES
Bill K. Brandt
Bill K. Brandt, R.C.E 8102

CARROLL CANYON ROAD
SCRIPPS MIRAMAR RANCH
BUSINESS PARK

CITY OF SAN DIEGO, CALIFORNIA
SHEET 10 OF 50 SHEETS

IM NO. 73-126
NO. 70397

4-22-74
CITY ENGINEER DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL CWC&A				
AS BUILT				

CONTRACTOR CAMERON BROS. DATE STARTED
INSPECTOR TOMES DATE COMPLETED 1-20-77

266-1733
LAMBERT COORDINATES

16005-10-D

A-6416

PRELIMINARY DRAINAGE STUDY

Carroll Canyon Mixed Use Project

Tentative Map 979190

PTS#: 240716

APN 363-360-28
Parcel 1 Parcel Map 4337
9850 Carroll Canyon Road
San Diego, CA 92177

Prepared By:

Gregory W. Lang

Gregory W. Lang, P.E. RCE 68075 EXP: 06-30-17
Pasco Laret Suiter & Associates, Inc.
535 N. Highway 101, Suite A
Solana Beach, CA 92075

PASCO LARET SUITER
& ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

REGISTERED PROFESSIONAL ENGINEER
GREGORY W. LANG
No. RCE 68075
EXP. 06-30-17
Civil
STATE OF CALIFORNIA

Prepared for:
Sudberry Development Inc.
5456 Morehouse Drive, Suite 260
San Diego, California

October 2015
Updated June 2016

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- Project Description 1
- Vicinity Map 2

Watershed Descriptions
- Existing 3
- Proposed 4

Hydrology Results
- Existing Conditions 5
- Proposed Conditions 5

Detention / Hydromodification 6

Conclusion 7

Methodology 8

APPENDICES

A. Existing Hydrology Map and Calculations

B. Proposed Hydrology Map and Calculations

C. Detention Basin Calculations

REFERENCES

City of San Diego Drainage Design Manual, 1984
City of San Diego Stormwater Standards,
August 2015

INTRODUCTION

This report presents the preliminary drainage study for the Carroll Canyon Mixed Use Project, Vesting Tentative Parcel Map. This report will present the preliminary drainage design for the project and compare peak runoff rates for existing and proposed conditions.

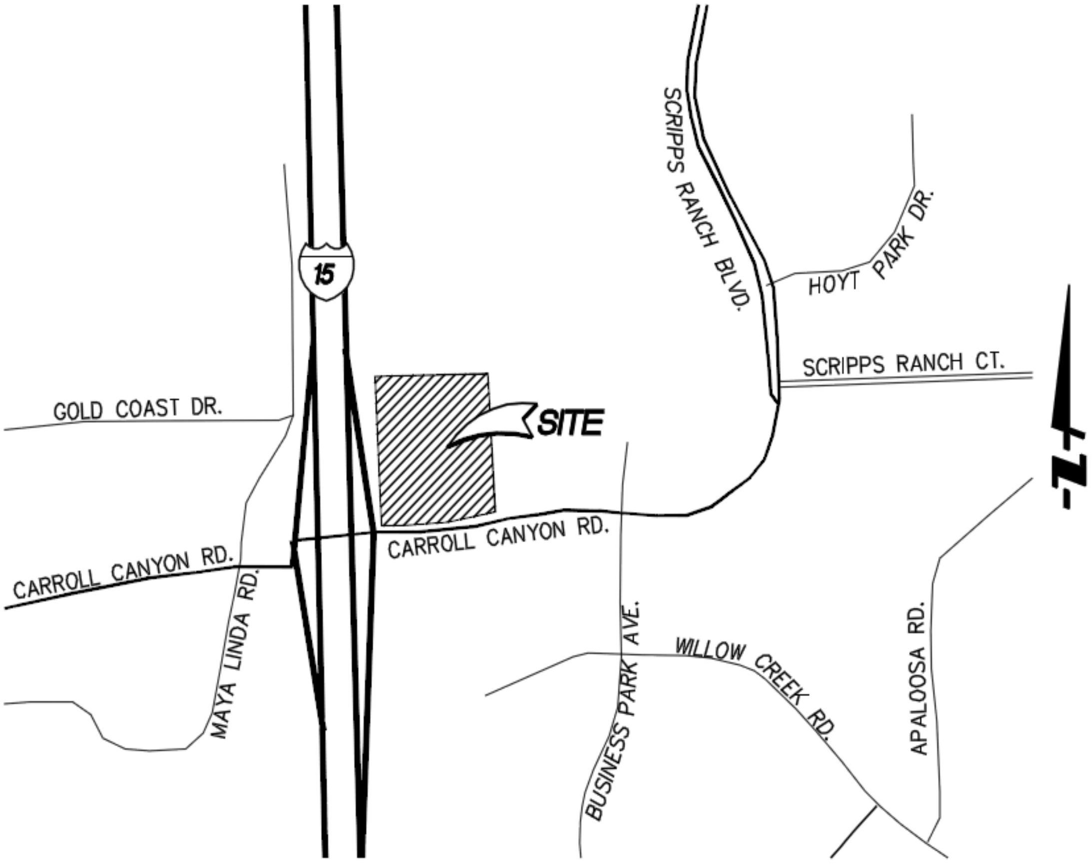
PROJECT DESCRIPTION

The project site is located within the Scripps Ranch Business Park in San Diego, California. The site is located east of the Interstate I-15, north of Carroll Canyon Road, east of an adjacent commercial development, and south of an existing Canyon and Scripps Ranch High School.

The project area consists of 9.5 acres of developed land which is zoned IP-2-1. The existing site is currently developed with two buildings, parking areas, landscaping, and miscellaneous improvements. The project proposes to demolish and scrape the existing surface improvements in preparation for a new development. The new development will include three commercial/ retail buildings and 5 4 story residential building including a large amenities area, pool and fitness center. The project will also include new parking areas, drive aisles and landscaping areas onsite. The offsite improvements for Carroll Canyon Road include the road widening, meandering sidewalk, a median, and a traffic signal at the main driveway entrance.

PROJECT VICINITY MAP

Project Name: Carroll Canyon Mixed Use Project
Permit Application Number: PTS 240716



WATERSHED DESCRIPTIONS

This project site is located within the Miramar Reservoir Hydrologic Area (HA 906.10) within the Penasquitos Hydrologic Unit. The site is tributary to Carroll Canyon Creek, Soledad Canyon, and the Los Penasquitos Lagoon. The site is not located within a FEMA flood hazard zone.

EXISTING CONDITION

The existing site topography is mostly flat with grades between 1% and 5%, except for a two-to-one slope near the northerly property line which slopes down to an existing canyon to the north. The southern portion of the site slopes south toward Carroll Canyon Road. The site is developed with approximately 60% impervious areas including two buildings, parking areas, and hardscape. It is assumed that the native soil is Type D in accordance with the Drainage Design Manual. Please see the Existing Hydrology exhibit in the appendix for reference.

The project site was divided into two major drainage basins based on downstream confluence points. Basin A (inclusive of A1, A2, and A3) consists of 6.97 acres of the northern and western areas of the project site. These areas drain north and west and confluence near the existing Caltrans box culvert northwest of the project site. This box culvert conveys runoff from the canyon and surrounding areas west under the Interstate I-15. Basin B consists of 2.55 acres of the south east portion of the site which drains south toward Carroll Canyon Road. Carroll Canyon road drains east via curb and gutter flow. For the purposes of this study, no offsite and downstream basin analysis was performed.

<u>Existing Basin A</u>

Basin A includes three sub-basins denoted as Basins A1, A2, and A3 which confluence at the Caltrans box culvert to the northwest of the project site. These three sub-basins were delineated based upon the discharge location from the project site. Basin A1 slopes to the north and drains into the canyon via a concrete ditch. Basin A2 drains west toward an existing graded ditch, and north toward the canyon. Discharge from Basin A2 is conveyed into the canyon via a concrete ditch. Basin A3 includes a portion of landscaped area near the southwest corner of the site. Runoff from this area drains to a sump prior to overtopping into the Caltrans right-of-way. Discharge from Basin A3 is conveyed north along the Interstate I-15 onramp where it is captured via a Caltrans catch basin and conveyed toward the box culvert.

<u>Existing Basin B</u>

Basin B includes the southeastern portions of the site which discharge to the curb and gutter of Carroll Canyon Road. A series of catch basins capture and convey runoff via underground storm drain toward two curb outlets which discharge to Carroll Canyon Road. The southerly portions of Basin B slope south and drain over the curb into Carroll Canyon Road. The confluence point for Basin B is in the curb and gutter of Carroll Canyon Road near the southeast corner of the property.

PROPOSED CONDITION

In proposed conditions, the site topography will be mostly flat with grades between 1% and 5%. The impervious areas will be increased due to the new buildings, hardscape, and parking areas. Pervious pavements will be utilized in lieu of standard pavement where feasible to mitigate a portion of the increased impervious areas. The impervious area will be increased to approximately 74% after accounting for pervious pavements in select parking areas. The onsite drainage design was governed by honoring the existing drainage basin boundary acreage of Basins A and B. Water Quality retention and infiltration is proposed for the DCV and Hydro modification Management Plan (HMP) facilities will be implemented to mitigate retention requirements and the potential increase in storm water runoff rates due to the proposed increase in impervious areas. Please see the Storm water retention / Hydro modification Management section of this report for more details.

Proposed Basin A

The proposed total acreage of Basin A will match the existing acreage. However, the sub-basin areas will be modified from existing conditions. The acreage of Basin A1will be increased from existing conditions. The proposed acreage of Basin A2 will be decreased from existing conditions. The existing Basin A3 which previously discharged into the Caltrans right of way will be eliminated, and this area will be re-routed into Basin A1 and B. Any increases in peak flow discharge from A1 will be mitigated through the implementation of onsite detention. The net effect on downstream drainage facilities of trading sub-basin areas will be negligible since these sub-basins confluence near the Caltrans box culvert.

Basin A1 will consist of the northeast portion of the site and discharge to Control Point 1. Runoff from this basin will be captured by a storm drain system and routed through a vault system below grade. The vault system outlets will discharge the DCV into the Drywell for infiltration and discharge the HMP volume into the existing easterly concrete ditch which drains north into the canyon. Basin A2 will consist of the north and western portions of the site and discharge to Control Point 2. Runoff from Basin A2 will be captured and conveyed via an underground storm drain system to the same vault system at the north center of the site. The vault system outlets will discharge the DCV into the Drywell for infiltration and discharge the HMP volume into the existing westerly concrete ditch which discharges north into the canyon.

Proposed Basin B

The proposed acreage of Basin B will match the existing acreage. Basin B will consist of the south portion of the site and include the retail buildings, and parking areas. Runoff from Basin B area will be captured by a series of storm drain inlets and conveyed via surface and underground storm drains to the underground retention vault. The detention system will discharge the DCV volume the Infiltration Drywell and the HMP discharge to Carroll Canyon Road via a curb outlet. The DCV and HMP storage volumes forhe southerly portions of Basin B, including somelandscaping areas and driveway entrances which are not feasible for capture will have been included in the vault volume sizing. Otherwise these landscape frontage areas and main driveway entrance will discharge into Carroll Canyon Road gutter system.

HYDROLOGY RESULTS

EXISTING CONDITION

Calculations were performed to determine the existing condition discharge during a storm event. The 50-year design storm was selected in accordance with the City of San Diego Drainage Design Manual, Section 1-102.2.3.B. See the Methodology section in this report for more details. The following table summarizes the peak discharge at the major points of concentration. Please refer to the Existing Hydrology exhibit in the appendix.

Table 1: Existing Hydrology Summary

Basin	Point of Concentration	Area (ac)	Average Runoff Coefficient	Time of Concentration (min)	Q_{50} (cfs)
A1	CP 1	1.43	0.63	10.13	2.97
A2	CP 2	4.81	0.69	14.71	8.96
A3	CP 3	0.73	0.50	13.62	1.02
A (Total)		6.97	-	-	-
B	CP B	2.55	0.59	21.39	3.46

For detailed hydrology calculations please see Appendix A.

PROPOSED CONDITION

Calculations were performed to determine the proposed condition discharge during a storm event. The 50-year design storm was selected in accordance with the City of San Diego Drainage Design Manual, Section 1-102.2.3.B. See the Methodology section in this report for more details. The following table summarizes the peak discharge at the major points of concentration. Please refer to the Proposed Hydrology exhibit in Appendix B.

Table 2: Proposed Hydrology Summary

Basin	Point of Concentration	Area (ac)	Average Runoff Coefficient	Time of Concentration (min)	Q_{50} (cfs) (undetained)	Q_{50} (cfs) (detained)
A1	CP 1	2.61	0.70	16.48	4.75	2
A2	CP 2	4.32	0.70	9.58	9.83	1
A (Total)		6.93	-	-	-	-
B	CP 3	2.59	0.77	17.37	5.98	2.5

As shown above, the proposed project would result in an undetained increase in peak runoff rates for all Basins if not properly mitigated. Therefore, a detention system will be implemented to provide hydromodification management and reduce the peak runoff rates for the design storm to match the existing conditions. For information on the detention system please see the Detention / Hydromodification section in this report. For detailed hydrology calculations please see Appendix B.

DETENTION / HYDROMODIFICATION

The proposed project will result in an increase in impervious surfaces from existing conditions. This would potentially result in an increase in storm water runoff rate and volume if left unmitigated. The project will be required to detain the increase in runoff to minimize the impacts to public drainage facilities. In addition, the project will be required to comply with the Hydro modification Management Plan (HMP) requirements as described in the Storm water Standards Manual.

To fulfill the HMP requirements, the project has been designed so that runoff rates and durations are controlled to maintain or reduce pre-project downstream erosion conditions and protect stream habitat. The project will mitigate the increase in runoff by implementing a series of storm water Best Management Practices (BMPs) and detention facilities which have been specifically designed for Hydro modification Management.

In addition to hydro modification mitigation, the proposed detention facilities will provide mitigation for increases in peak flow where necessary. As shown in Tables 1 and 2, the 50-year peak flow rate will increase from existing to proposed conditions in all basins. Therefore, the detention facilities in these basins have also been sized to provide peak detention to match the existing 50-year flow rates. The detention facilities have been designed for the 6-hour 50-year storm. The detention facilities will have a multi-stage outlet structure, with a combination of a low-flow orifice sized for hydro modification mitigation, a weir and/or an outlet orifice. The following table lists the flow rates and outlet configuration for each detention basin. Please refer to the Methodology section for information on how these values were calculated, and to Appendix C for detailed calculations.

Basin	Node	Q50 (Undetained)	Q50 (Detained)	Hydromod. Orifice	Peak Detention Outlet
A1	CP 1	4.75 cfs	2 cfs	2 in.	6-inch and 4-inch
A2	CP 2	9.83 cfs	1 cfs	2 In.	12-inch and 4-inch
B	CP B	5.98cfs	2.5cfs	2 in.	2-8 inch and one 2-inch

In both cases, the proposed detention facility will be located on the private storm drain system prior to discharge from the site, as shown on the Proposed Hydrology exhibit in Appendix B. The detention facility for Basin B will also be located upstream of the proposed curb outlet to Carroll Canyon Road, and will reduce the proposed discharge through this curb outlet to 2.5 cfs.

Due to the preliminary nature of this study, the detention facilities have been assumed to be underground vaults which are fully lined with concrete or an impermeable liner, and are 4 to 12 feet deep. During final engineering, other types of detention facilities may be selected, and detailed final design of the detention systems will be performed at that time. Types of detention facilities which may be selected during final design include cast-in-place concrete vaults; precast concrete vaults; large-diameter HDPE, PVC or RCP pipes; arched detention chambers; or any of a number of proprietary products designed to facilitate underground detention. The outlet structures, including low-flow orifice opening and high-flow by-pass, will also undergo detailed design at the time of final engineering.

CONCLUSION

The proposed project will be designed to honor existing basin boundaries and minimize the effects of the development to downstream drainage facilities and drainage channels. The total area of Basin A which drains north to the Caltrans box culvert will not be altered from existing conditions. The total area of Basin B which drains to Carroll Canyon Road will not be altered from existing conditions.

The proposed project will increase the impervious areas from existing conditions due to the proposed buildings, parking, and hardscape areas. Permeable pavements will be implemented in parking areas where feasible to mitigate a portion of this increase and infiltration is proposed as the BMP for full DCV retention. The increase in impervious areas would potentially result in an increase in storm water runoff rates if left unmitigated as shown in Table 2 of the Hydrology Results section. Therefore detention and HMP facilities will be implemented to reduce runoff rates to match existing conditions for the HMP and 50-year design storm requirements. The calculations and conclusions prove compliance to Hydro modification Management Plan Controls.

The final design of HMP, Water Quality BMPs, and onsite storm drain facilities will be presented in subsequent reports during final engineering.

METHODOLOGY

RUNOFF CALCULATIONS

The design criteria, as found in the City of San Diego Drainage Design Manual Section 1-102.2, specifies the design runoff conditions be based on the 50-year storm frequency. Runoff was calculated using the Modified Rational Method as described in pages 80-89 of the Drainage Design Manual. The rational method equation is as follows:

$Q = C \times I \times A$

Where:
Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr)
A = Drainage basin area in acres, (ac)

Runoff Coefficient

An average runoff coefficient was used over each entire basin unless the sub-basin area differed significantly from the average. Soil Type D was assumed for the entire study per the City of San Diego Drainage Design Manual page 82. Average runoff coefficients were calculated in accordance with the Drainage Design Manual, page 82, by adjusting the tabulated impervious ratios to match the actual impervious ratios of the site as shown in the following sample calculation:

Sample Runoff Coefficient Calculation:
Actual Impervious Percentage = 87%
Tabulated Impervious Percentage= 90% (C=0.95)
Revised C = 87/90 x 0.95 = 0.92

The calculated runoff coefficients for each basin are summarized in the Appendix.

Time of Concentration

Time of concentration was calculated per page 81 of the drainage design manual as follows:

$Tc = Ti + Tf,$

Where Ti is the inlet time, Tf is the travel time, and Tc is the time of concentration. The inlet time (Ti) was calculated according the Drainage Design Manual page 86, "Urban Areas Overland Time of Flow Curves". Additional travel time (Tf) was calculated by estimating velocity using Manning's formula for open channel flow. The travel time was calculated by dividing the flow length by the flow velocity as described on page 81 of the Drainage Design Manual.

Rainfall Intensity

Rainfall intensity was calculated in accordance with the City of San Diego Drainage Design Manual. The intensity – duration chart on page 83 of the Drainage Design Manual was used to calculate corresponding intensities for each time of concentration. This data was input into the I-D-F Curve Table for the 2-year, 10-year and 50-year design storm events. The time of concentration – intensity data pairs can be seen in the Appendix.

DETENTION CALCULATIONS

To design the proposed detention facilities, the 50-year 6-hour storm was routed through the detention facility, and the detention volume and outlet configuration were iteratively sized until the proposed peak flow rate was equal to or below the existing peak flow rate. This was done using the following procedures.

Runoff Hydrographs

Based on the proposed hydrology calculations, a runoff hydrograph was generated for the 50-year 6-hour storm event. This was done using the Rational Method Hydrograph Program developed by Rick Engineering for use in San Diego County. Based on inputs including the time of concentration, 6-hour rainfall, basin area, runoff coefficient, and peak discharge, this program developed a runoff hydrograph with time steps corresponding to the time of concentration. Output from this program can be found in Appendix C.

Orifice Calculations

In sizing the outlet structures, the orifice equation was used to calculate the discharge through an orifice. The orifice equation is given below:

$$Qo = Co \times Ao \times (2 \times g \times Ho)^{1/2}$$

Where:
Qo = Flow rate through the orifice in cfs
Co = Coefficient accounting for entrance loss to the orifice (0.6 assumed)
Ao = Area of the orifice in square feet
g = Gravitational acceleration equal to 32.2 feet per second per second
Ho = Head acting on the orifice in feet

Weir Calculations

Where the outlet structures incorporated a weir, the weir equation was used to calculate the discharge over the weir. The weir equation is given below:

$$Qw = Cw \times Pe \times Hw^{3/2}$$

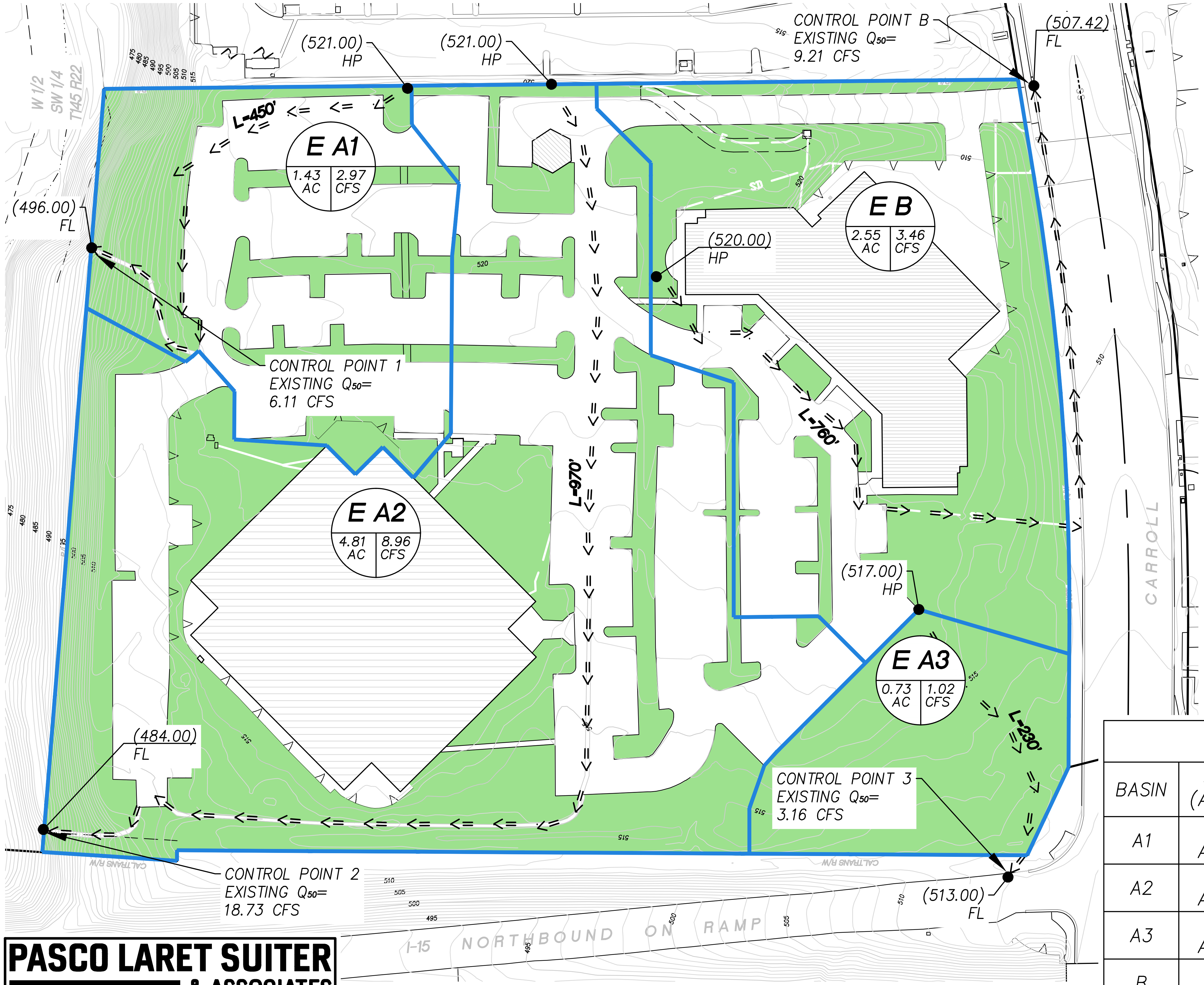
Qw = Flow rate over the weir in cfs
Cw = Weir coefficient = 3.0
Pe = Effective grate perimeter length
Dw = Depth of flow approaching inlet

Detention Basin Routing

Detention basin routing calculations were performed using Hydraflow Hydrographs, Version 9. The runoff hydrographs described above were input into the program, along with stage-storage information for the proposed detention vaults. The outlet structure information was either entered using the orifice feature of the program (in the case of Basin B), or calculated manually and entered into the program as user-defined outflow data (in the case of Basin A2, due to the non-standard nature of the outlet structure). The program then routes the flows through the detention facility, and generates an outflow hydrograph. Additional output information includes the peak discharge from the detention facility, the maximum depth of storage in the detention facility, and the maximum volume stored. Detailed output from Hydraflow Hydrographs can be found in Appendix C.

APPENDIX A

Existing Hydrology Map and Calculations



LEGEND

DESCRIPTION	SYMBOL
LOT LINE	— — —
BASIN BOUNDARY	—
FLOW DIRECTION	→
FLOW PATH	—
EXISTING PERVIOUS AREA	🟩
BASIN SUMMARY Q_{50}	E 1 X.X AC X.X CFS

HYDROLOGY EXHIBIT
EXISTING CONDITION

CARROLL CANYON MIXED USE
9850 CARROLL CANYON RD, SAN DIEGO, CA 92131
PROJECT NUMBER: PE 2314
SCALE: 1" = 80'
DATE: OCTOBER 2015
SHEET 1 OF 1

EXISTING CONDITION

BASIN	AREA (ACRES)	EXISTING PERVIOUS AREA (ACRES)	% IMPERVIOUS	C FACTOR (MOD)
A1	1.43 ACRES	0.57 ACRES	60.1%	0.63
A2	4.81 ACRES	1.70 ACRES	64.7%	0.69
A3	0.73 ACRES	0.73 ACRES	0%	0.50
B	2.55 ACRES	1.12 ACRES	56.1%	0.59
TOTAL	9.52 ACRES	4.12 ACRES	56.7%	0.60

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PASCO LARET SUITER & ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: Oct 2015
Checked:MDW Date: Oct 2015
Sheet: 1 of 1

Time of Concentration Calculations

Using the "Urban Areas Overland Time of Flow Curves" from the
City of San Diego Drainage Design Manual:
Where:

Tc = Time of Concentration (Minutes)
C =Runoff Coefficient
S = Effective slope
D = Distance

Tc =1.8 (1.1 - C) (D)^.5 / (s^1/3)

Basin	D (Feet)	C	S (Slope)	Tc (Minutes)	Pipe Tc (Minutes)	Total Tc (Min)
EX A1	450	0.6300	5.56	10.13	0.00	10.13
EX A2	970	0.6900	3.81	14.71	0.00	14.71
EX A3	230	0.5000	1.74	13.62	0.00	13.62
EX B	760	0.5900	1.66	21.39	0.00	21.39

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Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: October 2015
Checked: MDW Date: October 2015
Sheet: 1 of 2

Existing Condition

Q = C x I x A

Where:

Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr) (Tc Calcualtions in Appendix 3)
A = Drainage basin area in acres, (ac)

Rational Method calculations were performed using the City of San Diego Drainage Design Manual (Section 1-102.3)

Drainage Area	Year	C	I (in/hr)	A (ac.)	Q (cfs)
Ex A1	2	0.63	1.80	1.43	1.62
	10	0.63	2.60	1.43	2.34
	50	0.63	3.30	1.43	2.97
	100	0.63	3.50	1.43	3.15
Ex A2	2	0.69	1.45	4.81	4.81
	10	0.69	2.15	4.81	7.14
	50	0.69	2.70	4.81	8.96
	100	0.69	3.00	4.81	9.96
Ex A3	2	0.50	1.50	0.73	0.55
	10	0.50	2.20	0.73	0.80
	50	0.50	2.80	0.73	1.02
	100	0.50	3.00	0.73	1.10
Ex B	2	0.59	1.20	2.55	1.81
	10	0.59	1.80	2.55	2.71
	50	0.59	2.30	2.55	3.46
	100	0.59	2.40	2.55	3.61

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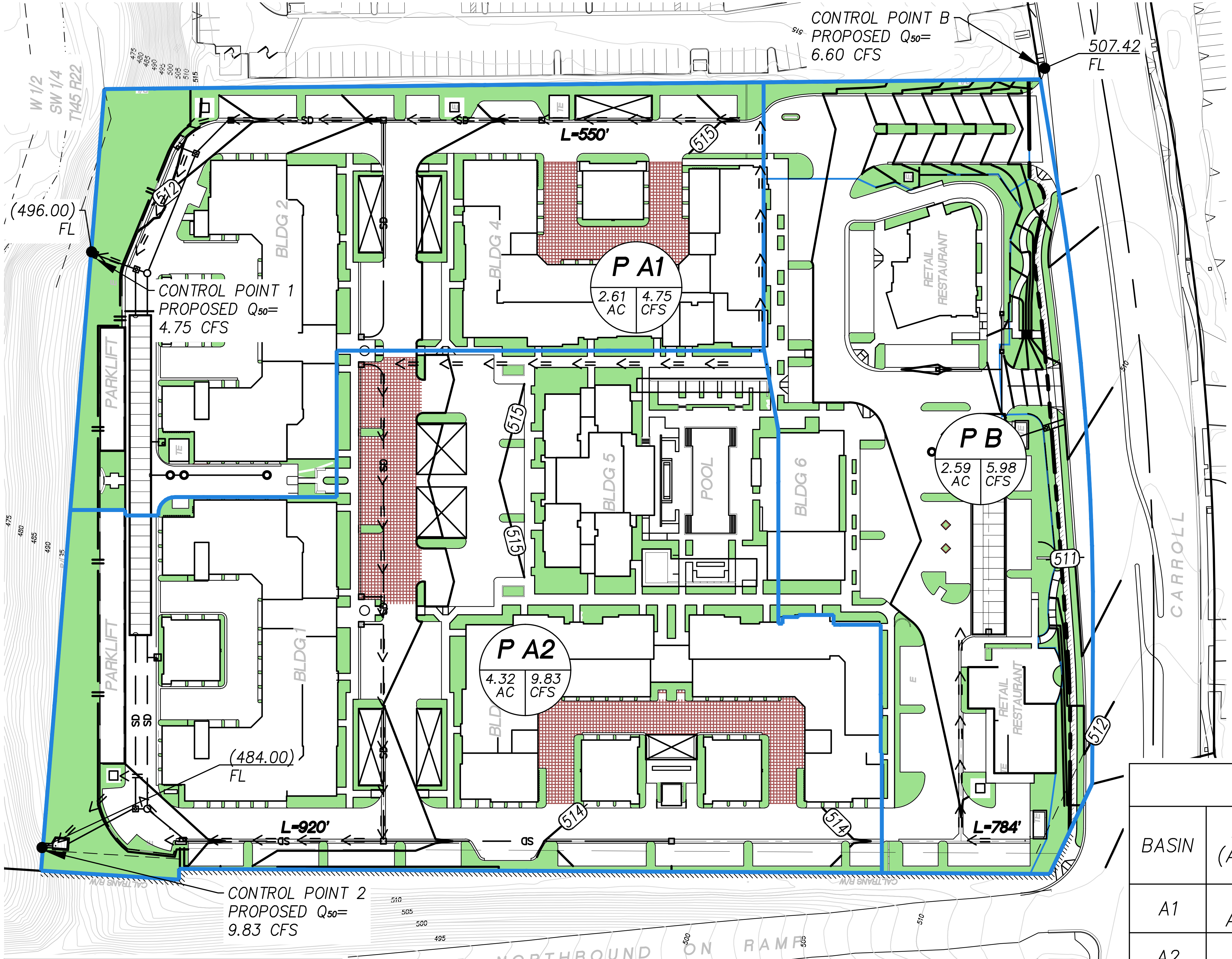
Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: October 2015
Checked: MDW Date: October 2015
Sheet: 2 of 2

APPENDIX B

Proposed Hydrology Map and Calculations



LEGEND

DESCRIPTION	SYMBOL
LOT LINE	— — —
BASIN BOUNDARY	━━
FLOW DIRECTION	→
FLOW PATH	——
PROPOSED PERVIOUS AREA	🟩
BASIN SUMMARY Q_{50}	P 1 X.X AC X.X CFS

HYDROLOGY EXHIBIT PROPOSED CONDITION

CARROLL CANYON MIXED USE
9850 CARROLL CANYON RD, SAN DIEGO, CA 92131
PROJECT NUMBER: PE 2314
SCALE: 1" = 80'
DATE: JUNE 2016
SHEET 1 OF 1

PROPOSED CONDITION

BASIN	AREA (ACRES)	PROPOSED PERVIOUS AREA (ACRES)	% IMPERVIOUS	C FACTOR
A1	2.61 ACRES	0.66 ACRES	74.7%	0.70
A2	4.32 ACRES	1.08 ACRES	75.0%	0.70
B	2.59 ACRES	0.72 ACRES	72.2%	0.77
TOTAL	9.52 ACRES	2.46 ACRES	74.2%	0.77 (R)

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ph 858.259.8212 | fx 858.259.4812 | plsaengineering.com

Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: October 2015
Checked:MDW Date: October 2015
Sheet: 1 of 1

Time of Concentration Calculations

Using the "Urban Areas Overland Time of Flow Curves" from the
City of San Diego Drainage Design Manual:
Where:

Tc = Time of Concentration (Minutes)
C =Runoff Coefficient
S = Effective slope
D = Distance

Tc =1.8 (1.1 - C) (D)^.5 / (s^1/3)

Basin	D (Feet)	C	S (Slope)	Tc (Minutes)	Pipe Tc (Minutes)	Total Tc (Min)
PR A1	324	0.7000	0.59	15.48	1.00	16.48
PR A2	293	0.7000	4.29	7.58	2.00	9.58
PR B	784	0.7700	0.88	17.37	0.00	17.37

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Project: Carroll Canyon Mixed Use
Job No.: PE 2314 Scale: N/A
Calc. By: MB Date: October 2015
Checked:MDW Date: October 2015
Sheet: 1 of 1

Proposed Condition

Q = C x I x A

Where:

Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr) (Tc Calculations in Appendix 3)
A = Drainage basin area in acres, (ac)

Rational Method calculations were performed using the City of San Diego Drainage Design Manual (Section 1-102.3)

Drainage Area	Year	C	I (in/hr)	A (ac.)	Q (cfs)
PR A1	2	0.70	1.40	2.61	2.56
	10	0.70	2.00	2.61	3.65
	50	0.70	2.60	2.61	4.75
	100	0.70	2.80	2.61	5.12
PR A2	2	0.70	1.80	4.32	5.44
	10	0.70	2.60	4.32	7.86
	50	0.70	3.25	4.32	9.83
	100	0.70	3.45	4.32	10.43
PR B	2	0.77	1.60	2.59	3.19
	10	0.77	2.40	2.59	4.79
	50	0.77	3.00	2.59	5.98
	100	0.77	3.20	2.59	6.38

APPENDIX C

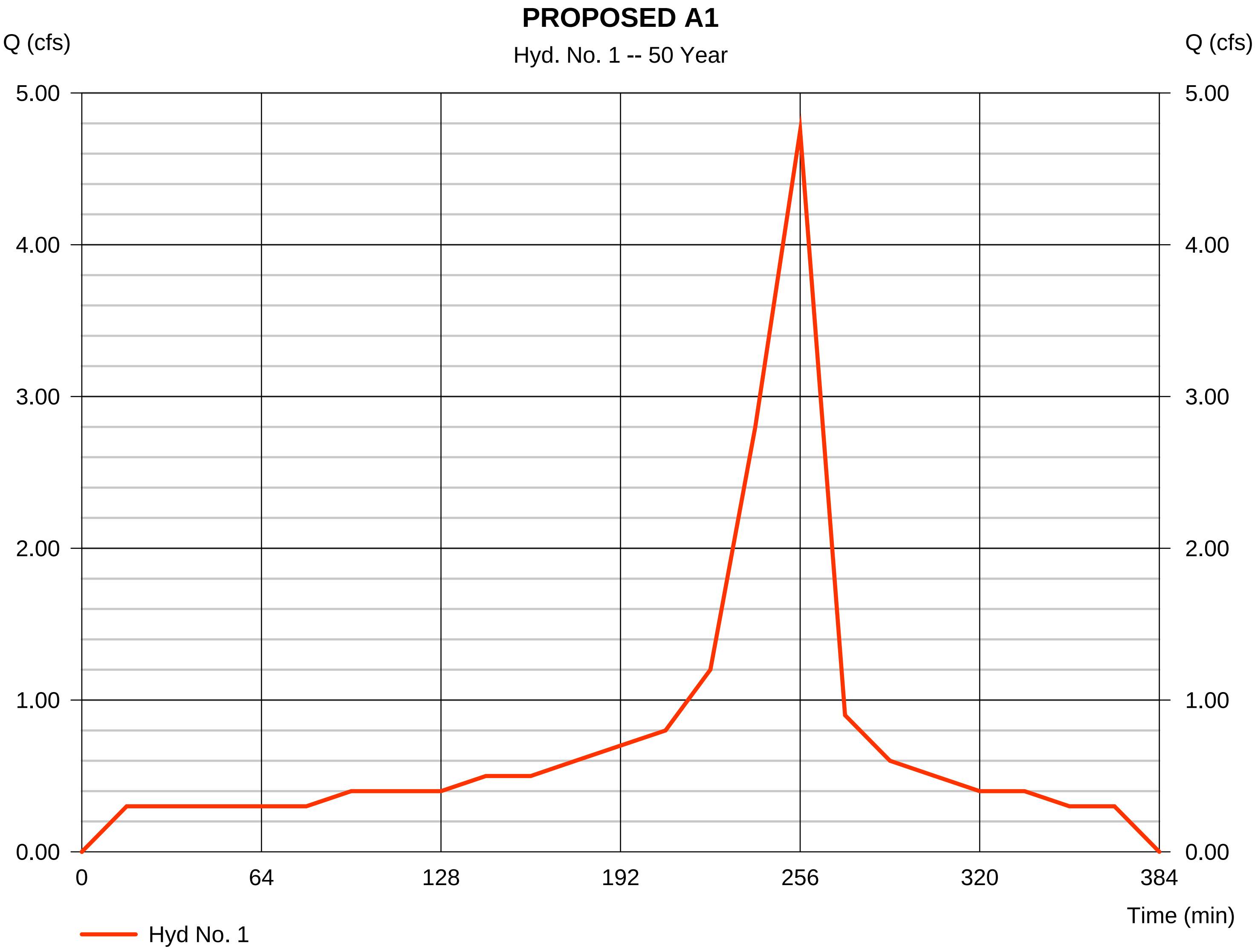
Detention Basin Calculations

Hydrograph Report

Hyd. No. 1

PROPOSED A1

Hydrograph type	= Manual	Peak discharge	= 4.750 cfs
Storm frequency	= 50 yrs	Time to peak	= 256 min
Time interval	= 16 min	Hyd. volume	= 17,232 cuft



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10 Tuesday, 02 / 17 / 2015

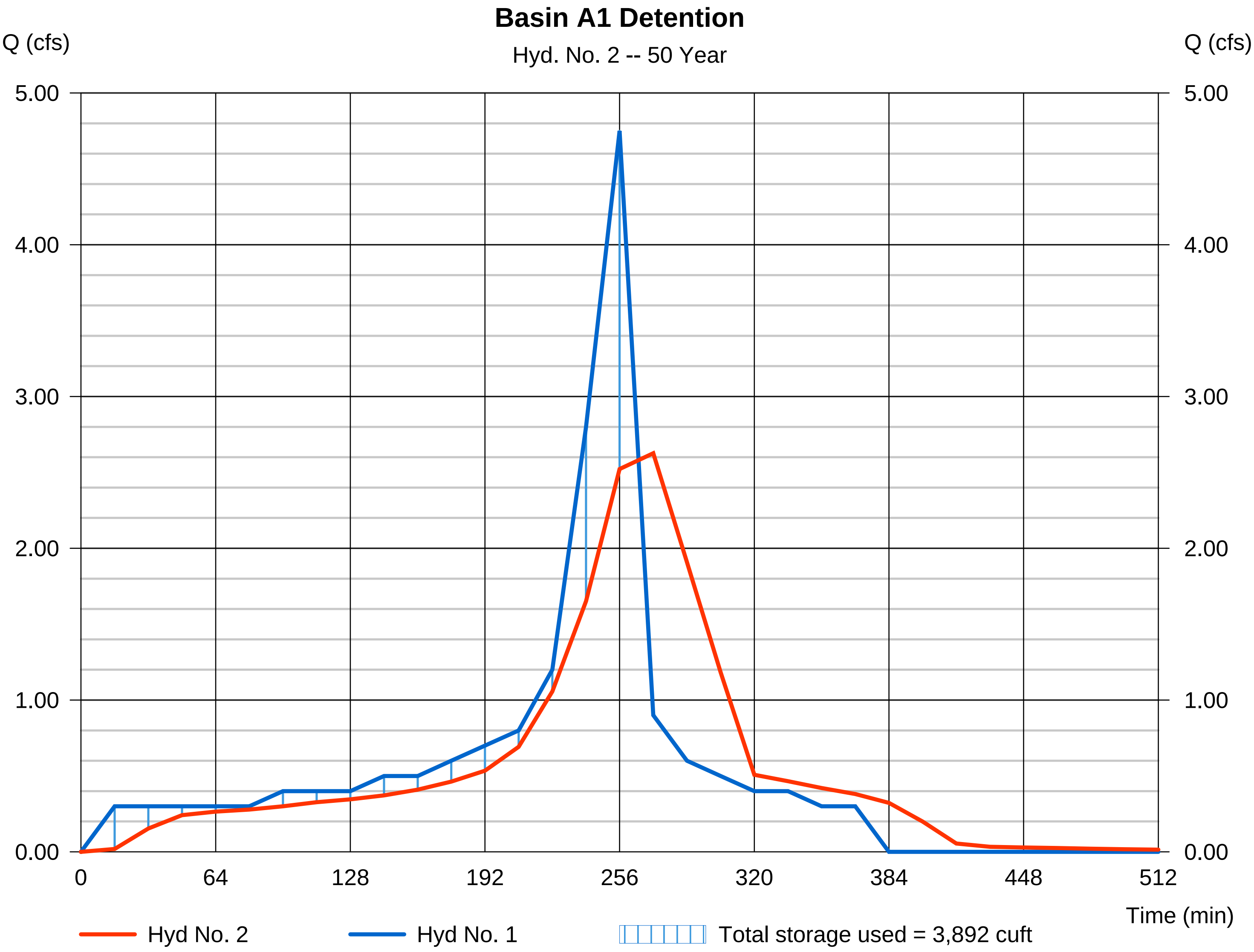
Hyd. No. 2

Basin A1 Detention

Hydrograph type = Reservoir
Storm frequency = 50 yrs
Time interval = 16 min
Inflow hyd. No. = 1 - PROPOSED A1
Reservoir name = BASIN A1 DETENTION

Peak discharge = 2.626 cfs
Time to peak = 272 min
Hyd. volume = 17,223 cuft
Max. Elevation = 510.62 ft
Max. Storage = 3,892 cuft

Storage Indication method used.



Pond No. 1 - BASIN A1 DETENTION

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 505.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	505.00	840	0	0
1.00	506.00	840	840	840
2.00	507.00	840	840	1,680
3.00	508.00	840	840	2,520
4.00	509.00	840	840	3,360
5.00	510.00	840	840	4,200
6.00	511.00	840	840	5,040

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	Inactive	Inactive
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 505.00	506.00	0.00	0.00
Length (ft)	= 0.50	0.50	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	505.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.00	840	506.00	0.38 ic	0.00	---	---	---	---	---	---	---	---	0.384
2.00	1,680	507.00	0.57 ic	0.82 ic	---	---	---	---	---	---	---	---	1.388
3.00	2,520	508.00	0.71 ic	1.25 ic	---	---	---	---	---	---	---	---	1.958
4.00	3,360	509.00	0.82 ic	1.57 ic	---	---	---	---	---	---	---	---	2.390
5.00	4,200	510.00	0.92 ic	1.83 ic	---	---	---	---	---	---	---	---	2.754
6.00	5,040	511.00	1.01 ic	2.06 ic	---	---	---	---	---	---	---	---	3.075

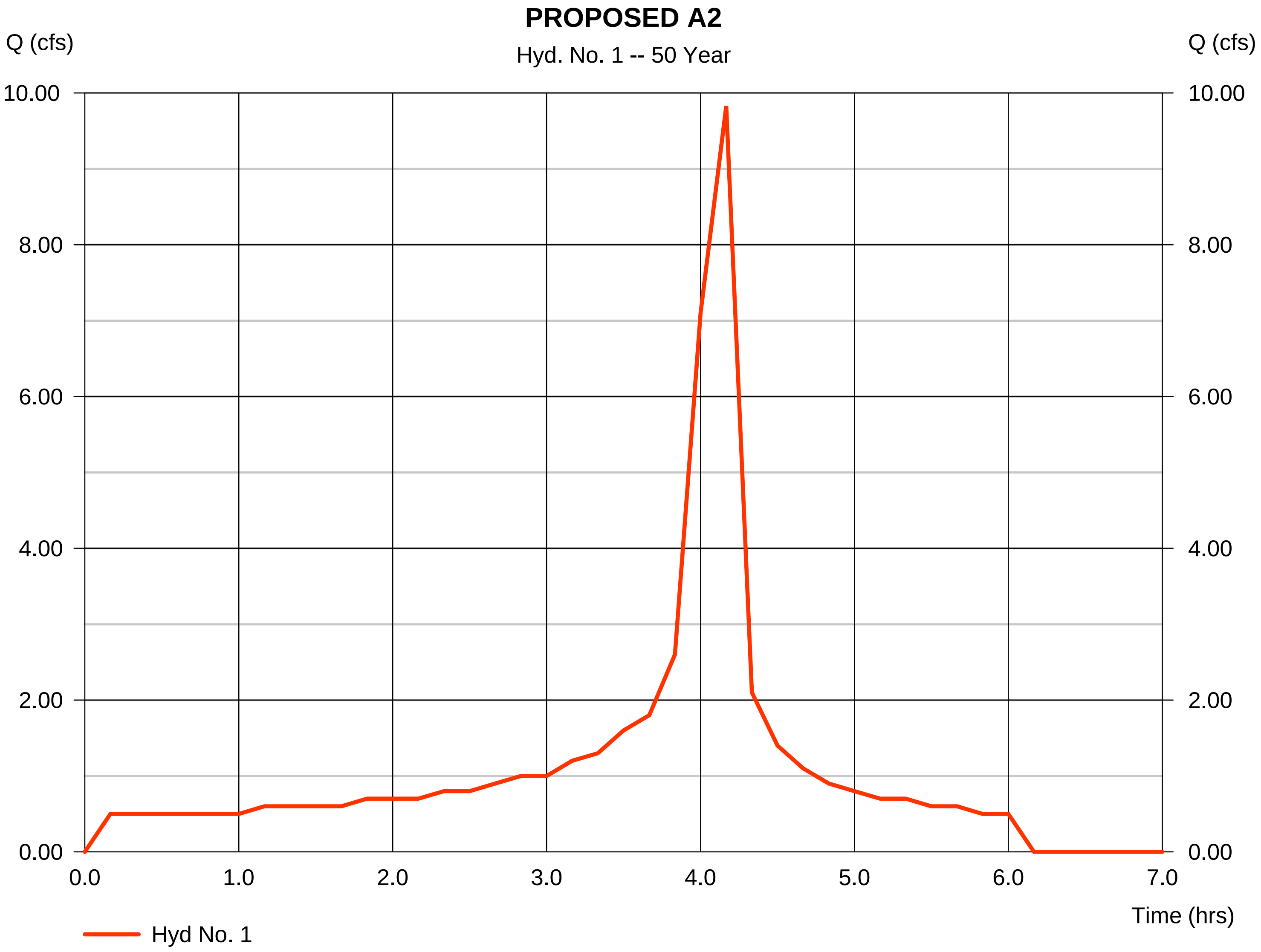
Hydrograph Report

Hyd. No. 1

PROPOSED A2

Hydrograph type = Manual
Storm frequency = 50 yrs
Time interval = 10 min

Peak discharge = 9.830 cfs
Time to peak = 4.17 hrs
Hyd. volume = 28,398 cuft



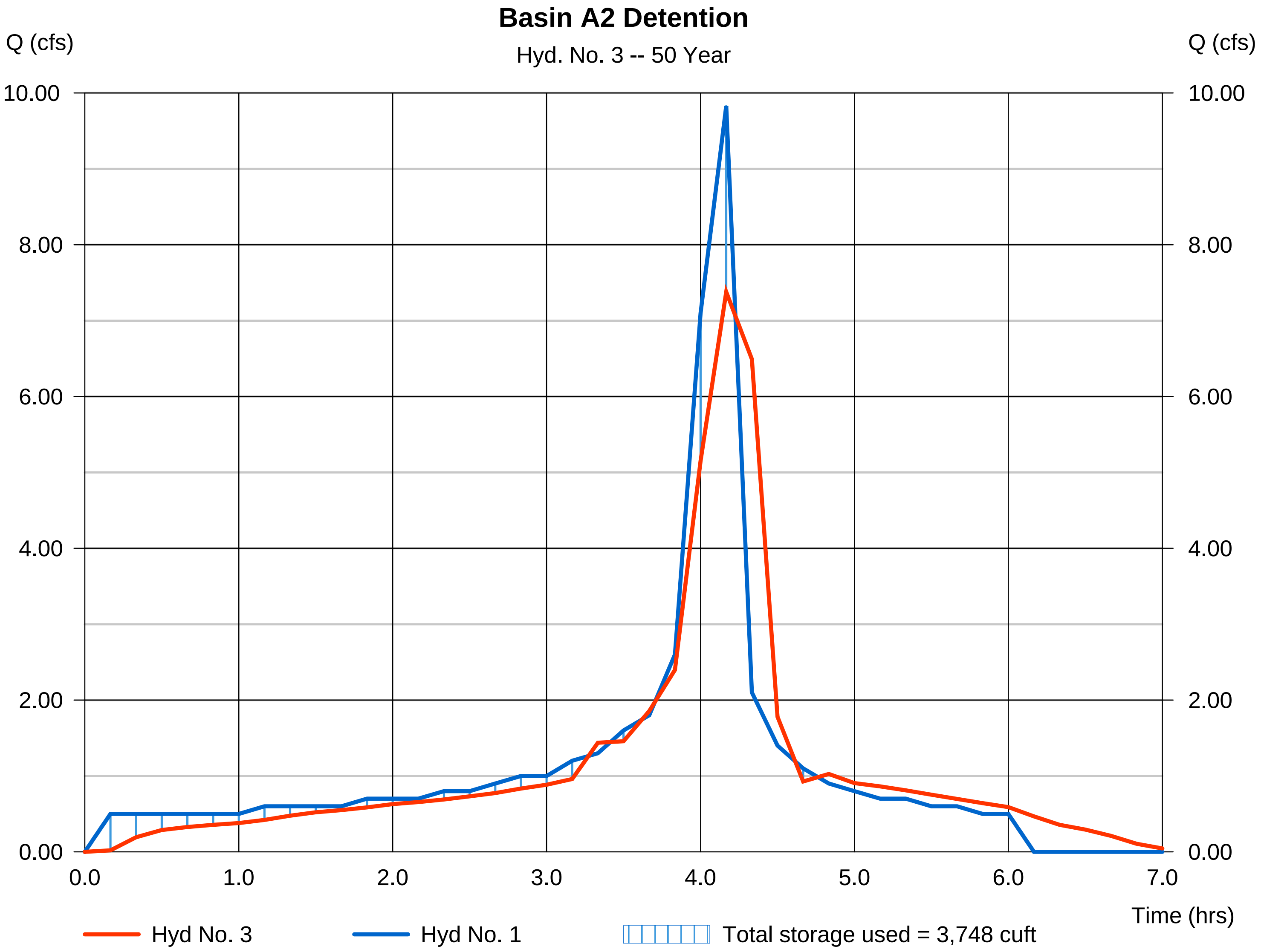
Hydrograph Report

Hyd. No. 3

Basin A2 Detention

Hydrograph type	= Reservoir	Peak discharge	= 7.378 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.17 hrs
Time interval	= 10 min	Hyd. volume	= 28,389 cuft
Inflow hyd. No.	= 1 - PROPOSED A2	Max. Elevation	= 510.34 ft
Reservoir name	= BASIN A2 DETENTION	Max. Storage	= 3,748 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BASIN A2 DETENTION

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 505.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	505.00	840	0	0
1.00	506.00	840	840	840
2.00	507.00	840	840	1,680
3.00	508.00	840	840	2,520
4.00	509.00	840	840	3,360
5.00	510.00	840	840	4,200
6.00	511.00	840	840	5,040

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	12.00	Inactive	Inactive
Span (in)	= 4.00	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 505.00	506.00	0.00	0.00
Length (ft)	= 0.50	0.50	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	505.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.00	840	506.00	0.38 ic	0.00	---	---	---	---	---	---	---	---	0.384
2.00	1,680	507.00	0.57 ic	0.36 oc	---	---	---	---	---	---	---	---	0.931
3.00	2,520	508.00	0.71 ic	4.63 ic	---	---	---	---	---	---	---	---	5.338
4.00	3,360	509.00	0.82 ic	5.98 ic	---	---	---	---	---	---	---	---	6.801
5.00	4,200	510.00	0.92 ic	7.07 ic	---	---	---	---	---	---	---	---	7.998
6.00	5,040	511.00	1.01 ic	8.02 ic	---	---	---	---	---	---	---	---	9.036

Hydrograph Report

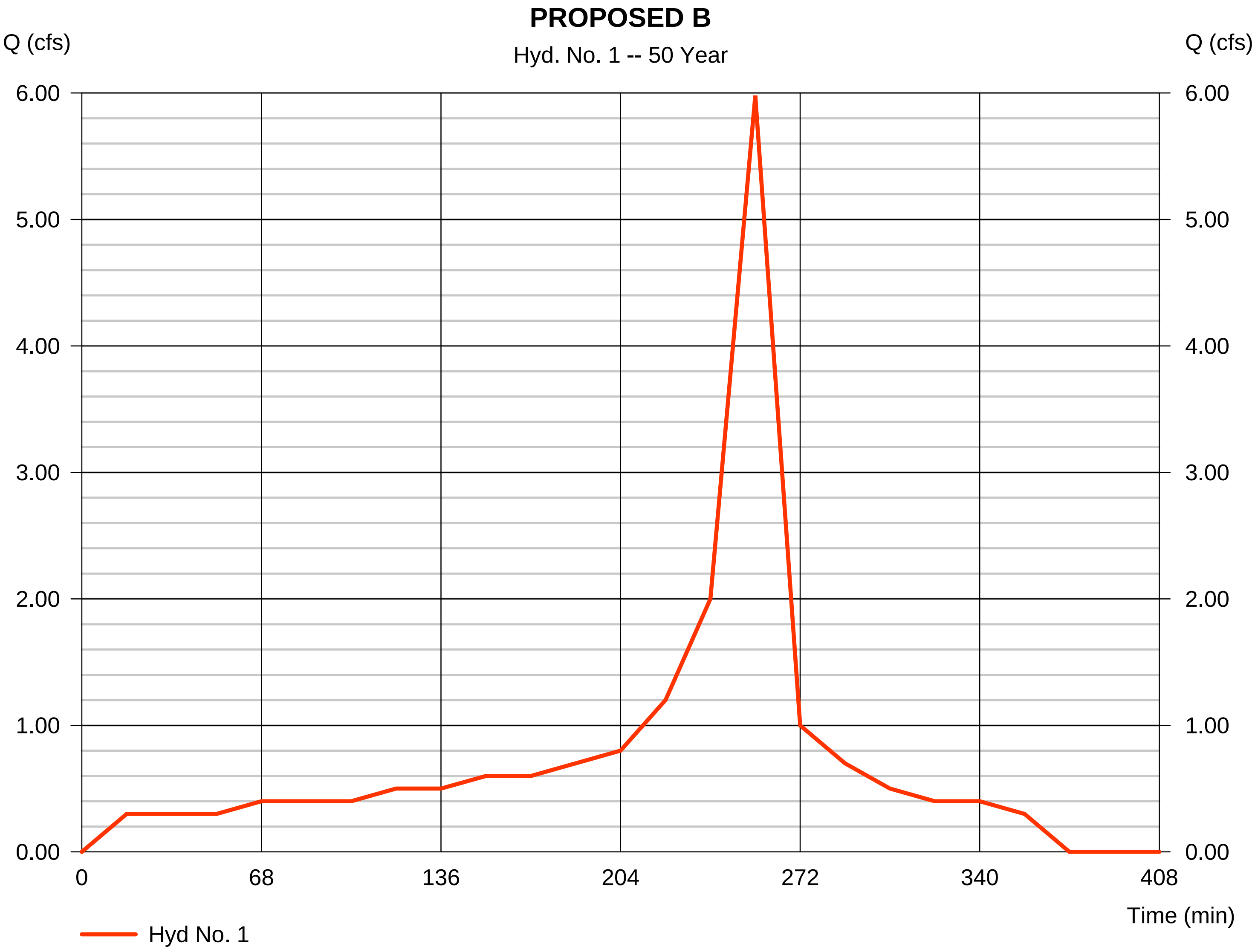
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10 Tuesday, 02 / 17 / 2015

Hyd. No. 1

PROPOSED B

Hydrograph type = Manual
Storm frequency = 50 yrs
Time interval = 17 min

Peak discharge = 5.980 cfs
Time to peak = 255 min
Hyd. volume = 18,646 cuft



Hydrograph Report

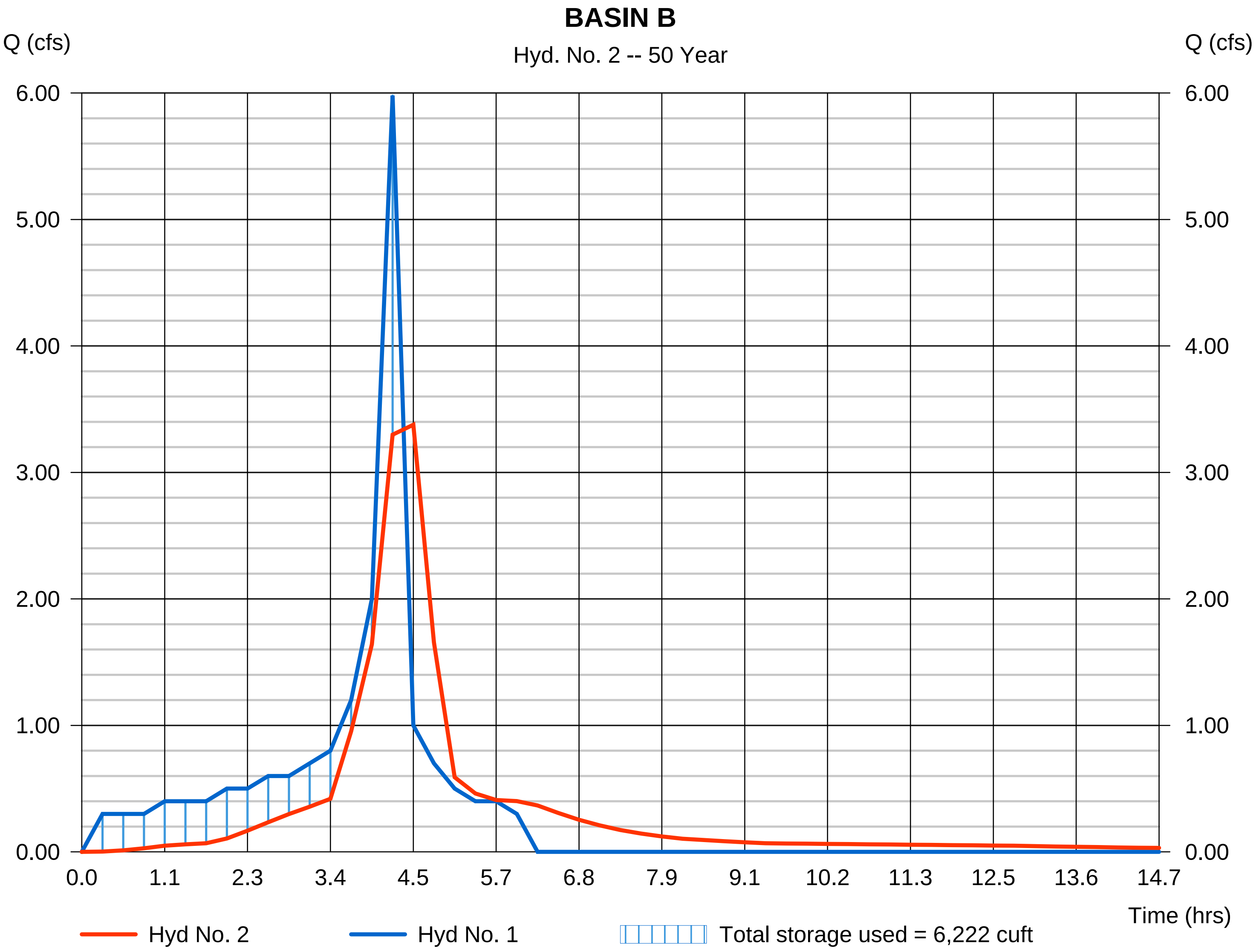
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10 Tuesday, 02 / 17 / 2015

Hyd. No. 2

BASIN B

Hydrograph type	= Reservoir	Peak discharge	= 3.377 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.53 hrs
Time interval	= 17 min	Hyd. volume	= 18,588 cuft
Inflow hyd. No.	= 1 - PROPOSED B	Max. Elevation	= 512.00 ft
Reservoir name	= BASIN B DETENTION	Max. Storage	= 6,222 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BASIN B DETENTION

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 510.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	510.00	3,528	0	0
1.00	511.00	3,528	3,528	3,528
2.00	512.00	3,528	3,528	7,056

Culvert / Orifice Structures

		[A]	[B]	[C]	[PrfRsr]
Rise (in)	=	2.00	8.00	8.00	Inactive
Span (in)	=	2.00	8.00	8.00	0.00
No. Barrels	=	1	1	1	0
Invert El. (ft)	=	510.00	510.50	510.50	0.00
Length (ft)	=	0.50	0.50	0.50	0.00
Slope (%)	=	1.00	1.00	1.00	n/a
N-Value	=	.013	.013	.013	n/a
Orifice Coeff.	=	0.60	0.60	0.60	0.60
Multi-Stage	=	n/a	No	No	No

Weir Structures

		[A]	[B]	[C]	[D]
Crest Len (ft)	=	0.00	0.00	0.00	0.00
Crest El. (ft)	=	0.00	0.00	0.00	0.00
Weir Coeff.	=	3.33	3.33	3.33	3.33
Weir Type	=	---	---	---	---
Multi-Stage	=	No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

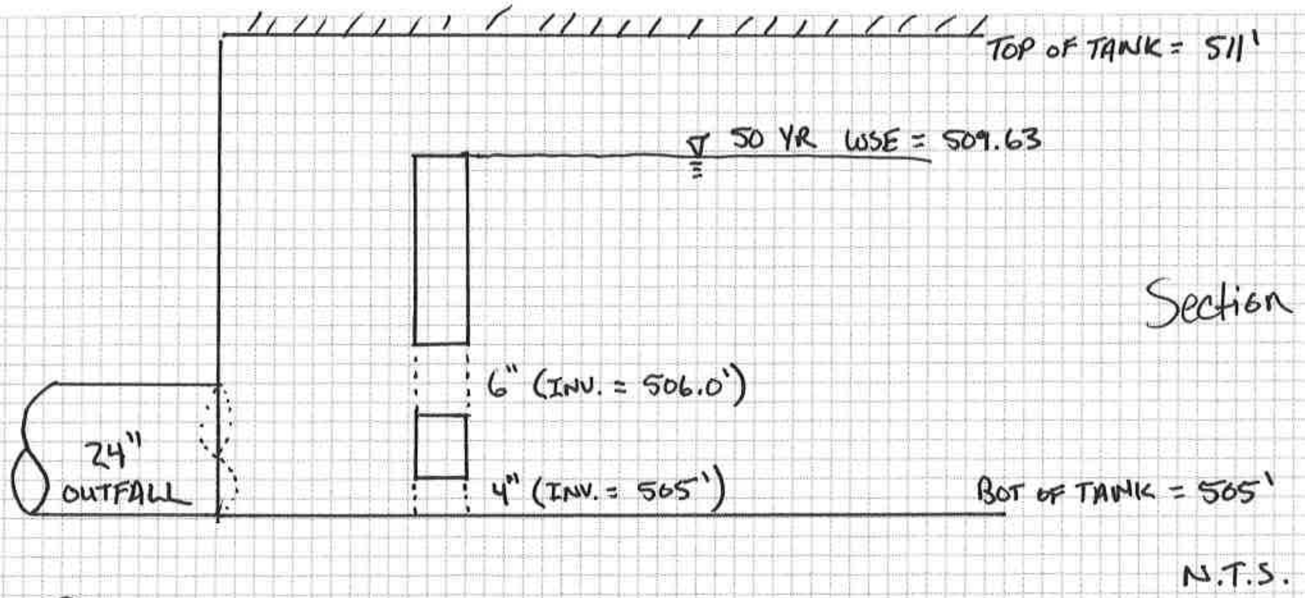
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	510.00	0.00	0.00	0.00	---	---	---	---	---	---	---	0.000
1.00	3,528	511.00	0.10 ic	0.13 oc	0.13 oc	---	---	---	---	---	---	---	0.359
2.00	7,056	512.00	0.15 ic	1.82 ic	1.82 ic	---	---	---	---	---	---	---	3.776

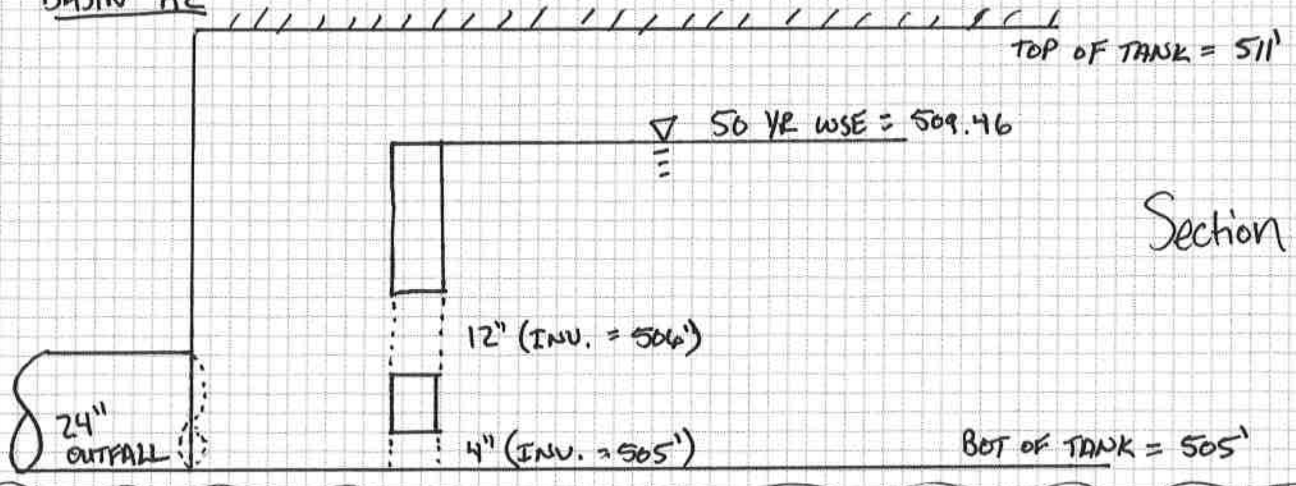
Date 2/17/15 Job#

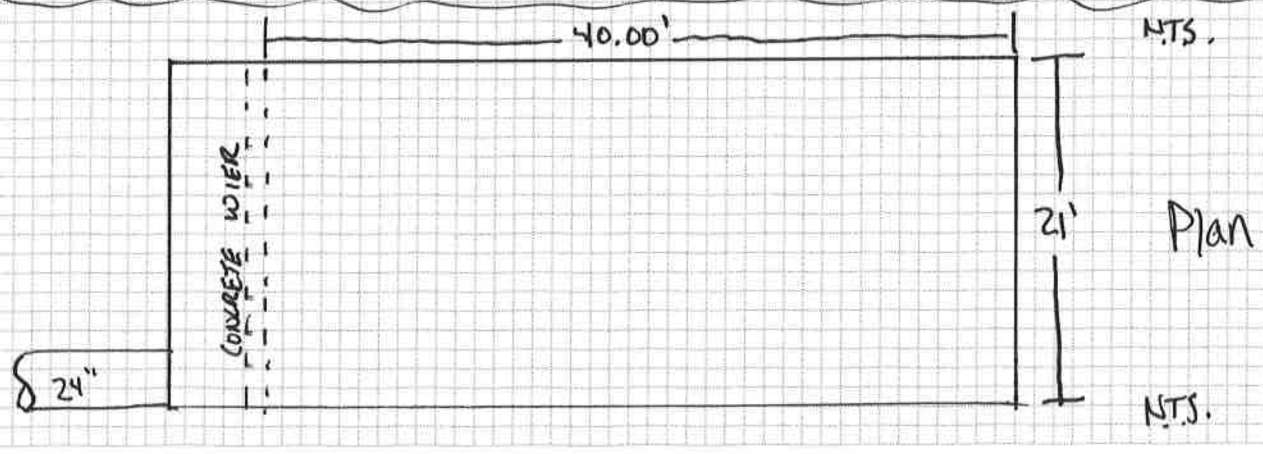
BASIN A1



~~BASI~~

BASIN A2

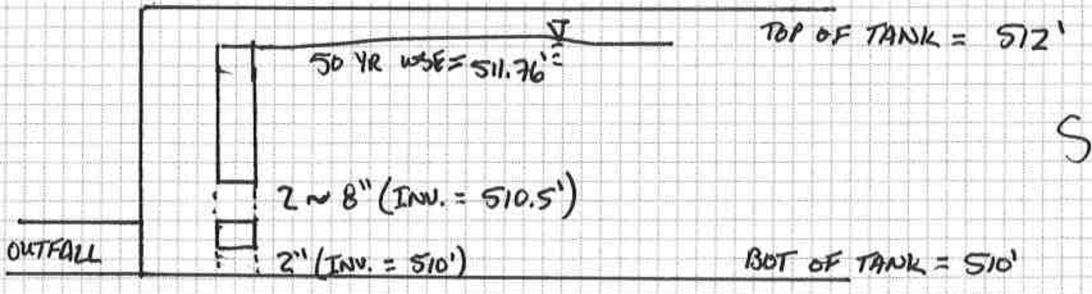




Date 2/17/15 Job#

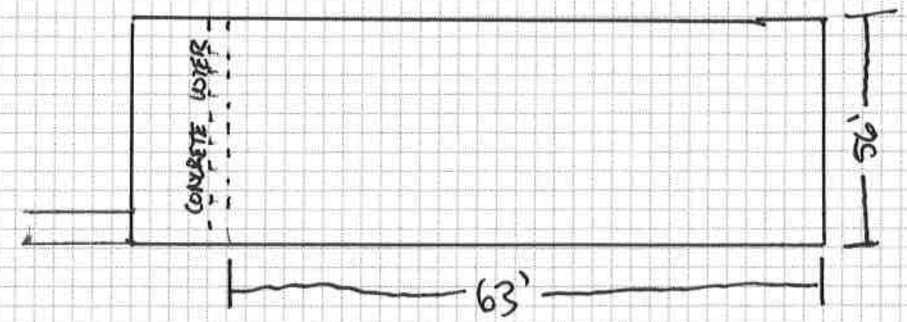
BASIN B

NTS.



Section

(NTS)



PLAN

CLIMATE ACTION PLAN
CONSISTENCY CHECKLIST INTRODUCTION

In December 2015, the City adopted a Climate Action Plan (CAP) that outlines the actions that City will undertake to achieve its proportional share of State greenhouse gas (GHG) emission reductions. The purpose of the Climate Action Plan Consistency Checklist (Checklist) is to, in conjunction with the CAP, provide a streamlined review process for proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to the California Environmental Quality Act (CEQA).[1]

Analysis of GHG emissions and potential climate change impacts from new development is required under CEQA. The CAP is a plan for the reduction of GHG emissions in accordance with CEQA Guidelines Section 15183.5. Pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b), a project's incremental contribution to a cumulative GHG emissions effect may be determined not to be cumulatively considerable if it complies with the requirements of the CAP.

This Checklist is part of the CAP and contains measures that are required to be implemented on a project-by-project basis to ensure that the specified emissions targets identified in the CAP are achieved. Implementation of these measures would ensure that new development is consistent with the CAP's assumptions for relevant CAP strategies toward achieving the identified GHG reduction targets. Projects that are consistent with the CAP as determined through the use of this Checklist may rely on the CAP for the cumulative impacts analysis of GHG emissions. Projects that are not consistent with the CAP must prepare a comprehensive project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions and incorporation of the measures in this Checklist to the extent feasible. Cumulative GHG impacts would be significant for any project that is not consistent with the CAP.

The Checklist may be updated to incorporate new GHG reduction techniques or to comply with later amendments to the CAP or local, State, or federal law.

Questions pertaining to the Checklist should be directed to Development Services Department at 619-446-5000.

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[1] Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.

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CAP CONSISTENCY CHECKLIST
SUBMITTAL APPLICATION

- The Checklist is required only for projects subject to CEQA review.[2]
- If required, the Checklist must be included in the project submittal package. Application submittal procedures can be found in Chapter 11: Land Development Procedures of the City's Municipal Code.
- The requirements in the Checklist will be included in the project's conditions of approval.
- The applicant must provide an explanation of how the proposed project will implement the requirements described herein to the satisfaction of the Planning Department.

Application Information

Contact Information

Project No./Name: 240716 / Carroll Canyon Mixed Use Project

Property Address: 9850 Carroll Canyon Road, San Diego 92131

Applicant Name/Co.: Jeff Rogers / Sudberry Development, Inc.

Contact Phone: 858.546.3000 x 571 Contact Email: jeffrogers@sudprop.com

Was a consultant retained to complete this checklist? ☑ Yes ☐ No If Yes, complete the following

Consultant Name: Karen Ruggels Contact Phone: 619.578.9505

Company Name: KLR Planning Contact Email: karen@klrplanning.com

Project Information

1. What is the size of the project (acres)? 9.52 acres (9.28 net acres)
2. Identify all applicable proposed land uses:
   - ☐ Residential (indicate # of single-family units):
   - ☑ Residential (indicate # of multi-family units): 260 units
   - ☑ Commercial (total square footage): 10,700 square feet
   - ☐ Industrial (total square footage):
   - ☐ Other (describe):
3. Is the project located in a Transit Priority Area? ☐ Yes ☑ No
4. Provide a brief description of the project proposed: See Attachment 1

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[2] Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.

CAP CONSISTENCY CHECKLIST QUESTIONS

Step 1: Land Use Consistency

The first step in determining CAP consistency for discretionary development projects is to assess the project's consistency with the growth projections used in the development of the CAP. This section allows the City to determine a project's consistency with the land use assumptions used in the CAP.

Step 1: Land Use Consistency		
Checklist Item (Check the appropriate box and provide explanation and supporting documentation for your answer)	Yes	No
1. Is the proposed project consistent with the existing General Plan and Community Plan land use and zoning designations?;[3] OR, 2. If the proposed project is not consistent with the existing land use plan and zoning designations, does the project include a land use plan and/or zoning designation amendment that would result in an equivalent or less GHG-intensive project when compared to the existing designations?; OR, 3. If the proposed project is not consistent with the existing land use plan and zoning designations, and includes a land use plan and/or zoning designation amendment that would result in an increase in GHG emissions when compared to the existing designations, would the project be located in a Transit Priority Area (TPA) and implement CAP Strategy 3 actions, as determined in Step 3 to the satisfaction of the Development Services Department?	☑	☐

If "***Yes***," proceed to Step 2 of the Checklist. For questions 2 and 3 above, provide estimated project emissions under both existing and proposed designation(s) for comparison. For question 3 above, complete Step 3.

If "***No***," in accordance with the City's Significance Determination Thresholds, the project's GHG impact is significant. The project must nonetheless incorporate each of the measures identified in Step 2 to mitigate cumulative GHG emissions impacts unless the decision maker finds that a measure is infeasible in accordance with CEQA Guidelines Section 15091. Proceed and complete Step 2 of the Checklist.

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[3] This question may also be answered in the affirmative if the project is consistent with SANDAG Series 12 growth projections, which were used to determine the CAP projections, as determined by the Planning Department.

Step 2: CAP Strategies Consistency

The second step of the CAP consistency review is to review and evaluate a project's consistency with the applicable strategies and actions of the CAP. Step 2 only applies to development projects that involve permits that would require a certificate of occupancy from the Building Official or projects comprised of one and two family dwellings or townhouses as defined in the California Residential Code and their accessory structures.[4] All other development projects that would not require a certificate of occupancy from the Building Official shall implement Best Management Practices for construction activities as set forth in the Greenbook (for public projects).

Step 2: CAP Strategies Consistency			
Checklist Item (Check the appropriate box and provide explanation for your answer)	Yes	No	N/A
Strategy 1: Energy & Water Efficient Buildings			
1. *Cool/Green Roofs*. • Would the project include roofing materials with a minimum 3-year aged solar reflection and thermal emittance or solar reflection index equal to or greater than the values specified in the voluntary measures under California Green Building Standards Code (Attachment A)?; OR • Would the project roof construction have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25 pounds per square foot as specified in the voluntary measures under California Green Building Standards Code?; OR • Would the project include a combination of the above two options? Check "N/A" only if the project does not include a roof component.	☑	☐	☐
2. *Plumbing fixtures and fittings* With respect to plumbing fixtures or fittings provided as part of the project, would those low-flow fixtures/appliances be consistent with each of the following: Residential buildings: • Kitchen faucets: maximum flow rate not to exceed 1.5 gallons per minute at 60 psi; • Standard dishwashers: 4.25 gallons per cycle; • Compact dishwashers: 3.5 gallons per cycle; and • Clothes washers: water factor of 6 gallons per cubic feet of drum capacity? Nonresidential buildings: • Plumbing fixtures and fittings that do not exceed the maximum flow rate specified in Table A5.303.2.3.1 (voluntary measures) of the California Green Building Standards Code (See Attachment A); and • Appliances and fixtures for commercial applications that meet the provisions of Section A5.303.3 (voluntary measures) of the California Green Building Standards Code (See Attachment A)? Check "N/A" only if the project does not include any plumbing fixtures or fittings.	☑	☐	☐

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[4] Actions that are not subject to Step 2 would include, for example: 1) discretionary map actions that do not propose specific development, 2) permits allowing wireless communication facilities, 3) special events permits, 4) use permits that do not result in the expansion or enlargement of a building, and 5) non-building infrastructure projects such as roads and pipelines. Because such actions would not result in new occupancy buildings from which GHG emissions reductions could be achieved, the items contained in Step 2 would not be applicable.

Step 2: CAP Strategies Consistency

Checklist Item (Check the appropriate box and provide explanation for your answer)	Yes	No	N/A
Strategy 2: Clean & Renewable Energy			
3. *Energy Performance Standard / Renewable Energy* Is the project designed to have an energy budget that meets the following performance standards when compared to the Title 24, Part 6 Energy Budget for the Proposed Design Building as calculated by Compliance Software certified by the California Energy Commission (percent improvement over current code): • Low-rise residential – 15% improvement? • Nonresidential with indoor lighting OR mechanical systems, but not both – 5% improvement? • Nonresidential with both indoor lighting AND mechanical systems – 10% improvement?[5] The demand reduction may be provided through on-site renewable energy generation, such as solar, or by designing the project to have an energy budget that meets the above-mentioned performance standards, when compared to the Title 24, Part 6 Energy Budget for the Proposed Design Building (percent improvement over current code). Note: For Energy Budget calculations, high-rise residential and hotel/motel buildings are considered non-residential buildings. Check "N/A" only if the project does not contain any residential or non-residential buildings.	☑	☐	☐
Strategy 3: Bicycling, Walking, Transit & Land Use			
4. *Electric Vehicle Charging* • Single-family projects: Would the required parking serving each new single-family residence and each unit of a duplex be constructed with a listed cabinet, box or enclosure connected to a raceway linking the required parking space to the electrical service, to allow for the future installation of electric vehicle supply equipment to provide an electric vehicle charging station for use by the resident? • Multiple-family projects of 10 dwelling units or less: Would 3% of the total parking spaces required, or a minimum of one space, whichever is greater, be provided with a listed cabinet, box or enclosure connected to a conduit linking the parking spaces with the electrical service, in a manner approved by the building and safety official, to allow for the future installation of electric vehicle supply equipment to provide electric vehicle charging stations at such time as it is needed for use by residents? • Multiple-family projects of more than 10 dwelling units: Would 3% of the total parking spaces required, or a minimum of one space, whichever is greater, be provided with a listed cabinet, box or enclosure connected to a conduit linking the parking spaces with the electrical service, in a manner approved by the building and safety official? Of the total listed cabinets, boxes or enclosures provided, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use by residents?	☑	☐	☐

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[5] CALGreen defines mechanical systems as equipment, appliances, fixtures, fittings and/or appurtenances, including ventilating, heating, cooling, air-conditioning and refrigeration systems, incinerators and other energy-related systems.

<table>
<tr><th colspan="4">Step 2: CAP Strategies Consistency</th></tr>
<tr><th>Checklist Item
(Check the appropriate box and provide explanation for your answer)</th><th>Yes</th><th>No</th><th>N/A</th></tr>
<tr><td>

- <u>Non-residential projects</u>: If the project includes new commercial, industrial, or other uses with the building or land area, capacity, or numbers of employees listed in Attachment A, would 3% of the total parking spaces required, or a minimum of one space, whichever is greater, be provided with a listed cabinet, box or enclosure connected to a conduit linking the parking spaces with the electrical service, in a manner approved by the building and safety official? Of the total listed cabinets, boxes or enclosures provided, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use?

Check "N/A" only if the project is does not include new commercial, industrial, or other uses with the building or land area, capacity, or numbers of employees listed in Attachment A.

</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">

Strategy 3: Bicycling, Walking, Transit & Land Use
(Complete this section if project includes non-residential or mixed uses)

</td></tr>
<tr><td>

5. *Bicycle Parking Spaces*

Would the project provide more short- and long-term bicycle parking spaces than required in the City's Municipal Code (Chapter 14, Article 2, Division 5)?[6]

Check "N/A" only if the project is a residential project.

</td><td>☑</td><td>☐</td><td>☐</td></tr>
<tr><td>

6. *Shower facilities*

If the project includes nonresidential development that would accommodate over 10 tenant occupants (employees), would the project include changing/shower facilities in accordance with the voluntary measures under the California Green Building Standards Code as shown in the table below?

<table>
<tr><th>Number of Tenant Occupants (Employees)</th><th>Shower/Changing Facilities Required</th><th>Two-Tier (12" X 15" X 72") Personal Effects Lockers Required</th></tr>
<tr><td>0-10</td><td>0</td><td>0</td></tr>
<tr><td>11-50</td><td>1 shower stall</td><td>2</td></tr>
<tr><td>51-100</td><td>1 shower stall</td><td>3</td></tr>
<tr><td>101-200</td><td>1 shower stall</td><td>4</td></tr>
<tr><td>Over 200</td><td>1 shower stall plus 1 additional shower stall for each 200 additional tenant-occupants</td><td>1 two-tier locker plus 1 two-tier locker for each 50 additional tenant-occupants</td></tr>
</table>

Check "N/A" only if the project is a residential project, or if it does not include nonresidential development that would accommodate over 10 tenant occupants (employees).

</td><td>☑</td><td>☐</td><td>☐</td></tr>
</table>

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[6] Non-portable bicycle corrals within 600 feet of project frontage can be counted towards the project's bicycle parking requirements.

<table>
<tr><th colspan="4">Step 2: CAP Strategies Consistency</th></tr>
<tr><th>Checklist Item
(Check the appropriate box and provide explanation for your answer)</th><th>Yes</th><th>No</th><th>N/A</th></tr>
<tr><td>

7. *Designated Parking Spaces*

If the project includes an employment use in a TPA, would the project provide designated parking for a combination of low-emitting, fuel-efficient, and carpool/vanpool vehicles in accordance with the following table?

<table>
<tr><th>Number of Required Parking Spaces</th><th>Number of Designated Parking Spaces</th></tr>
<tr><td>0-9</td><td>0</td></tr>
<tr><td>10-25</td><td>2</td></tr>
<tr><td>26-50</td><td>4</td></tr>
<tr><td>51-75</td><td>6</td></tr>
<tr><td>76-100</td><td>9</td></tr>
<tr><td>101-150</td><td>11</td></tr>
<tr><td>151-200</td><td>18</td></tr>
<tr><td>201 and over</td><td>At least 10% of total</td></tr>
</table>

This measure does not cover electric vehicles. See Question 4 for electric vehicle parking requirements.

Note: Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces. The required designated parking spaces are to be provided within the overall minimum parking requirement, not in addition to it.

Check "N/A" only if the project is a residential project, or if it does not include an employment use in a TPA.

</td><td>☐</td><td>☐</td><td>☑</td></tr>
<tr><td>

8. *Transportation Demand Management Program*

If the project would accommodate over 50 tenant-occupants (employees), would it include a transportation demand management program that would be applicable to existing tenants and future tenants that includes:

At least one of the following components:

- Parking cash out program
- Parking management plan that includes charging employees market-rate for single-occupancy vehicle parking and providing reserved, discounted, or free spaces for registered carpools or vanpools
- Unbundled parking whereby parking spaces would be leased or sold separately from the rental or purchase fees for the development for the life of the development

And at least three of the following components:

- Commitment to maintaining an employer network in the SANDAG iCommute program and promoting its RideMatcher service to tenants/employees
- On-site carsharing vehicle(s) or bikesharing
- Flexible or alternative work hours
- Telework program
- Transit, carpool, and vanpool subsidies

</td><td>☐</td><td>☐</td><td>☑</td></tr>
</table>

Step 2: CAP Strategies Consistency			
Checklist Item (Check the appropriate box and provide explanation for your answer)	Yes	No	N/A
• Pre-tax deduction for transit or vanpool fares and bicycle commute costs • Access to services that reduce the need to drive, such as cafes, commercial stores, banks, post offices, restaurants, gyms, or childcare, either onsite or within 1,320 feet (1/4 mile) of the structure/use? Check "N/A" only if the project is a residential project or if it would not accommodate over 50 tenant-occupants (employees).			

Step 3: Project CAP Conformance Evaluation (if applicable) NOT APPLICABLE

The third step of the CAP consistency review only applies if Step 1 is answered in the affirmative under option 3. The purpose of this step is to determine whether a project that is located in a TPA but that includes a land use plan and/or zoning designation amendment that would result in an increase in GHG emissions when compared to the existing designations, is nevertheless consistent with the assumptions in the CAP because it would implement CAP Strategy 3 actions. The following questions must each be answered in the affirmative and fully explained.

1. **Would the proposed project implement the General Plan's City of Villages strategy in an identified Transit Priority Area (TPA) that will result in an increase in the capacity for transit-supportive residential and/or employment densities?**

   Considerations for this question:
   - Does the proposed land use and zoning designation associated with the project provide capacity for transit-supportive residential densities within the TPA?
   - Is the project site suitable to accommodate mixed-use village development, as defined in the General Plan, within the TPA?
   - Does the land use and zoning associated with the project increase the capacity for transit-supportive employment intensities within the TPA?

2. **Would the proposed project implement the General Plan's Mobility Element in Transit Priority Areas to increase the use of transit?**

   Considerations for this question:
   - Does the proposed project support/incorporate identified transit routes and stops/stations?
   - Does the project include transit priority measures?

3. **Would the proposed project implement pedestrian improvements in Transit Priority Areas to increase walking opportunities?**

   Considerations for this question:
   - Does the proposed project circulation system provide multiple and direct pedestrian connections and accessibility to local activity centers (such as transit stations, schools, shopping centers, and libraries)?
   - Does the proposed project urban design include features for walkability to promote a transit supportive environment?

4. **Would the proposed project implement the City of San Diego's Bicycle Master Plan to increase bicycling opportunities?**

   Considerations for this question:
   - Does the proposed project circulation system include bicycle improvements consistent with the Bicycle Master Plan?
   - Does the overall project circulation system provide a balanced, multimodal, "complete streets" approach to accommodate mobility needs of all users?

5. **Would the proposed project incorporate implementation mechanisms that support Transit Oriented Development?**

   Considerations for this question:
   - Does the proposed project include new or expanded urban public spaces such as plazas, pocket parks, or urban greens in the TPA?
   - Does the land use and zoning associated with the proposed project increase the potential for jobs within the TPA?
   - Do the zoning/implementing regulations associated with the proposed project support the efficient use of parking through mechanisms such as: shared parking, parking districts, unbundled parking, reduced parking, paid or time-limited parking, etc.?

6. **Would the proposed project implement the Urban Forest Management Plan to increase urban tree canopy coverage?**

   Considerations for this question:
   - Does the proposed project provide at least three different species for the primary, secondary and accent trees in order to accommodate varying parkway widths?
   - Does the proposed project include policies or strategies for preserving existing trees?
   - Does the proposed project incorporate tree planting that will contribute to the City's 20% urban canopy tree coverage goal?

CLIMATE ACTION PLAN CONSISTENCY CHECKLIST
ATTACHMENT A

This attachment provides performance standards for applicable Climate Action Pan (CAP) Consistency Checklist measures.

Table 1 **Roof Design Values for Question 1: Cool/Green Roofs supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan**

Land Use Type	Roof Slope	Minimum 3-Year Aged Solar Reflectance	Thermal Emittance	Solar Reflective Index
Low-Rise Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
High-Rise Residential Buildings, Hotels and Motels	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
Non-Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 residential and non-residential voluntary measures shown in Tables A4.106.5.1 and A5.106.11.2.2, respectively. Roof installation and verification shall occur in accordance with the CALGreen Code.

CALGreen does not include recommended values for low-rise residential buildings with roof slopes of ≤ 2:12 for San Diego's climate zones (7 and 10). Therefore, the values for climate zone 15 that covers Imperial County are adapted here.

Solar Reflectance Index (SRI) equal to or greater than the values specified in this table may be used as an alternative to compliance with the aged solar reflectance values and thermal emittance.

Table 2 **Fixture Flow Rates for Non-Residential Buildings related to Question 2: Plumbing Fixtures and Fittings supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan**

Fixture Type	Maximum Flow Rate
Showerheads	1.8 gpm @ 80 psi
Lavatory Faucets	0.35 gpm @60 psi
Kitchen Faucets	1.6 gpm @ 60 psi
Wash Fountains	1.6 [rim space(in.)/20 gpm @ 60 psi]
Metering Faucets	0.18 gallons/cycle
Metering Faucets for Wash Fountains	0.18 [rim space(in.)/20 gpm @ 60 psi]
Gravity Tank-type Water Closets	1.12 gallons/flush
Flushometer Tank Water Closets	1.12 gallons/flush
Flushometer Valve Water Closets	1.12 gallons/flush
Electromechanical Hydraulic Water Closets	1.12 gallons/flush
Urinals	0.5 gallons/flush

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 non-residential voluntary measures shown in Tables A5.303.2.3.1 and A5.106.11.2.2, respectively. See the California Plumbing Code for definitions of each fixture type.

Where complying faucets are unavailable, aerators rated at 0.35 gpm or other means may be used to achieve reduction.

Acronyms:
gpm = gallons per minute
psi = pounds per square inch (unit of pressure)
in. = inch

Table 3 Standards for Appliances and Fixtures for Commercial Application related to Question 2: Plumbing Fixtures and Fittings supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan

Appliance/Fixture Type	Standard	
Clothes Washers	Maximum Water Factor (WF) that will reduce the use of water by 10 percent below the California Energy Commissions' WF standards for commercial clothes washers located in Title 20 of the *California Code of Regulations.*	
Conveyor-type Dishwashers	0.70 maximum gallons per rack (2.6 L) (High-Temperature)	0.62 maximum gallons per rack (4.4 L) (Chemical)
Door-type Dishwashers	0.95 maximum gallons per rack (3.6 L) (High-Temperature)	1.16 maximum gallons per rack (2.6 L) (Chemical)
Undercounter-type Dishwashers	0.90 maximum gallons per rack (3.4 L) (High-Temperature)	0.98 maximum gallons per rack (3.7 L) (Chemical)
Combination Ovens	Consume no more than 10 gallons per hour (38 L/h) in the full operational mode.	
Commercial Pre-rinse Spray Valves (manufactured on or after January 1, 2006)	Function at equal to or less than 1.6 gallons per minute (0.10 L/s) at 60 psi (414 kPa) and • Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate. • Be equipped with an integral automatic shutoff. • Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gallons per minute (0.08 L/s) or less.	

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 non-residential voluntary measures shown in Section A5.303.3. See the California Plumbing Code for definitions of each appliance/fixture type.

Acronyms:
L = liter
L/h = liters per hour
L/s = liters per second
psi = pounds per square inch (unit of pressure)
kPa = kilopascal (unit of pressure)

Table 4 **Size-based Trigger Levels for Electric Vehicle Charging Requirements for Non-Residential Buildings related to Question 10: Electric Vehicle Charging supporting Strategy 3: Bicycling, Walking, Transit & Land Use of the Climate Action Plan**

Land Use Type	Size-based Trigger Level
Hospital	500 or more beds OR Expansion of a 500+ bed hospital by 20%
College	3,000 or more students OR Expansion of a 3,000+ student college by 20%
Hotels/Motels	500 or more rooms
Industrial, Manufacturing or Processing Plants or Industrial Parks	1,000 or more employees OR 40 acres or more of land area OR 650,000 square feet or more of gross floor area
Office buildings or Office Parks	1,000 or more employees OR 250,000 square feet or more of gross floor area
Shopping centers or Trade Centers	1,000 or more employees OR 500,000 square feet or more of gross floor area
Sports, Entertainment or Recreation Facilities	Accommodate at least 4,000 persons per performance OR Contain 1,500 or more fixed seats
Transit Projects (including, but not limited to, transit stations and park and ride lots).	All

Source: Adapted from the Governor's Office of Planning and Research's (OPR's) Model Building Code for Plug-In Electric Vehicle Charging

ATTACHMENT 2

CARROLL CANYON MIXED USE PROJECT

CAP CONSISTENCY CHECKLIST SUPPORTING DOCUMENTATION

Step 1: Land Use Consistency

2. The project is not consistent with the existing land use plan and zoning designations. The project includes a land use plan and zoning designation amendment that would result in a less GHG-intensive project when compared with the existing designations.

In order to determine if a proposed project would result in less GHG emissions than what could occur under existing land use designation(s), City Development Services Department staff has determined that the existing IP-2-1 zone should be used to evaluate the project's consistency with the GHG emissions identified in the City's Climate Action Plan.

According to the Scripps Miramar Ranch Community Plan, the project site is designated as Industrial Park. The project site is zoned IP-2-1 (Industrial Park), which allows for development in accordance with the Community Plan at a maximum floor area ratio (FAR) of 2.0. Thus, development of the project site under the Industrial Park land use designation can support an allowed development intensity of approximately 800,000 square feet light industrial/business park uses. This development intensity would result in approximately 14,338,517 VMT[1] annually and generation of approximately 11,835 CO_2 equivalent GHG emissions. The project proposes to rezone the project site from IP-2-1 to RM-3-7 (Multifamily Residential) and CC-2-3 (Community Commercial). The project would develop with 260 multi-family residential units and 10,700 square feet of commercial use. This development would result in approximately 3,949,372 VMT annually and approximately 2,174 CO_2 equivalent GHG emissions. The proposed project would generate less GHG emission than would occur if the project site were to develop in accordance with the existing zoning and land use designation. The table below provides a summary of the comparison.

Development	**Vehicle Miles Traveled (VMT)**	**GHG Emissions (CO_2 equivalent GHG emissions)**
Development under Existing Land Use and Zoning	14,338,517[1]	11,835
Proposed Project	3,949,372	2,174

Additionally, development of the project site in accordance with the existing zoning and land use designation would occur as a single, employment-intensive use and would not provide the inherent trip-reducing benefits of a mixed-use project. Industrial park development of the project site would result in greater peak hour trips in both the morning and the afternoon, as employees of the site would arrive at the site during the morning peak-hour commute and leave the project site during the afternoon peak-hour commute. Furthermore, the proposed project would provide housing proximate to transit and nearby services and amenities. The commercial uses proposed by the project are within

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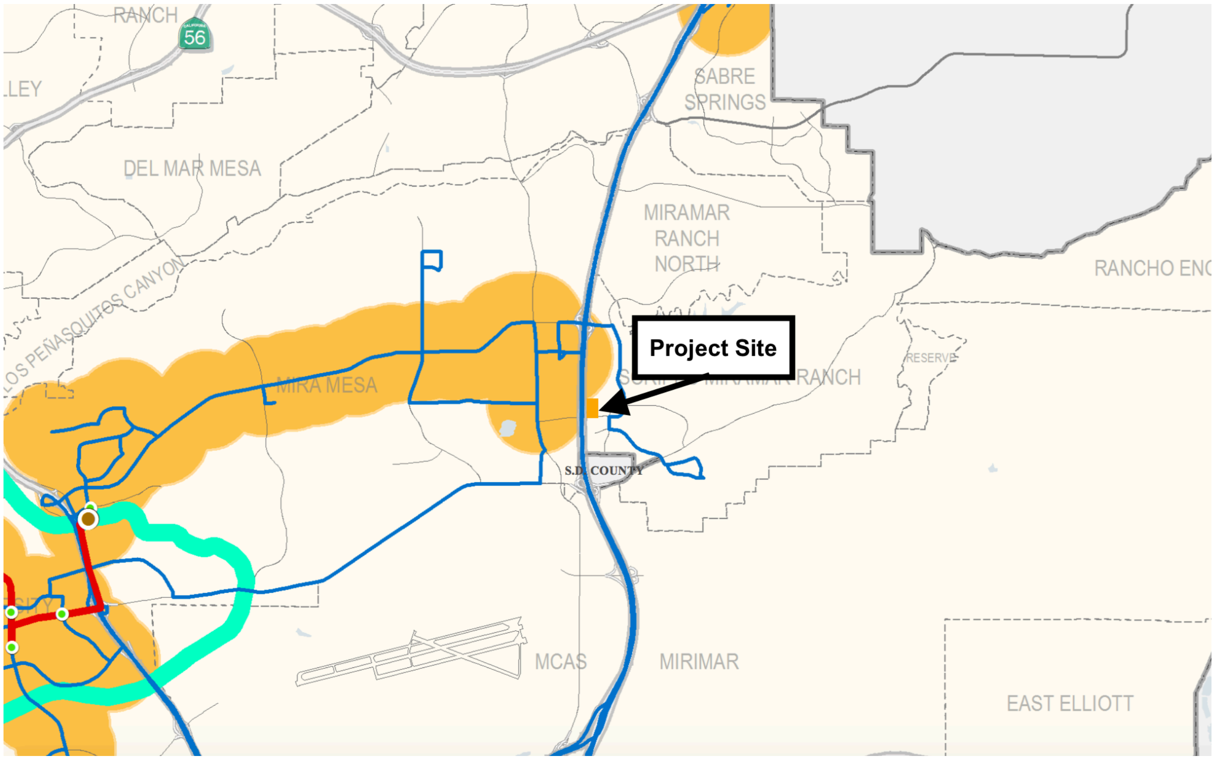
[1] For purposes of the CAP Consistency Checklist Application, development of the project site under the existing zoning and land use designation has been assumed using the City's Commercial Office trip generation rate, which results in 8,132 average daily traffic (ADT). It should be noted that use of the City's trip generation rate for Business Park development of the site at 16 ADT/1,000 square feet of business park space, which could also occur under the existing zoning and land use designation, would generate approximately 12,800 ADT – or roughly 57 percent more traffic and an associated higher VMT and CO_2 equivalent GHG emissions.

walking distance to employment uses in adjacent industrial and business parks, thereby reducing mid-day travel to access restaurants and neighborhood-serving retail uses.

As described above, the proposed project requires rezones and amendment to the Scripps Miramar Ranch Community Plan that would result in a less GHG-intensive project than what is allowed by the existing zoning and land use designations.

The City's Climate Action Plan includes a Transit Priority Area (TPA) Map as Appendix B. Review of the TPA Map shows that the project site lies partially within two TPAs – one located immediately north and one located immediately west on the west side of Interstate 15 – with the majority of the project site not within a TPA. (See Figure 1, *Transit Priority Areas in Relationship to the Project Site*.) Therefore, location of the project site within a TPA does not apply. However, the project site is served by bus route 964 (Alliant University – Camino Ruiz & Capricorn), which has 30-minute peak-hour service connecting to Gold Coast Drive and Black Mountain Road. The bus stop at Gold Coast Drive and Black Mountain Road is the location of the nearest TPA bus stop that serves bus route 20 (Rancho Bernardo Station – Downtown San Diego), with a 15-minute peak-hour service, and bus route 31 (Miramar College Transit Station – UTC Transit Station), with a 30-minute peak-hour service. Residential density at the project location supports surrounding TPAs and the goals of TPAs by providing residents and employees that may utilize area transit. The project site's location, mix of uses, access to transit, and its immediate adjacency to and partially within two TPAs further supports the City's Climate Action Plan.

Figure 1. Transit Priority Areas in Relationship to the Project Site



Step 2: CAP Strategies Consistency

STRATEGY 1: ENERGY & WATER EFFICIENT BUILDINGS

1. **Cool/Green Roofs** – The proposed project includes roofing materials with a minimum 3-year aged solar reflection and thermal emittance or solar reflection index equal to or greater than the values specified in the voluntary measures under the California Green Building Standards Code.

2. **Plumbing fixtures and fittings** –The proposed project shall include the following plumbing fixtures and fittings:

   - Residential buildings shall include the following plumbing fixtures and fittings:
     - Kitchen faucets will not exceed maximum flow rate of 1.5 gallons per minute at 60 psi;
     - Standard dishwashers will not exceed maximum flow rate of 4.25 gallons per cycle;
     - Compact dishwashers will not exceed 3.5 gallons per cycle; and
     - Clothes washers will not exceed a water factor of 6 gallons per cubic feet drum capacity.

   - Nonresidential buildings shall include the following plumbing fixtures and fittings:
     - Plumbing fixtures and fittings will not exceed the maximum flow rate specified in Table A5.303.2.3.1 (voluntary measures) of the California Green Building Standards Code.
     - Appliances and fixtures will meet the provisions of Section A5.303.3 (voluntary measures) of the California Green Building Standards.

STRATEGY 2: CLEAN & RENEWABLE ENERGY

3. **Clean & Renewable Energy** – The project shall comply with the following energy performance standards:

   - Low-rise residential use: 15 percent improvement when compared to Title 24 (2013), Part 6 Energy Budget for Proposed Design Building as calculated by Compliance Software certified by the California Energy Commission.
   - Non-residential with indoor lighting and mechanical systems use: Ten percent improvement when compared to Title 24 (2013), Part 6 Energy Budget for Proposed Design Building as calculated by Compliance Software certified by the California Energy Commission.

STRATEGY 3: BICYCLE, WALKING, TRANSIT & LAND USE

4. **Electric Vehicle Charging** –The proposed project includes a shared parking arrangement between project residential and commercial uses, in the form of 419 gated residential parking spaces and 109 open shared parking spaces. Because the commercial component does not meet the requirements of Attachment A, Table 4, of the City of San Diego CAP Consistency Checklist, the electric vehicle charging component only applies to the residential parking, here determined to be the gated parking of 419 parking spaces, and does not apply to the commercial portions of the project.

    - The project shall provide three percent of the total parking spaces required for residential use (13 spaces) with a listed cabinet, box, or enclosure connected to a conduit linking the parking spaces with the electrical service, in a manner approved by the building and safety official. Of the total listed cabinets, boxes, or enclosures provided, 50 percent (eight spaces) are to have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use by residents.

5. **Bicycle Parking Spaces** – The project shall provide short-term and long-term bicycle parking spaces in excess of those required in the City's Municipal Code (Chapter 14, Article 2, Division 5). The project proposes 68 bicycle parking spaces where 67 are required.

6. **Shower Facilities** – Commercial components of the project that accommodate over ten tenant-occupants (employees) shall include changing/shower facilities in accordance with the voluntary measures in the California Green Building Standards Code.

7. **Designated Parking Spaces** – Ten percent of the total required parking spaces (53 parking spaces) would be designated for use by a combination of low-emitting, fuel-efficient, and carpool/vanpool vehicles would be provided. These parking spaces would be provided within the gated and open parking areas, commiserate with the ratio of parking spaces within these areas.

8. **Transportation Demand Management Program** – Not applicable. The proposed project would not generate over 50 tenant-occupants (employees).

Step 3: Project CAP Conformance Evaluation
NOT REQUIRED.

From: Clint Linton <CJLinton73@aol.com>
Sent: Monday, February 27, 2017 8:05 AM
To: Szymanski, Jeffrey
Subject: Re: Carroll Canyon EIR 240716

Good morning Jeff,

I have reviewed the project for AB52 and the geo report as well. I agree that there is minimal chance of cultural resources or remains on site due to the heavy disturbance from past activities. This is a project that inwouldnt recommend monitoring on. Thank you, clint

Sent from my iPhone

On Feb 21, 2017, at 10:52 AM, Szymanski, Jeffrey <JSzymanski@sandiego.gov> wrote:

> Hi Clint,
>
> I am contacting you in regards to the project we spoke about last week. We received a letter from the Native American Heritage Commission that expressed concerns due to AB 52 consultation and the lack of Archy and Native American monitoring.
>
> In making my determination I considered that the site was not located on the City's Historical Sensitivity map, the lack of recorded resources within the general vicinity, the fact that the site has been previously developed, and the geologic conditions.
>
> If possible could you please review this project and let me know if you think the City should implement measures to address AB 52?
>
> I have attached the geo tech study that has a short project description, site location and also shows that the site in underlain by fill, formation (Lindavista) and then stadium formation. All of which I would not classify as being cultural. Please let me know if you need any additional information.
>
> When you have a chance please let me know.
>
> Thanks,
>
> Jeff
>
> <Appendix G - Soil and Geologic Reconnaissance.pdf>